

**A Comparison of Creative Thinking and Reflective-Impulsive Style in Grade 10  
Male Students from Rural and Urban Saudi Arabia**

**By**

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## DECLARATION

I, Tareq Abdulali Al- Silami, declare that the PhD thesis entitled A Comparison of Creative Thinking and Reflective-Impulsive Style in Grade 10 Male Students from Rural and Urban Saudi Arabia is no more than 100,000 words in length, including quotes and exclusive of tables, figures, appendices, bibliography, references, and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

Signature

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Date: 31/1/2011

### **ABSTRACT**

Creative people are the means for a country to remain competitive, no less so than for Saudi Arabia. The Kingdom has immense natural resources, and this extends to its human capital: exceptional people who are necessary to assist its growth and harness its potential for the 21st century. This growth requires knowledge and skills from all Saudis in order to maintain and advance the country's position in the global community. Consequently, the main aim of this study is to determine the differences between rural and urban Saudi male students in regard to creative thinking and cognitive style. An additional aim is to review the opinions of education professionals (teachers, principals, and supervisors) in regards to the creativity level of students in rural and urban schools and the factors that impact on the creativity of students.

The research for this thesis incorporated a mixed method approach in two separate studies. The first study utilized a quantitative approach and involved the administration of the Torrance Test of Creative Thinking (TTCT) TTCT Figural B and Matching Familiar Figural Test (MFFT) to assess creative thinking and reflective-impulsive style. The sample comprised grade 10 male students at six secondary schools – three from the city of Makkah (120 students) and three from rural locations (120 students), all aged between 15 and 17 years. To evaluate the test response data, multiple analyses of variance (MANOVA) and one-way ANOVA were used. The second study utilized a qualitative approach. This study used semi-structured interviews with a selection of education professionals: including 15 male teachers from the rural setting; 15 male teachers from the urban setting; 5 male supervisors from the Makkah

Department of Education; 6 male principals from rural schools; and 6 male principals from urban schools.

The quantitative findings show that students in urban schools scored higher in the TTCT characteristics than rural students. It also showed urban students were more reflective than the rural students. Further, there is a positive relationship between creative thinking and reflective style. The qualitative research finds that education professionals perceive that the urban environment has a more positive influence on a student's creativity than that offered by the rural environment. Greater maturity and motivation are also factors that influence creative thinking in students. In conclusion, characteristics such as home situation, educational administration practices, school location, and teacher experience level play important roles in facilitating students to be creative. Overall, the Saudi system of education should allocate substantially more resources to rural schools to improve opportunities for the students in these schools to achieve their creative potential.

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**DEDICATION**

This thesis is dedicated to my beloved parents, wife, and children.

## TABLE OF CONTENTS

DECLARATION.....	II
ABSTRACT .....	III
ACKNOWLEDGEMENTS .....	V
DEDICATION .....	VI
TABLE OF CONTENTS .....	VII
LIST OF TABLES .....	XII
LIST OF FIGURES .....	XIV
LIST OF APPENDIXES .....	XV
CHAPTER 1: INTRODUCTION.....	1
1.1 Purpose of the Research .....	6
1.2 Research Aims.....	6
1.3 Research Questions .....	7
1.4 Contribution to Knowledge .....	8
1.5 Organisation of the thesis .....	9
1.6 Summary.....	11
CHAPTER 2: LITERATURE REVIEW.....	12
2.1 Introduction .....	12
2.2 Creative Thinking Dimensions.....	13
2.2.1 Conceptualising Creative Thinking.....	14
2.2.2 Theorists in Creative Thinking.....	19
2.2.3 Approaches to Creative Thinking Research .....	26
2.2.4 Influencing Factors .....	33
2.2.4 Measurement .....	54
2.3 Cognitive Style .....	58
2.3.1 Definitions .....	59
2.3.2 Classification of Cognitive Strategies .....	61
2.3.3 Reflective-impulsive Style .....	67
2.3.4 Reflective-impulsive Style and Creativity.....	70
2.4 Teaching Creativity .....	72
2.4.1 Influences .....	73

2.4.2 Classroom Motivators .....	74
2.4.3 Teaching Styles .....	76
2.5 Summary.....	78
CHAPTER 3: PEDAGOGY AND CREATIVE THINKING IN SAUDI ARABIA .....	82
3.1 Introduction .....	82
3.2 Profile of Saudi Arabia.....	83
3.2.1 Geography .....	83
3.2.2 History .....	85
3.2.3 Government and People.....	86
3.2.4 Economy .....	88
3.3 Development of Education .....	90
3.3.1 Education Prior to Unification.....	91
3.3.2 Evolution of the Education System .....	93
3.3.3 Budget Allocation.....	101
3.4 Education Policy and Practice .....	103
3.4.1 Principles and Outcomes .....	103
3.4.2 Secondary School Charter .....	105
3.4.3 Secondary School Gender Comparison.....	107
3.4.4 Inputs and Outcomes .....	112
3.5 Comparison of Rural and Urban Environments .....	117
3.5.1 Social Profile .....	118
3.5.2 Rural education.....	120
3.6 Creative Thinking Policies .....	124
3.6.1 Creative thinking Programs.....	125
3.6.2 National Outcomes .....	131
3.7 Summary.....	135
CHAPTER 4: QUANTITATIVE STUDY .....	138
4.1 Introduction .....	138
4.2 Research Method .....	140
4.2.1 Sampling.....	140
4.2.1.1 Participants .....	140
4.2.2 Measures .....	142
4.2.2.1 Instruments. ....	142



4.2.2.2 Reliability and Validation.....	145
4.2.3 Procedures .....	150
4.2.3.1 Data collection.....	150
4.2.3.2 Data analysis.....	151
4.3 Result.....	153
4.3.1 Descriptive statistics: Participants Students and Schools.....	153
4.3.1.1 TTCT abilities, MFFT Status and School Region.....	155
4.3.1.2 TTCT and individual school.....	159
4.3.2 MANOVA results for TTCT, cognitive style, and school region .....	167
4.3.3 MANOVA results for creative abilities for each individual school .....	173
4.4 Discussion.....	180
4.4.1 Creative Thinking and MFFT Status .....	180
4.4.1.1 Creative Thinking and the School Region.....	181
4.4.1.2 MFFT Status and School Region .....	183
4.4.1.3 Creative Thinking and Reflective-Impulsive Style .....	183
4.4.2 Individual Schools and Creativity .....	185
4.5 Summary.....	186
CHAPTER 5 QUALITATIVE STUDY .....	188
5.1 Introduction .....	188
5.2 Research Method .....	190
5.2.1 Sampling.....	190
5.2.2 Measures.....	195
5.2.2.1 Interviews. ....	195
5.2.3 Procedures .....	197
5.2.3.1 Data collection.....	197
5.2.3.2 Data analysis.....	198
5.2.3.3 Research questions .....	198
5.3 Results .....	199
5.3.1 Supervisor Respondents .....	199
5.3.2 Principal Respondents .....	209
5.3.3 Teacher Respondents.....	219
5.4 General Findings .....	235
5.4.1 Factors of Group Accord .....	235

5.4.1.1 Definition of Creativity .....	235
5.4.1.2 The Home Environment .....	236
5.4.1.3 The Teachers' role.....	236
5.4.1.4 The School Environment.....	237
5.4.1.5 Motivation .....	238
5.4.1.6 Age .....	238
5.4.1.7 Creativity Linked to Impulsive or Reflective Style.....	238
5.4.2 Factors of Group Discord .....	239
5.4.2.1 School Performance.....	239
5.4.2.2 Resources.....	239
5.5 Discussion.....	240
5.5.1 The home Environment .....	240
5.5.2 The School Environment .....	242
5.5.3 The Motivation of Students .....	245
5.5.4 The relationship between Age and Creative Thinking .....	245
5.5.5 The relationship between Reflective-Impulsive Style and Creative Thinking.....	245
5.6 Summary.....	247
CHAPTER 6 GENERAL DISCUSSION.....	249
6.1 Introduction .....	249
6.2 Research Overview .....	250
6.2.1 Research Methodology .....	250
6.2.2 Quantitative Research Findings.....	252
6.2.3 Qualitative research Findings .....	255
6.2.4 Summary.....	257
6.3 Creative Thinking in Saudi Students.....	259
6.3.1 Fostering Creative Thinking.....	259
6.3.2 Theorists on Creative Thinking .....	260
6.3.3 Cultural Influences on Creative Thinking .....	263
6.3.4 The Influence of Age on Creative Thinking.....	265
6.4 Reflective-Impulsive Style in Saudi Arabia .....	267
6.4.1 Reflective-Impulsive Style and Culture .....	267
6.4.2 Reflective-Impulsive style and Creative Thinking in Saudi Arabia.....	268
6.5 Nurturing Creative Thinking .....	269

6.5.1 Parental Influence .....	269
6.5.2 School Resources.....	270
6.5.3 Teachers.....	272
6.5.4. Rural and Urban comparison.....	275
6.5.5 Motivation .....	276
6.6 Summary.....	279
CHAPTER 7 SUMMARY AND RECOMMENDATIONS .....	282
7.1 Summary of Thesis.....	283
7.2 Strengths of the Study .....	287
7.3 Limitations of the Study .....	288
7.4 Conclusions .....	289
7.5 Recommendations .....	295
7.5.1 Recommendations for theory .....	295
7.5.2 Recommendations for educational practice .....	296
7.5.3 Recommendations for Saudi education .....	297
7.5.3.1 Ministry of Higher Education.....	298
7.5.3.2 Ministry of Education.....	298
7.6 Future Research .....	299
REFERENCES .....	301
APPENDIXES.....	368

## LIST OF TABLES

Table 2.1: Critical/ Creative dichotomy. ....	24
Table 2.2: Descriptions of cognitive style dimensions.....	64
Table 3.1: OPEC Values of Petroleum exports, 2004 to 2008 (\$US m.) .....	89
Table 3.2: Establishment of public schools, by emirate .....	95
Table 3.3: GCC school student numbers: 1990, 2000, and 2015 (projected).....	98
Table 3.4: Budget allocation for education, 1969 to 2005. ....	101
Table 3.5: Secondary education statistics for boys, 1953 to2006 .....	107
Table 3.6: Secondary education statistics for girls, 1963 to 2006.....	108
Table 3.7: Boys’ secondary schools study plan.....	110
Table 3.8: Girls’ secondary schools study plan.....	111
Table 3.9: Educational institutions, 1991 and 2005 .....	114
Table 4.1: Test-retest reliability Coefficients of the TTCT Figural Form B for raw scores. ....	146
Table 4.2: Test-retest reliability Coefficients of the TTCT Figural Form B for standard scores. ....	147
Table 4.3: Correlation between TTCT abilities.....	148
Table 4.4: Mean Latency and Accuracy in the Four Groups.....	154
Table 4.5: Descriptive analysis: MFFT category means, TTCT subscale & location..	162
Table 4.6: Descriptive analysis: TTCT subscale and individual school. ....	166
Table 4.7: ANOVA: Status MFFT and school region.....	170
Table 4.8: Post-hoc test for schools: Contrast MFFT category and TTCT subscale . .	171
Table 4.9: ANOVA: Creative abilities and individual schools. ....	173
Table 4.10: Post-hoc test: Contrast individual school and TTCT subscale.....	174

Table 4.11: Post-hoc test: Contrast individual school and creativity index. ....	179
Table 5.1: Distribution of Teachers and Principals participating. ....	192
Table 5. 2: Respondent teachers' age groups. ....	192
Table 5.3: Teaching experience of teacher respondents. ....	193
Table 5.4: Characteristics of respondent principals. ....	194
Table 5.5: Characteristics of respondent supervisors. ....	195
Table 5.6: Supervisor participants: key themes. ....	207
Table 5.7: Principal participants: key themes. ....	217
Table 5.8: Teacher participants: key themes. ....	232

## LIST OF FIGURES

Figure 2.1: Lipman's three 'thinking' structures.....	20
Figure 2.2: Whole brain model.....	27
Figure 2.3: Model of motivation, personality traits and creativity.....	34
Figure 2.4: Relationship between intellectual growth and age.....	51
Figure 2.5: Matching Familiar Figures Test: Scoring. ....	68
Figure 3.1: Map of Saudi Arabia. ....	85
Figure 3.2: Structure of Ministry of Education, 2006. ....	100
Figure 4.1: School region and MFFT category: Originality.....	168
Figure 4.2: School region and MFFT category: Elaboration.....	168
Figure 4.3: School region and MFFT category: Abstractness of title. ....	168
Figure 4.4: School region and MFFT category: Fluency. ....	169
Figure 4.5: School region and MFFT category: Resistance to closure. ....	169
Figure 4.6: School region and MFFT category: Creativity index. ....	172
Figure 4.7: Individual schools: Means for originality.. ....	175
Figure 4.8: Individual schools: Means for elaboration.....	175
Figure 4.9: Individual schools: Means for abstractness of title.....	176
Figure 4.10: Individual schools: Means for fluency.....	176
Figure 4.11: Individual schools: Means for resistance to closure. ....	177
Figure 4.12: Individual schools: Means for creativity index.....	178

## LIST OF APPENDIXES

Appendix A: Torrance Test of Creative Thinking Figural B .....	368
Appendix B: Translation of Torrance Test of Creative Thinking Figural B .....	376
Appendix C: Matching Familiar Figure Test .....	384
Appendix D: Translation of Matching Familiar Figure Test.....	387
Appendix E: Interviews.....	434
Appendix F: The interview responses .....	439
Appendix G: Letter to the Director of the Educational Department in Makkah area.....	468
Appendix H: Translation of appendix G .....	470
Appendix I: Approval of Victoria University Human Ethics Committee for collecting the data.....	472
Appendix J: MEMO to the secondary schools in Makkah area .....	474
Appendix K: Translation of appendix J.....	476
Appendix L: MEMO to the supervisors in the Educational Department in Makkah ...	478
Appendix M: Translation of appendix L .....	480
Appendix N: Information and consent forms for students' participants .....	482
Appendix O: Information and consent forms for educators' participants .....	486
Appendix P: Data collection processes .....	491

## **CHAPTER 1: INTRODUCTION**

Creative thinking is an elusive concept, yet it constitutes an important facet of daily life. Whilst procedures and resources are the foundations of successful task or project completion, outcomes can be enhanced by lateral or creative thinking that extends the nature of the project and leads to improved productivity. Conceptually, creative thinking alludes to Barron (1969), who emphasises the core concepts of originality and meaningfulness that form the genesis of the definitions and models that proliferated over time. The question is therefore whether creativity as a human value is innate, or must it be learned. If it is innate, then creativity's positive attributes should be encouraged; if imagination is a skill to be learned, then again, there must be a curriculum for students to master. Following this argument, a number of scholars assert that creative thinking has an important role in the curriculum (Cropley, 2001; Guilford, 1968; Sternberg, 1999; Vong, 2008). The challenge is therefore to define creativity, measure it, analyse its effects on children in urban and rural areas, and extrapolate these results into findings to assist in creative pedagogy.

Creative thinking can be described as a series of dimensions or attributes of an individual's ability to produce valuable ideas, or novel and workable tasks, or a unique talent, or to use imagination (Amabile, 1996; Ausubel, 1963; Boden, 2001; Lubart, 1994; National Advisory Committee on Creative and Cultural Education, UK (NACCCE), 1999; Onda, 1994a; Rogers, 1954; Zabelina & Robinson, 2010). There is substantial literature on creative thinking, with the early theorists being Guilford and Torrance (Sternberg, 2006a). Building on Guilford's work, Torrance developed the



Torrance Test of Creative Thinking (TTCT) in the 1960s as a measure of divergent thinking which is predictive of creativity, and the foremost extant test was revised several times, the last being in 1998. 'TTCT appears to be a measure, not only for identifying and educating the gifted, but also for discovering and encouraging everyday life creativity in the general population' (Kim, 2006, p.11). The Torrance test comprises two verbal forms, termed A and B; and two figural forms, also A and B (AL Zyoudi, 2009; Rudowicz, Lok, & Kitto, 1995). This thesis utilises the TTCT figural form B as this form removes possible bias from the verbal tests that require a particular language and is deemed the most appropriate for Saudi children, who are the intended population sample.

Cognitive styles can be described as broad dispositions and higher order meta-strategies that assist individuals to make sense and interact with their environments (Al Soulami, 2004; Miller, 1987). Definitions of cognitive style cover a considerable area and link with personality, although style is independent of personality (Riding & Rayner, 1998; Riding, 2000). However, cognitive style is not static: a person's thinking can change depending on their social learning and situational factors (Adams, 2001; Loomis & Saltz, 1984; Price, 2004; Sadler-Smith & Badger, 1998). For example, cognitive style test results can be affected by examination conditions and in this manner individual differences affect learning and achievement (Gregorc, 1982; Hill, 1978; Williams & Anshel, 2000).

When students solve problems, Kagan, Rosman, Day, Albert, and Philips (1964) posit that impulsive children make quick decisions, with more errors, while reflective children take longer to make decisions, and make fewer errors. Kagan et al. term this set

of individual differences the Reflective-Impulsive (RI) dimension (Finch, Spirito & Brophy, 1982). Kagan et al. developed the Matching Familiar Figures Test (MFFT) to measure the RI cognitive style (Kenny, 2009; Rozenzweig & Corroyer, 2005). Using a variety of cultures in their assessments, the researchers focused on cognitive style and a broad set of associated variables such as culture, intelligence, academic achievement and environment, and flexibility in mental processes (Kubes, 1998; Loomis & Saltz, 1984; Riding & Pearson, 1994; Russo et al., 2001; Spinella & Miley, 2003; Sternberg, 1995). Referring to individual characteristics, that is, the holistic-analytic dimension or the verbal-imagery dimensions that are used to organise information, cognitive style appears to have a crucial role in fostering individual versatility and creativity.

Research findings show a relationship between creative thinking and cognitive style. For instance, Groborz and Necka (2003) found a relationship between generative and evaluation skills; whilst Noppe (1996) stated that a cognitive-styles approach offers a compelling and potentially fruitful framework for understanding creativity. There are a multitude of reasons why this relationship is crucial. Firstly, it embodies the connection between understanding, intelligence, and personality, which is very important for creative thinking. Secondly, it may be helpful to interpret the functioning of individual creative thinking in terms of processing information and the neuro-physiological underpinning of cognitive style factors (Frare, 1986).

For the methodology of this study of creative thinking and reflective-impulsive style in grade 10 male students from rural and urban Saudi Arabia, the suggestion of Onwuegbuzie and Teddlie (2003) to combine methods (quantitative and qualitative) support the methodological integrity of the study; also this enables the researcher obtain

more information in regard to the study. This study therefore, will adapt this methodology to work towards highlighting a strong connection between quantitative data related to student skills and qualitative data generated from those education professionals who have an understanding of these skills. The quantitative analysis for this study therefore comprises testing rural and urban students using the TTCT and MFFT to measure creativity and RI, then categorising and comparing the results. The student participants in the study were selected from Grade 10 and are approximately 16 years of age. This decision was underpinned by Piaget's developmental theory of 1972, which states that the formal operational (abstract thinking) stage starts around 12 years of age at early high school level, and creative thinking is at its strongest at 16 years (Moses & Baldwin, 2005; Smith & Carlsson, 1983). An individual's RI style is also influenced by age; researchers find that students at high school score higher on the MFFT than primary school students (Drake, 1970; Frare, 1986). Given the decade-long concerns raised by creativity scholars about the potential for creativity to be suppressed in schools and classrooms (with E.P. Torrance being one of the most vocal), exploring creative thinking among students in middle to secondary school grades is an important area of enquiry. This quantitative approach is then informed by qualitative research, using interviews with the students' teachers and principals, and education supervisors of the schools to assess their perceptions regarding the theories of creative thinking and cognitive style, as well as their views on the students' environments and behaviour.

This research is undertaken on a premise that there are differences in creative thinking between the groups and that this difference is to the detriment of the rural students (Shutiva, 1991). In part, this is relates to the Saudi emirate system, where outlying Bedouins resist integration with urban society and prefer the existing level of

decentralisation and their semi-nomadic lifestyle, which places strain on the resources of small schools. The rural population can thus be affected by inadequate infrastructure and educator training in rural schools, where there are inadequate buildings, teachers, and equipment to meet the students' needs (Al-Issa, 2005, Hamed et al., 2007). Craft (2005) also notes issues for engendering creative thinking that relate to the curricula; the teachers' flexibility, including time, to encourage creative thinking; and the inherent tensions between teaching for creativity, and learning to think creatively. Thus the focus of this study is to assess individual creativity and RI styles in rural male students, comparing these samples with other samples from their urban counterparts to measure and analyse their creative thinking responses, a distinction not included in previous studies (Al Soulami, 2004; Al-Suleiman, 1998).

This introductory chapter presents the framework of the empirical thesis, that is a comparison of 'creative thinking' and 'cognitive style' (reflective–impulsive) in a select sample of grade 10 male students in rural and urban Saudi Arabia schools. It commences with an account of the conceptualisation and evolution of creative thinking, and the linkages from a number of research findings between cognition and creative thinking that have been formed over the last half-century. This is followed by the structural features of the study; the purpose of the research, first in its aim to understand the nature of this relationship in a study of grade 10 male students in Makkah, Saudi Arabia; and second, to explore any differences in test results between the pupils in urban and rural schools. The next part of the chapter devolves the purpose of the study into research aims and a set of research questions. The contribution to the body of knowledge is then explained, and the chapter is concluded with an outline of how the thesis has been organised.

### **1.1 Purpose of the Research**

The purpose of this research is to use creativity as a theoretical framework to explore differences between traditionalist schooling in rural areas around Makkah, Saudi Arabia, and that within the city itself. Whilst there is little empirical research on this topic, there are comprehensive findings linking a range of creativity attributes to positive scholastic outcomes (Brown, 1989; Fan & Zhang, 2009). This current research comprehensively examines differences in creative thinking abilities between students in rural and in urban schools; and the views of the school educators on creativity characteristics and standards. Whilst the primary purpose is to offer further research to add to the body of knowledge, there is also the opportunity to find evidence connecting the level of rural scholastic achievement in Saudi Arabia with the resources available to rural children elsewhere.

There is another point regarding the scope of this study. In Saudi Arabia, religious and cultural considerations separate schools according to gender, and prohibit male access to girls' schools. Therefore, the current study is limited to male secondary students in grade 10 in six Saudi public rural and urban schools.

### **1.2 Research Aims**

The research aims are to use theories of creative thinking and cognitive style to determine whether any differences in these linkages can be identified between urban and rural school children. Saudi Arabia is an emerging economy and it has achieved remarkable progress over the last few decades. However, until recently, the majority of this progress was concentrated in urban areas. There also exists a rural reluctance

towards rapid change; however, there is a greater acceptance in the city where change is better understood. Through measurement and comparison of creativity in students about to emerge into the Saudi job market the impact of these factors may emerge. To meet the pace of global change and skills and knowledge of the labour market, employees will increasingly need to be creative, innovative, and adaptable, and have advanced communication and social skills; however, United Nations Educational, Scientific and Cultural Organisation (UNESCO)( 2005) states that these abilities and skills are generally not provided in schools. “Education reforms must, therefore, consider ways of incorporating the skills and abilities that will be required” (UNESCO, 2005, p.2). In this case, any variations between rural and urban graduates will impinge on their varying attitudes to tertiary education and adaptability in the global economy, where Saudi Arabia is taking a greater role.

The aim of this thesis is thus to explore contributing factors in nurturing a more open attitude in students, and use these findings to add to theory and also assist the education authorities to adjust resources and curricula, if required. Finally, these findings and conclusions, whilst of local importance, also serve toward assisting researchers and authorities in similar environments, particularly Arabic, where there is discordance between urban and rural outcomes from these tests.

### **1.3 Research Questions**

The research questions of this thesis concern the postulated differences between students in urban areas and regional areas in Saudi Arabia. The primary question is the effect of the rural environment on the creativity of these students compared to the

greater range of influences and stimuli of the urban environment of city students. This thesis was guided by the following questions.

1. determine and analyse results from students using the creativity test TTCT figure B, and the RI test MFFT. Sub-questions therefore are to analyse the results and make a series of comparisons: against the mean, by urban and rural, and by school;
2. determine and analyse the responses of interview participants, that is principals, supervisors, and teachers, regarding the standard of creativity of their students, and the factors that they envisage as impinging on the levels of creativity, and the reflective-impulsive test results.

#### **1.4 Contribution to Knowledge**

This research contributes to the theory of creativity and extends prior research findings through seeking evidence from a deeper cultural perspective, that is, comparison of creativity between urban and rural Saudi students, and its relationship to cognitive styles. The study fosters creativity, which ‘is crucial for the knowledge economy; it is essential that education serves its purpose in improving this important aspect’ (Horng, Hong, ChanLin, Chang, & Chu, 2005). There are extant studies examining the relationship between RI and creative thinking (Aronoff, 1980; Schmidt & Sinor, 1983); however, there is no study comparing rural and urban students in RI cognitive style and creative thinking in Saudi society. This research seeks to address these dimensions and thus add to the body of knowledge.

The knowledge gained from this research will add to the literature, extending the findings for empirical studies on creative thinking further, into the experiences of developing nations. As a corollary, this thesis also identifies students classified as impulsive in MFFT in rural or urban schools as well as seeking out differences between rural and urban students in relation to RI and creative thinking. These findings will assist with the design and provision of suitable educational programs and open the field to researchers to explore further outcomes of this research.

The knowledge gained in this research will help provide additional information to teachers working with male students in rural and urban settings with regard to supporting and developing the creative thinking skills of students within the Saudi education system.

A further goal is to discover the students who are classified as impulsive in their cognitive style. This information will serve to provide improved education programs and open the field to researchers to better understand cognitive processing patterns. Another goal is to learn more about the differences between groups of rural and urban students in relation to RI and creative thinking and to consider why these differences exist.

### **1.5 Organisation of the thesis**

This thesis is presented in seven chapters. The first chapter introduces the purpose of the research and the significance of the study; it also sets out the research questions, research aims, and contribution of the study.



The second chapter reviews the literature on creative thinking and the RI style for students in rural and urban schools. It examines the work of several theorists and the various models that have been postulated and tested, factors related to creative thinking, the measurement of creativity and the variations attributable to rural and urban areas in Saudi Arabia. Next, education styles dictated by the environment are presented, together with teaching creativity. A brief survey of the literature on cognitive style completes the chapter.

Chapter 3 is an overview of school education in Saudi Arabia. It includes a profile of Saudi Arabia as a country, a description of the educational system prior to and during the Saudi regime, and the current education policy. Also, this chapter focuses on educational policy, the types of education in Saudi Arabia, current teaching and learning practices in secondary schools, and the education challenges for the country. The final section considers creative thinking policy and practices that the government has in place, the means by which creative thinking in students is identified and nurtured.

Chapter 4 presents the quantitative research relating to the TTCT and MFFT tests which were delivered to a sample of grade 10 students at selected boys' schools around Makkah and its environs. The data from these test results were used as the quantitative part of this study, and the analysis undertaken is based on the research questions. The chapter explains sample selection, testing procedures, and the collection of data. As noted, descriptive and inferential statistics were employed to analyse the TTCT with the MFFT for the rural and urban schools. The fifth chapter presents the qualitative research. This chapter again describes the sample selection, the interviewing technique, the questions and the responses. The data from all of the student participants,

the teachers, principals, and supervisors is then transcribed, translated, and subjected to factor analysis.

The sixth chapter comprises the discussion of the findings for both the quantitative and qualitative forms of research, the conclusions drawn, and the outcomes compared with the literature. The final chapter summarises the thesis and presents the review limitations and advantages of the research, together with discussion on the theoretical constructs employed and recommendations for the Saudi Arabian Ministry of Education to consider. Suggestions for future research complete the thesis.

## **1.6 Summary**

This introductory chapter describes the background to the study and briefly considers the literature relating to the analytical models referenced. It then describes the primary research, noting the purpose, aims, questions and methodology for the study, and explains the contribution to knowledge expected from this thesis. The planned framework of the thesis is also outlined.

The following chapter researches the literature surveyed to consider the theories and explanations conceptualising creative thinking and examines the antecedents of the two tests, the TTCT and the MFFT. Chapter 2 considers the teaching methods that elicit creative thinking and explains the rationale for using the tests and their contribution to this thesis.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

The aim of this literature review is to discuss the elements of creative thinking which lead to a conceptualisation of the phenomenon. This chapter is essentially an examination of the work of scholars who seek to define creative thinking from their varying perspectives and disciplines; the theoretical constructs that have been postulated, tested and refined over time; and the means of measurement for creative thinking and methods of data collection under those models. A similar process is undertaken for cognitive development. The examination of the evidence presented from the various studies will also be considered and will serve to provide a design framework for this research.

This review centres on the literature relating to the research question, which is to determine and analyse results from students using the creativity test TTCT figure B, and the RI test MFFT. The first sub-question supporting this primary focus relates to analysing the results of these tests to make a series of comparisons: against the mean, by urban and rural location, and by school. The second sub-question is to collect data from education professionals, principals, supervisors, and teachers regarding the standard of creative thinking they perceive in the students, and factors that they envisage as impinging on the level of creativity and the reflective-impulsive test results.

The overall aim of the literature review is to discuss the role of the definitions and theories of creative thinking examined in the context of the underlying purposes of

the data collection. The examination of the evidence presented from the various studies is also considered and serves to provide a design framework for this research.

To determine the theoretical framework for the study and explore contributing research, this chapter is presented as follows. First are the domains and theories and models for creative thinking and creativity, based on varying contemporary thought, descriptions of creative thinking, and the theories and models extracted from a psychological focus. Approaches to creative thinking through differing disciplines are then presented, followed by factors related to creative thinking, including motivation and social environment.

The second part of the chapter presents definitions and classifications of cognitive style; and the relationship between cognitive style and environment, and also creative thinking. This part has definitions of reflective-impulsive style, and discusses these and creative thinking. The third part of the chapter considers the role of teachers in creative thinking and this concept within the teaching experience. These concepts are investigated and discussed within the parameters for this study toward a better understanding of creativity.

## **2.2 Creative Thinking Dimensions**

The systematic investigation of creativity is described by Getzels (1987) as occurring in three overlapping periods. Each period has a dominating but not exclusive paradigm, starting with genius, then giftedness, then originality. A ‘breakaway’ definition for creativity is termed cognitive style, and has its origin on the work on perception and filtering mechanisms that differ between individuals (Willerman, 1979). According to Plucker, Beghetto, and Dow (2004), creativity appears as an important

element of cognitive abilities including problem-solving, social and emotional well-being, and career success. However, the stereotypes that obscure creativity are caused by inadequate definition.

Within these parameters, this section considers dimensions and concepts for creative thinking, models, and theoretical constructs of creativity. It includes a discussion on the characterisation and dimensions for creative thinking over time, the theorists' pathways and the development of models of creative thinking that have emerged. Next, the theoretical approaches of creative thinking are presented; followed by influencing factors, and the selected measurement model, the TTCT.

### **2.2.1 Conceptualising Creative Thinking**

There is a plethora of definitions used to describe creative thinking and there is little agreement among researchers. The Oxford English Etymology describes creativity as derived from the Latin *creatus*: “to bring forth, produce, and cause to grow” (Boon, 1997, p.1). The following summary of extant opinion on the nature of creativity includes an introduction, then concepts are presented as the outcomes or products of creativity, creativity as perception or a psychological trait, and finally creative thinking for students.

Striking advances in human affairs, such as in the creative arts, political and military leadership, and scientific discovery and invention were mainly due to a few exceptionally creatively gifted individuals (Weyl, 1970). However, there is a large division between feats of creativity that can change society (termed Big-C) and the daily exercise of creative solutions to problems or conceptual insights (little-c) (Beghetto & Kaufman 2007). This was later extended by the authors to encompass a four-way

version of creativity to improve issues of definition. The revised model encompasses “Big-C” for eminent insights; “little-c” for everyday creativity; “mini-c,” creativity inherent in the learning process; and “Pro-c”, the developmental progression represents professionalism in any creative area (Kaufman & Beghetto 2009). Meaningfulness is inherent in creative thinking; without connectivity to a problem or a concept for a meaningful outcome, a creative notion is without focus (Finke, Ward, & Smith, 1992).

As an early researcher, Barron (1969) assisted in bringing the field of creativity into focus, significantly changing research pathways on exceptionality, purpose and process. Creativity should be regarded in day-to-day terms, contributing to a person’s wellbeing and that of society, with “creativity as a source of beauty, awe, and openness to greater meaning” (Richards 2006, p.352). Barron emphasises the core concepts of originality and meaningfulness that form the genesis of the definitions and models that proliferated over time. Barron and Harrington (1981) also consider creativity as a measure of traditional intelligence, perceived intelligence, and divergent thinking abilities. Torrance (1974) adds to these criteria with a procedural definition:

a process of becoming sensitive to problems, deficiencies, gaps in knowledge . .  
 . identifying the difficulty; searching for solutions, making guesses, or  
 formulating hypotheses about the deficiencies: testing and retesting these  
 hypotheses . . . and finally communicating the results (p.4).

These are the parameters of definition accepted for this thesis. As Mumford (2003) states: “we seem to have reached a general agreement that creativity involves the production of novel, useful products” (p. 110).

Later, Boden (2001) defines creative thinking as “(the) ability to come up with new ideas that are surprising yet intelligible, and also valuable in some way” (p. 95). Creative thinking occurs on many levels: individually, as a group and as an organisation (Puccio & Murdock, 2001). Cropley (2001) takes this notion further, suggesting that rapid change in global communities requires greater creative thinking, endorsing an earlier position by Rogers (1957). In addition, Torrance (1965) believes that creative thinking is important in most areas of life such as mental health and educational achievement. Al Souлами (2004) adds that creative thinking is important in all fields of endeavour, and creativity displays the following elements: motivation, environment, personal characteristics (for example, reflective-impulsive style), and practice. To this list, Sternberg (2006a) adds abilities of intellectual, knowledge, and styles of thinking. School children have long been of interest to creativity researchers, and there are findings of a strong relationship between students' creative thinking and academic achievement, particularly in mathematics (Feldman, 1998; Onda, 1994b; Sternberg, 1999). Creativity is valued in all societies, and designers of gifted scholastic programs consider it an important dimension of giftedness; an example is the Georgia Department of Education in the United States (1998).

Several researchers describe a series of dimensions or attributes for creativity: ability to produce valuable ideas, or novel, workable tasks, or a unique talent; use of imagination (Amabile, 1996; Ausubel, 1963; Boden, 2001; Lubart, 1994; NACCCE, 1999; Onda, 1994a; Rogers, 1954). Amabile notes that the “task” of creativity is heuristic rather than algorithmic. Cook (1998) holds creativity as vital in achieving excellence; however, the nature of creativity varies depending on the context; painting, design, or even business success. Rogers (1957/1954) declares creativity is conditional

upon an individual's openness to experience, internal locus of evaluation, and an ability to manipulate elements and concept.

Creative thinking is characterised by Haefele (1962) as "the ability to formulate new combinations from two or more concepts already in the mind" (p.5). Morgan (cited in Taylor & Getzels, 1975) describes creative thinking as "the power of the human mind to create new content - transferring relations and thereby generating new 'correlates' - extends its sphere not only to representation in ideas, but also to fully sensuous presentation" (p.2). Anderson (1980) adopts a similar position and Cropley (1999) draws in the notion of risk taking as a non-intellectual entity in the creative cycle.

In 1926, Wallas speculated that creativity occurred in four stages; incubation, preparation, verification, and illumination (Bogen & Bogen, 2003). "Creativity means a person's capacity to produce new or original ideas, insights, restructuring, inventions, or artistic objects, which are accepted by experts as being of scientific, aesthetic, social or technological value" (Vernon, cited in Russ, 1993, p.2). Sternberg (2000) takes a different approach: creative thinking is not what one knows but how individuals decide how to use, or process, what they know. Tegano, Moran, and Sayers (1991) asserts that focusing on the process is the basis of creative potential where the individual absorbs information and, during incubation, the information settles in. With illumination, the solution presents itself to the individual and during verification the final product is created.

Researchers use extant metaphors to define creative thinking as product, process and person (Brown, 1989; Piirto, 1998; Tegano et al., 1991). Piirto redefines person as personality, and opined that creative thinking is influenced by genetics and environment



(home, school, and society). Perhaps in frustration, Prentky (2001) said that “what creativity is, and what it is not, hangs as the mythical albatross around the neck of scientific research on creativity” (p.97). Definitions of creativity, Dickhut (2003) reports, describe the novel (Lynch & Harris, 2001) then add appropriateness, such as using tools differently (Lubart, 2000). This approach extends to the “product”; individual differences of those who produce creativity, including their motivations and the processes behind creativity (Porzio, 2003). Creative thinking may therefore describe an object, or a notion that has gained acceptance. Rogers (as cited in Taylor & Getzels, 1975) states that creativity is an “emergence in action of a novel relational product, growing out of the uniqueness of the individual on the one hand, and the materials, events, people, or circumstances of his life on the other” (p.4). These definitions follow a similar approach where creativity can be observed as an outcome, whether physical or social, which is formed from human, social and environmental factors.

Another view of creative thinking as a product or outcome is in making something known which was previously unknown. Simon (2001) states that “we judge thought to be creative when it produces something that is both novel and interesting, and valuable” (p.208). While creativity can be seen in the product, it can also be considered as a part of the process. For instance, von Hagens (1995) perfected the transformation of body tissue using plastics in the creative use of tools, wherein plastics were painstakingly used to replace body parts for preservation. Ward, Finke, and Smith (1995) assert that the creative process used by von Hagens is a primary indicator of creativity.

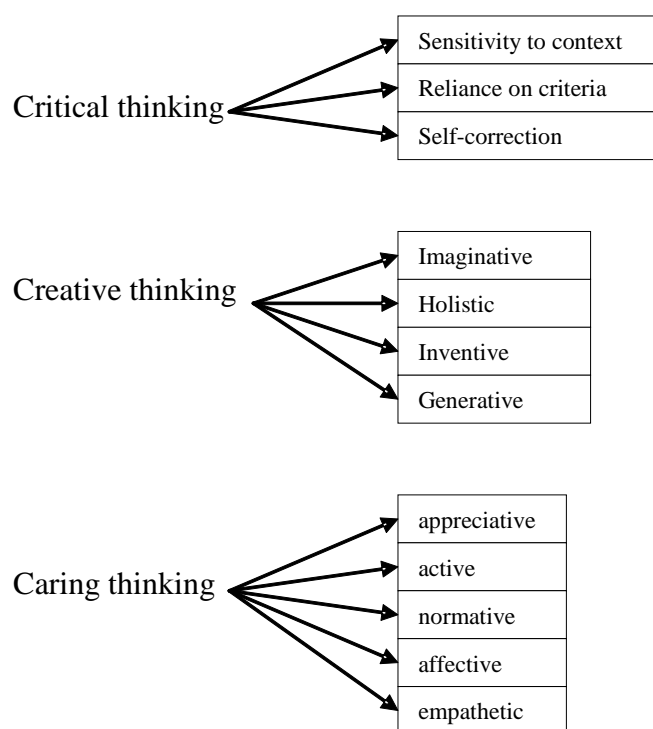
### **2.2.2 Theorists in Creative Thinking**

In Guilford's earlier work concerning the Structure of the Intellect (Guilford & Zimmerman, 1956), the author proposed a model concerning many intellectual abilities in three areas, operations, content, and products. The operations are general intellectual processes of encoding, deduction (including divergent production, or creative thinking) and evaluation. Three relevant categories of content are symbolic, semantic and behavioural. The "product", in this case creativity, is derived by applying particular operations to specific content: units, classes, relations, systems, transformations, and implications. Units are basic elements or ideas; classes are groups with common elements; and relations serve as a connecting, independent link between two units. Systems are complex organisations of independent, interacting parts. Transformation occurs when an item of information changes its nature. Haefele (1962) offers a summary of this process when proposing that "(t)he creative process is a new combination formed from pieces already in the mind, by symbolic manipulation during dissociated thought" (p. 5).

Creative thinking is part of convergent and evaluative thinking (Guilford, 1954). The capacity for creative thinking is evaluated through the fluency, flexibility, and uniqueness of a solution to a problem or situation. Also, measurement is calculated on the sensitivity which an individual has to the problem and the person's ability to give information new meaning. Sensitivity to the problem is in the evaluative process. Foresight is important, as the person must be able to anticipate those needs not yet met for improvement. Convergent thinking is used to redefine information, using transformation, which requires prodigious work. Guilford and Zimmerman (1956)

suggest several factors that have an effect on creative thinking, these factors are: cognition, memory, divergent thinking, convergent thinking, and evaluation. Hirokawa and Miyara, as cited in Nelson and Quick (1997), agree when they state that creative thinking is a process that is influenced by individual factors which lead to the production of new, useful ideas.

In a model for individuals' conceptualisation processes, Lipman (2003), presented in Moseley et al. (2005), proposes three types of thinking which should be cultivated in children: critical, creative and caring (figure 2.1 below).



Source: Moseley, et al. 2005 p.159

Figure 2.1 *Lipman's three "thinking" structures*

Following this theme, Ketovuori (2007) asserts that each type of thinking refers to a part of cultural knowledge: critical thinking (science), creative thinking (art), and caring thinking (ethics). However, this extrapolation arguably narrows the definitions of

creative thinking that assume it to be a process, rather than reside in a dimension. Baer and Kaufman (2005) refute this assumption, stating that the generality-specificity issue for creative thinking embodies the question of creativity, “challenging even such ideas as whether it can make sense to describe someone as ‘creative’ without reference to specific works or domains” (p. 158). Those who argue for general creative-thinking skills, the authors assert, also recognise that domain-specific thinking skills are important for creative thinking (e.g., Amabile, 1996) and domain-based theorists acknowledge general skills in all creative endeavours (e.g., Feist, 1998). There is a case for a hybrid approach to creativity theory and training for creative thinking (Baer & Kaufman, *ibid.*)

In the field of psychology, creative thinking was believed to hail from an unconscious process of thinking (Weisberg, 1986), probably due in some part to the Freudian approach to psychology at the time which placed a premium on unconscious thought. Thus the unconscious mind could process creative thought which then came into the conscious mind; however, there was no logical means of determining how the process took place. Taylor and Getzels (1975) argue that creativity is a process “that is extended in time and characterized by originality, adaptiveness and realization” (p. 4). Weisberg (1993) acknowledges that creative processes may be incomprehensible to others, and indeed, the question remains whether creative persons ever reflect on the process which allows them to engage in the creative process.

Creative thinking is a set of psychological factors: ability, knowledge, skills, motives, and personality traits of openness and flexibility; that allow an individual to be innovative, according to Cropley (2001). Maslow (1954) takes the position that creative

thinking is an aspect of personality; a special sensitivity which is absent in the verbalised world of concepts, abstractions, beliefs, and stereotypes. This view is reality-based, and perceptions can be attuned to all dimensions, such as the generic, the concrete, the fresh, the categorised, and the abstract. As these individuals are self-motivated, they possess a boldness, freedom, and spontaneity. The creative aura becomes this person's overall attitude and it is expressed and shown as such (Maslow, 1954). There are other depictions of the creative personality; independence, self confidence, and an unobstructed view of experience. These people possess a jovial attitude, and have a penchant for games, ability with complicated tasks, and tolerance for vagueness (Shallcross, 1981).

Divergent thinking, according to Runco (2010), is frequently associated with the potential for creative thinking. It is a cognitive process that can lead to conventional or extremely unconventional ideas. However, tests for divergent thinking do not measure creativity as they are scored for fluency (number of ideas), originality, flexibility (variability); and occasionally, quality, appropriateness, and elaboration. The TTCT is therefore a measurement of divergent thinking, or the measurement of ideas generation, as a dimension of creativity (ibid.). Plucker and Makel (2010) question the efficacy of such psychometric studies, with their emphasis on the quantity of responses, which is clearly not solely indicative of the creative thinking process. In this assessment process they note “the irony of creativity researchers continually reinventing the wheel” (p.63). Chen, Himsel, Kasof, Greenberger, & Dmitrieva (2006) investigate correlates of domain-general and domain-specific components of creativity and finding evidence of the domain-generality of creativity. This follows Diakidoy and Spanoudis (2002), who examined domain-specific components, such as content and type of task, and the extent

to which they influence divergent thinking and creativity, using TCCT and a corresponding Creativity in History Test. The results indicate that both content-specific and task-specific factors have significant effects on creativity.

High verbal aptitude can be assessed using a psychometric intelligence measure (Aguilar-Alonso, 1996). However, creativity in drawing can only be determined by a subjective appraisal and requires more complex psychometrics. In an organisational behavioural study, Nelson and Quick (1997) describe the following attributes of individuals' creativity: intellectual and artistic values coupled with a broad scope of interests; intuitive and willingness to take risks; highly motivated achievers with a desire for recognition; independence in judgment and tolerance of ambiguity; and a strong image of the creative self. While assumptions of creativity may veer toward the works of poets, painters, musicians and artists with their strong fantasy aspect, in fact the realist world of scientists, entrepreneurs and engineers, where creativity also comes into play, proves that creativity is part of thinking and the personality (Csikszentmihalyi, 1996).

Formal education comprises a set of goals, which include creating or keeping up with a logical argument, the ability to analyse and understand assertions, and deductive reasoning (Harris, 1998). Harris compares critical reasoning and creative thinking and surmises that both are essential for a career. Creative thinking, however, receives less attention in conventional pedagogy than factually based reasoning which can be readily measured. Although the two approaches differ, they do not necessarily operate independently (table 2.1).

Table 2.1  
*Critical/creative dichotomy*

Critical Thinking	Creative Thinking
analytic	generative
convergent	divergent
vertical	lateral
probability	possibility
judgment	suspended judgment
focused	diffuse
objective	subjective
answer	an answer
left brain	right brain
verbal	visual
linear	associative
reasoning	richness, novelty
yes, but	yes, and

Source: Harris, 1998

Whilst creativity tends to define ability, creative thinking may be viewed as a process. Torrance (1963) aptly defines creative thinking as divergent thinking not previously applied to solve a problem. Like Guilford, Torrance's modelling of creative thinking is based on originality, fluency, elaboration and flexibility (Sternberg, 2006a). Using these values, Sternberg (2006a) also observes that creative thinking is derived from divergent, not convergent, thinking.

For behaviourists, creative thinking can be defined as a rational process comprising two cognitive phases: the generation of options followed by the selection of original, effective pathways; sometimes the generation phase subsumes divergent characteristics (Muneyoshi, 2004). Davis (1999) suggests that creative thinking develops and increases the flexibility of an individual's abilities. Creative thinking

involves thinking, intuition, feeling and sensing. Anderson (1959) and Greenfield (2008) characterise creative thinking as a social process. Creative thinking encompasses more than using the imagination (Hijazi, 2001; Shuqir, 2002). Creative thinking can be a state, as a lifestyle; or a trait, perceptions applicable to the environment. Living creatively maximises capabilities by employing innate talents. Creative thinking informs the pursuit of new ideas, destinations and activities; however, artistic, scientific, entrepreneurial or literary talent need not be prevalent for creative thinking to occur.

In education, creative thinking is fundamental to teaching and learning and is the subject of intense debate (Cropley, 2001, Kaufmann & Sternberg, 2006). However, the debate is manifold across disciplines, dimensions, theoretical and empirical research, and forms of assessment. Kozbelt, Beghetto, and Runco (2010) recently reviewed the literature to categorise current trends. They define scientifically oriented theories as focussing on measuring creative phenomena, and metaphorically derived theories as providing other forms of creative thinking. The authors point out the differences between these quantitative and qualitative approaches; that the quantitative approaches cannot define the potential in creativity. Nevertheless, “(m)etaphorically oriented theories are of maximum use when they balance speculation with agreed-upon methods of empirical exploration, peer review, and the postulation of theoretical propositions that are open to empirical inquiry, elaboration, and refinement” (pp.22-23.) Further, they see further production of typologies as counterproductive; perhaps a more informative strategy is to study their components, rather than reconciling broad category labels.



In summary, definitions of creativity are multi-dimensional. Theorists may take a rational or technical approach to creative thinking, focussing on production analogies of inputs, process and outputs (Brown, 1989; Tegano et al., 1991). Others adopted an organic or psychological approach (Guilford, 1954; Weisberg, 1986); whilst modular theorists (Harris, 1998; Lipman, 2003) pursued an intrinsic/extrinsic theme.

The relationship between creative thinking and reflective impulsive style explored in this study relates to a hybrid, the intrinsic model and the psychological approaches, so that the emphasis is placed on the person rather than on the technical process. Furnham (1992) asserted that personality characteristics consist of three components: traits, cognitive styles, and coping behaviour. This research focuses on cognitive style, particularly the reflective-impulsive dimension and a comparison of the creative thinking skills of students in rural and urban schools. The following section discusses the approaches to creative thinking.

### **2.2.3 Approaches to Creative Thinking Research**

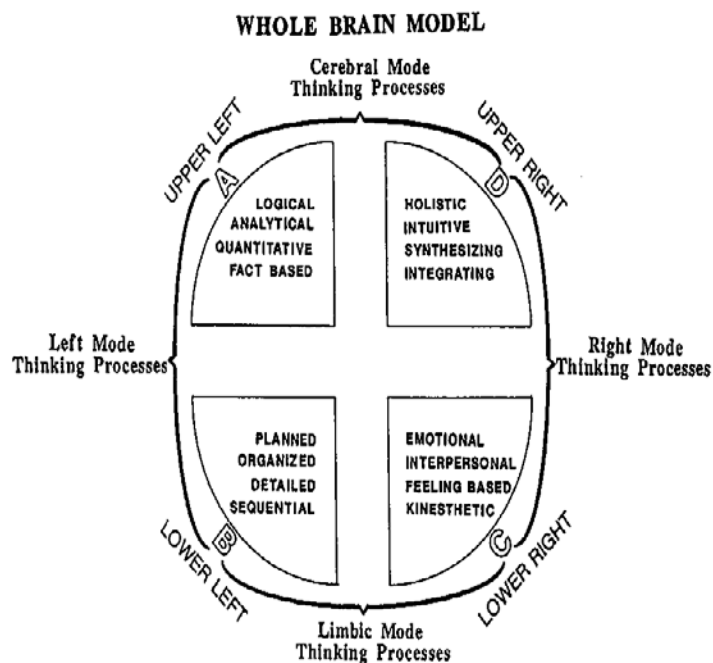
Of central interest to this thesis are the researchers who consider the assessment of creative thinking in education (Corcoran, 2006; Runco, 2007). This section also presents several theories that describe creative thinking: biological, psychoanalytic, constructivist, behaviourist, humanistic, and factor structure.

***Biological Approach.*** Biological theory, concerned with individuals and their environments, holds that creative thinking is a function in the brain. The brain is divided into two hemispheres, left and right, and each is independent, with different functions (Runco, 2007; Torrance, Reynolds, Ball, & Riegel, 1977). Sperry (1961) suggests that the right hemisphere is concerned with divergent thinking, while the left hemisphere

focused on convergent thinking. Creative thinking develops strongly when the right hemisphere is more active, a position that was also adopted by Katz (1997). Runco (2007) describes this concept:

(it) may be because often creativity is assumed to be illogical or at least non-traditional in its logic. Traditional logic or sequential processing was assigned to the left hemisphere, and left creative logic for the right (or non-dominant) hemisphere. Perhaps it was also the holistic processing of the right hemisphere, for that can play a role in many of arts (e.g., the visual arts). Yet the need for a collaborating brain is clear, even in the visual arts (p.75).

Herrmann (1991) adds that the whole brain (left and right hemispheres) is divided into four specialised quadrants, each with a different function (see Figure 2.2).



Source Herrmann, 1989, p.411

Figure 2.2 *Whole brain model*

However, Al-Solimani (1992) suggests that creative ability needs both left and right hemispheres, because creative activity needs logic which belongs to the left hemisphere and intuitiveness which belongs to the right hemisphere. Runco (2007) asserts “(creativity) may not draw from the entire brain but it certainly draws on many different brain structures and processes” (p.74).

***Psychoanalytic Approach.*** Psychoanalytic theory describes creative thinking as a result of the conflict between the contents of the instinct on one hand, and between customs of the society and their requirements on the other hand. Freud (1920) believes that creative thinking is a ‘defence mechanism’, termed exaltation, where an individual dampens energies of a sexual and aggressive nature to those that are socially acceptable. Creative individuals avoid reality in preference to a virtual life to allow expression of feelings and thoughts that are not accepted in society. Kubie (1958) states that although the preconscious is important for creative thinking; the author refutes the conscious and unconscious influences on creative thinking because these two factors may limit the freedom of imagination for the individual.

***Constructivist Approach.*** Constructivism may be defined as “an approach to teaching and learning that acknowledges that information can be conveyed but understanding is dependent upon the learner” (Casas, 2006, p.2). Each student is therefore responsible for constructing their individual knowledge. Packer and Goicoechea (2000) explain that constructivist theory evolved from Piaget’s theory: knowledge accumulates through an individual’s experience when interacting with the environment. The perspective of constructivist theory is that the learning happens when the person experiences problems and solves them at the same time.

In the latter part of the twentieth century there were several popular constructivist theories of learning. The three major theorists of that time were Piaget, Bruner, and Vygotsky.

Piaget's Theory Jean Piaget is considered an authoritative source on cognitive development (Wadsworth, 2004). Slavin (2009) adds that Piaget's theory of cognitive development represents constructivism, as Piaget viewed children's thinking as different from adults. There are three basic components in Piaget's theory: (1) schemas (building blocks of knowledge); (2) the process of moving from one stage to another stage; (3) and cognitive development (Slavin, 2009). De Ribaupierre and Rieben (1995) add that Piaget divided cognitive development into four stages: 'sensorimotor' (birth-2 years of age), 'preoperational' (2-7 years), 'concrete operational' (7-11 years), and 'formal operational' (age 11-adulthood). Piaget (1981) asserts that all children pass through these stages of development. Further, creative thinking occurs through "reflective abstraction" (p.225); thus it occurs in the last stage of cognitive development (formal operational). Earlier, Piaget (1979) proposed that individuals gain and reconstruct knowledge through their activities.

Bruner's Theory Bruner (1975) states that learning is a social process that requires students to actively build new ideas through processing current or past knowledge; the learner has an important role; to select the information, build hypotheses and make decisions. Cognitive structure provides the student with meaning and organisation and also gives the student the opportunity to move beyond this information. The teacher has a role in encouraging students to discover principles by

themselves. Bruner adds that the curriculum should be organised as a spiral in order that a student can build ideas on previous knowledge.

Both theorists, Bruner and Piaget, differ in their views. Piaget focuses on human behaviour as a biological process, while Bruner posits social values play an important role in the education of the individual (Bruner, 1990). The interaction between individuals and their social environment is the basis for knowledge and understanding of Bruner's theory.

Vygotsky's Theory Vygotsky was a pioneer in formational psychology, studying the interaction of children with their family and peers (Cohen, 2002). Like Bruner, Vygotsky believes that language improves by social interaction (Efland, 2002). Vygotsky's theory (1978) concerns socio-linguistic or social constructivism; the individual's mental development results from experiences and the environment. This view is contrary to Piaget and other theorists who state mental development was independent of the environment. The author proposes a relationship between learning and development, a 'zone of proximal development' (Vygotsky, 1978). He also suggests that development is a continuum of behaviours, based on two premises: a student can achieve learning independently and that a student needs a teacher's assistance to achieve such learning (Bodrova & Leong, 1996.) Vygotsky argues that children's creativity in its original form is syncretistic creativity; that is, the individual abilities have yet to separate and be specialised. Children do not know the main differences between poetry and prose, as well between dramas and narrating (Lindqvist, 2001). "Children rarely spend a long time completing each creation, but produce something in an instant, focusing all their emotions on what they are doing at that time" (Lindqvist, 2001, p. 8).

As part of an interactive environment, encouraging students to talk may “contribute substantially to intellectual development in general and literacy growth in particular” (Dyson, 1988, p.535). For this study, Vygotsky’s view of the learning process affords a basis for theory, moving from a government’s pedagogical policy of traditional learning techniques based on memory and recall, toward the creative approach envisioned by the theorist.

***Behaviourist Approach.*** While constructivist theory is based on the individual’s mind, considering reactions (stimuli and responses) that are easily observed; the behaviourist approach considers the individual’s actions. Slavin (2009) asserts that the behavioural learning theories are an “explanation of learning that emphasize observable changes in behaviour” (p.128). Skinner (1953) opines that changing behaviour is a result of the individual responding to stimuli that comes from the environment, for example, hitting a ball, solving homework problems. When a certain response to a specific stimulus reinforced (s-r), the individual is conditioned to respond. Therefore, reinforcement (e.g., praise, reward) is the key: “solving a problem is a behavioural event. The various kinds of activities which further the appearance of a solution are all forms of behaviour” (Skinner, 1966, p. 240). Skinner believes that both genetics and environment are determinants of creative behaviour. Mednick (1962) posits that original ideas tend to be strange (or different than other ideas) and creative individuals are better able to find these ideas (Runco, 2007).

Behaviourist theory suggests that creative thinking is an organisation of stimuli and responses. If this organisation is new and useful an individual’s creativity will increase.

***Humanistic Approach.*** Humanistic theory holds that creativity is an end to itself; that all have the same creative capacity and the difference is in the level of creativity. However, creativity is adversely affected by stress; therefore creative thinking is a process that requires psychological health and an environment that encourages individuals to be creative. Maslow (1968) believes that creative thinking is actualisation of the healthy self: “(my) feeling is that the concept of creativeness and the concept of the healthy, self-actualizing, fully-human person seem to be coming closer and closer together, and may perhaps turn out to be the same thing” (Maslow, 1963, p.3). Further, Rogers (1976) nominates three conditions for creative thinking: “openness to experience, internal locus of evaluation, and the ability to toy with elements and concepts” (pp.297-301). Rogers describes the creative process as the emergence of a novel product, growing out of the uniqueness of the individual.

***Factor Structure Approach.*** This theory explains a phenomenon by using factors. The factor could be ability, or a mental or characteristic trait. The person who has high mental abilities often has creative capacity, whereas a person who has low mental abilities is not creative (Spearman, 1931). Guilford (1950), however, states that divergent thinking is close to creative thinking and most creative abilities (flexibility, fluency, and originality) are part of divergent thinking. In addition, Guilford posits that intelligence is insufficient evidence of a person’s creative capability. The measure of creative capacity, the Torrance Test of Creative Thinking (Torrance, 1965), is discussed later on by Kim (2006) in s 2.2.4.

To summarise, the biological theorists Katz (1997) and Sperry (1961) state that creative thinking is located in the right hemisphere of the brain. Others prefer a more

holistic approach to creative thinking and that both the right and left hemispheres are necessary for intuition and logic (Herrmann, 1991; Runco, 2007). However, there is no clear direction from the psychoanalytic theorists, while constructivist theorists find evidence that creativity occurs when individuals are learning and solving problems (Bruner, 1975; Vygotsky, 1978). In contrast, the behaviourist researchers suggest that creativity occurs when individuals use new stimuli and responses (Runco, 2007; Slavin, 2009). Next, humanistic theory states that all individuals are creative but they differ in their level of creativity. Last, factor structure theory adherents find that creativity emanates from a number of abilities, fluency, originality, and flexibility; that are part of divergent thinking and factors that can be measured. This is the theory that tends toward greater utilisation today.

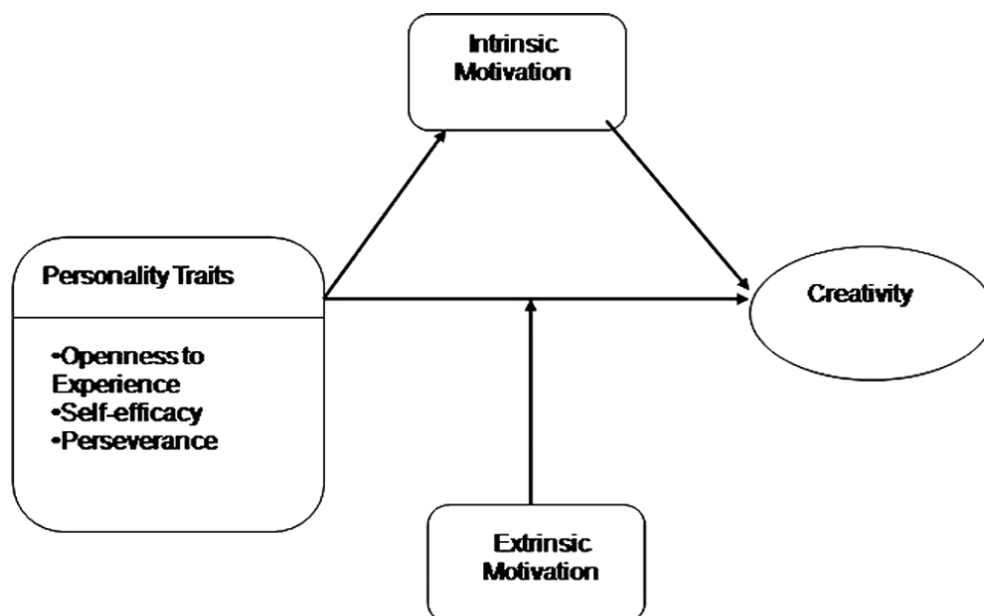
### **2.2.3 Influencing Factors**

The factors which may affect creativity are self-determination, types of motivation, environment, traits, and age. They are discussed in order.

**Motivation.** In self-determination theory, Ryan and Deci (2000) posit different types of motivation based on differing reasons for an action. Intrinsic motivation refers to an activity deemed inherently interesting or enjoyable to an individual, and extrinsic motivation refers to undertaking an action that leads to a possibly separate outcome. Intrinsic motivation is important for educators as it results in high-quality learning and creativity (ibid.). Extrinsic motivation relates to reward or to avoid a negative outcome (Eisenberger & Rhoades, 2001; Prabhu, Sutton, & Sauser, 2008). Earlier researchers considered that only intrinsic motivation was a factor in creativity (Amabile, 1988). Amabile (1982) undertook a study where a group of children were competing for



reward or the reward was removed from the creative competition. The latter, intrinsic reward, supported a superior response in creative behaviour. also noted that However, Mumford, Scott, Gaddis, and Strange (2002) show that under certain conditions, extrinsic motivation was positively related to creativity. Creativity may be induced through individual personality traits; extrinsic and intrinsic motivational factors are aligned with traits. The inner state of the individual is stimulated by the external qualities which can be found in the task (Brophy, 1983). Intrinsic motivation comes with a positive effect, while external motivation usually has a negative effect (Amabile, 1983b, 1996). Extrinsic motivation can affect creativity, especially if a reward is involved (Eisenberger & Rhoades, 2001). Choi (2004), Feist (1998) and Prabhu et al. (2008) assert that motivation, combined with individual traits, affects creativity as described in figure 2.3.



Source Prabhu, et al., 2008, p.55

Figure 2.3 *Model of motivation, personality traits and creativity*

***Intrinsic Motivation.*** An individual can be motivated to be creative, and the motivation must be internalised so that students, for example, are empowered to adopt challenges. Creative persons are independent thinkers and learners (MacKinnon, 1965). Hayes (1985) notes the acquisition of knowledge and its contribution to creativity, commitment and high standards of productive endeavour.

The extant theory of intrinsic motivation is based on the personality traits influencing creativity (Ambrose & Kulik, 1999; Choi, 2004; Eisenberger & Rhoades, 2001; Prabhu et al., 2008). Hennessey (2003) suggests curiosity, interest, or task participation are positive variables leading to accomplishment or individual competence, which, free of strong external control, have the sense of play rather than work: “(whether) prompted by just the right amount of novelty, feelings of competence or a sense of control, the intrinsically motivated state comes about as the result of an internal, very individualised process, the complexities of which we are only beginning to appreciate” (p.255). Intrinsic motivation comprises meaning, challenge, purpose, creative flow, interest, and learning.

Intrinsic motivation becomes prominent at the time that a person exhibits or expresses an interest to engage in an activity. Csikszentmihalyi (1988) was the first social psychologist to put forth the concept of flow, where an individual is immersed in an activity to the extent that there is a sense of being transported. Simultaneously, the person feels in control of the activity’s environment and the actions pertaining to the task. Flow occurs, according to Csikszentmihalyi, when one embodies a positive perspective and one perceives the given opportunities are synchronised and the task successfully completed. The individual seeks fulfilment due to the sense of well-being

the flow imparts; however, this requires a consistency in the challenge, while the skills must become more complex. This of course involves continuous skill development and taking on new challenges. Csikszentmihalyi (1988) states: “(flow) forces people to stretch themselves, to always take on another challenge, to improve on their abilities” (p. 30), arguing that structured activities enable flow to occur if they are designed so that the level of challenges and skills can be varied and controlled. The author cautions that an activity does not induce flow; that it is inherent in the individual, yet creativity can be learned. Hayes (1985) takes the position, that the key element of creative thinking in an individual is motivation. Hayes (1985) holds that “the relative existence of creativity is parallel to the differences in origin of the motivation. The motivational differences, in turn, contribute to cognitive differences” (p.144). Compilation of the differences may clarify the differences in creativity.

***Extrinsic Motivation.*** The extrinsic reward dimension of motivation was tested by Lepper, Sagotsky, Dafoe, and Greene (1982), who investigated anticipated reward on young children’s motivation and artistic performance. Children were divided into three groups for a free drawing activity. One group, who initially displayed an interest in drawing were adversely affected when informed that the work was to be assessed for reward. This was “tantamount to pouring water on the fire”; as the revelation of a reward caused a significant decrease in interest and this group spent less time drawing than the other children (Lepper et al., 1982). This result remained consistent over a week; also the quality of the drawings from the expected reward group was lower than those of the two other groups. Hennessey (2003) reports that rewards may sometimes increase the level of extrinsic motivation, without a negative effect on the intrinsic motivation or individual's achievements.

While studying the factors of achievement in Chinese university students, that is, motivation, creativity and complex thinking styles, Fan and Zhang (2009) find a strong relationship between the factors. Brown (1989) investigates the influences which contribute to intelligence and creativity, finding that the behavioural factors of emotion and motivation were contingent with intelligence tests and may also impact performance on creativity tests. Hebb (1955) and Berlyne (1960) find a relationship between the motivating factors which represent the most favourable level of novelty. White (1959) and Harter (1978) nominate the components of intrinsic motivation as competence and mastery. De Charms (1968) and Lepper et al. (1982) centre their attention on a sense of control: the perception of the individual that the task is externally controlled leads to a reliance on extrinsic motivation.

***Social Motivation.*** A hybrid form of motivation emanates from social psychology. Csikszentmihalyi (1996) notes the tensions of maturity and the impact on the individual and creativity, particularly puberty and the growing independence of young adulthood. Adolescent motivational research was also the milieu of Connell and Wellborn (1991), building on the prior work of Deci and Ryan (1985) who formulated a model of the psychological needs of competence, autonomy, and relatedness.

Competence related to task involvement, that is, a child perceives that a task can be accomplished to generate motivation. Autonomy is present when the child expects that there will be little authoritative influence on the task process, and relatedness includes social environmental factors, such as bonding with peers and other learners.

Communication and bonding underlies an individual's ability to contribute to a group of learners. This view is also shared by Anning (1988) and Wentz-Gross, Siperstein, Untch and Widaman (1997), who support the idea that children are better suited to learning

when they have social support in their environment. Socialisation as a factor of creativity evolved over time so that due consideration is taken of individual difference variables when constructing models. Deci and Ryan (1985) contend that each individual will vary in the application of three orientations: control, impersonal, and autonomy which impact on creativity.

***Social Environment.*** Factors from the environment which may affect the knowledge and skills of creative individuals are described by Cropley (2001) as human and physical resources, and reward or punishment. Researchers also demonstrate the relationship between culture and creative thinking (Sternberg & Lubart, 2000; Yue & Rudowicz, 2002). Clark (1983) and Fielding (1997) explain that ideas, art, and creative expressions are given form through culture, which has a substantial influence on creativity. Woodman, Sawyer, and Griffin (1993) nominate the elements necessary for creativity as the capacity and cognitive style of the individual; personality factors, motivation and knowledge; and social and contextual impacts further influenced by reinforcement. Vygotsky (1978) finds that creative thinking is not an innate property owned by a small number of people, but it exists in all humans.

Familial, cultural and socio-economic factors affect students' learning and creativity (Feuerstein, 2000; Lee, 2008; Whitelaw, 2006). Within the family, interactions usually precipitate various levels of intellectual stimulation and emotional security which enable creativity (Harrington, Block, & Block, 1987). A stimulating family environment which presents a range of creative materials, together with cultural activities appreciably assists in promoting creativity (Rogers, 1954; Simonton, 1984). The parents' role in the creative process was explored by Snowden and Christian

(1999). They find a correlation between the educational attainment level of the parents and the parents' level of understanding the need to which the child must develop their skills. Loveless (2001) states that "new approaches to flexibility and exploration in ways of working, pedagogy, curriculum, assessment, and management of time and resources in schools could be tried, but this will require the encouragement of an ethos of creative challenge and celebration of imagination and possibility thinking" (p.380).

The level of a parent's involvement in school activities has a positive impact on the student's outlook towards learning. Nevertheless, teachers are sometimes reluctant in their approach to parental resources, perhaps due to expectations of parent apathy or adverse outcomes (Epstein, 1985). Following this communication issue, Peña (2000) notes that, although the family environment is the primary setting for a child's growth, parental participation in school affairs tended to be less education-oriented, directed more towards a school-community role. For parents and teachers alike, understanding a child's creativity is a daunting task both in its manifestation and the factors which may draw forth curiosity and experimentation (Weisberg, 1993). The following are examples of cultural diversity research. Rudowicz et al. (1995) conducted a study on students in elementary schools (10 to 12 years) in Hong Kong, by using Torrance tests for creative thinking and comparing their findings with standard findings from different countries such as: Taiwan, Singapore, and the USA. The study demonstrates that the students in Hong Kong scored higher in originality and fluency than other students, which may be due to cultural factors. Later, Fleith, Renzulli, and Westberg (2002) conducted a larger study in Brazil using pre-teenagers, also using the TTCT. The researchers find that the school environment is very important in improving the creative ability of students, whilst family, culture, and individual personality also play an important role in

enhancing creative thinking. In addition, Kharkhurin and Samadpour Motalleebi (2008) studied the impact of culture on the creative thinking of American, Russian, and Iranian students. The study finds the socio-cultural environment has an effect on creative thinking of students and that creative thinking of students is different from culture to culture. For example, the definition of creative thinking in Western countries focuses on originality and innovation, while it has less value in Eastern countries. Cultural diversity brings variance in expressions and meanings; and educators find creativity across race, culture, gender, ethnicity, and creed (Frasier, 1989; Maker & Schiever, 1989; Ngara, 2008; Ngara & Porath, 2007; Niwa, 2005).

Learning is influenced by the social environment of family, peers, and teachers. The physical conditions of school, resource facilities, tools, and curriculum form the framework in which learning occurs (Csikszentmihalyi, 1988). Within a network with access to technical skills and in which the individual is encouraged to develop and maintain motivation, social support can be reinforced and strengthened through cooperative learning strategies. A congenial classroom environment fosters positive attitudes toward novelty, the acceptance of diversity, and a sincere commitment to goals (Anning, 1988; Csikszentmihalyi, 1996). In noting familial impact on creativity, John-Steiner (1997) argues that the child's creativity can either be hindered or fostered by parental expectations, following the work of Amabile (1983a), who studied the attitudes of the parents of creative children. Parents act as models, and creativity can be fostered in children if those in their most immediate environment present them with positive reinforcements. With a supportive classroom environment, children will understand the interaction between studying and being creative. In this context, Amabile (1983, a, b) proposes three major components: task motivation, skills and creativity processes, all of

which must interact within the social environment. However, the optimum confluence of factors that encourage creativity are subject to counter-influences which have a deleterious effect. These include functional disinterest, constraint, evaluation, and insufficient resources which may be consciously adopted or evolved.

Cultural background and socio-economic factors influence learning. Curricula are formulated to meet with social and commercial norms and expectations, with little allowance for diversity. There is therefore a danger that a given curriculum could be weighted against individuals who have not assimilated at the level of the majority standard (Maker, 1983; Passow, 1986; Payne, 2007; Tonemah, 1987). A representative sample used in standardised tests to identify the gifted is, by its nature, biased against underrepresented groups (Padilla & Wyatt, 1983). For example, when standardised texts are translated from English to indigenous languages or dialects, inadequate translation inhibits the student's ability to make the proper connection with their native language (Brescia & Fortune, 1988; Padilla & Wyatt, 1983).

There is a relationship between intelligence and creative thinking, according to Sternberg (2001), whilst Renzulli (1978) argues that giftedness arises from a confluence or interaction between above average general ability, and high levels of task commitment and creativity. Torrance (1970) also links creativity with intelligence. Separately, Fitzgerald (1975) and Maker (1983) purported difficulty in establishing whether issues in identifying giftedness were due to economic, cultural or geographic differences, in that most of those excluded were in non-urban areas and were of low-income status. To increase the proportion of individuals from previously neglected environments, researchers recommended that expressions of creativity should be



measured with subjective data; the identification measures should be flexible, broadly based and varied (Abdallah, 1996; Al-Enezi, 2003; Al-Pakistani, 2007; Banda, 1989; Frasier, 1989; Maker & Schiever, 1989).

For optimum creativity, motivated individuals with relevant skills, cognitive and personality characteristics require a set motivational task and a supportive environment (Amabile, 1996). Such an environment is expressed through a child's creative orientation, evaluation expectations, assessment and reward. Amabile's findings are particularly pertinent from an educational perspective. Feldman (2000) notes that a student's associations; family, peers, teachers, and cultural groups, affect the level of creativity; while Reisman et al. (2002) amplify Feldman's point in that while educational and social roles can directly affect a student's creative abilities, they are not the determinants. A student can possess certain innate qualities which are not measured by traditional pedagogical means. As a consequence, educators may not perceive a particular student's creative scope as it is outside the standard frames of reference. Under optimum circumstances, and given the right tasks, all individuals can achieve creativity (Al-Attas, 2005; Anning, 1988; Corcoran, 2006; Csikszentmihalyi, 1988; Glor 1998).

The primary years of curricula formulation are critical to building creativity, and designers should avoid copious standardised norms and have intervals which foster explorative thinking (Al-Pakistani, 2007; Craft, 2008; Torrance, 1965). These researchers are of the opinion that the curriculum in the primary years should be structured to assist and support students to develop a variety of divergent thinking. This type of structure empowers students to engage their imaginations, which should lead to

creative problem solving. Stein (1975) presents a convincing argument as to the importance of specific occurrences and cultural entities and their relationship to creative productivity. This is supported by Parnes (1962), Torrance (1965) and De Bono (1970), who further argue that teaching techniques should promote divergent and convergent thinking; and a classroom culture must encourage students to learn. Sternberg (2003) finds that teaching creative thinking contributes to a student's academic achievement. Whilst encouraging creative pupils, this approach may support students who are less creative, encouraging them to experiment in a creative atmosphere:

when we teach for creativity in schools, then we need to encourage all kinds of creativity, not just the more conventional kinds (such as forward incrementation). Teachers who reward all kinds of creativity are those who are likely to find among their students those who have made one of the most important decisions a person can make in his or her life: the decision to be creative (Sternberg, 2003, p.337).

Whilst parents and teachers understand creative students, they can encourage or discourage certain personality traits (Runco & Johnson, 2002). For example, teachers understand that reflectivity is related to creativity. Scott (1999) noted issues related to the teacher's perception of student creativity due to overcrowding and time constraints, leading to "the inability to attend to each child's individual needs" as well as the pressure to "prepare students for the next grade level" (p.327). Rogers (1998) states that the evidence points to a failure to promote the allocation of specific time devoted to creative subjects and that not enough emphasis is placed on the development of creativity in the training of new teachers. Further, teachers may find issues when

evaluating the creative work, as students exhibit development in a number of dimensions: for personal meaning, and as learners who need to progress and improve values, expression, and attitudes (Sefton-Green, 2000).

The teacher is an important factor in the development of creative thinking in a child. The social environment can hinder a child's creative development; after a few years at school a cautious demeanour can develop which runs counter to innovation (Csikszentmihalyi, 1996; Torrance, 1995). In the classroom setting, some students tend to become passive observers rather than active participants. The teacher can adversely support this trait through an authoritarian position within the classroom; or the approach to teaching which, if unconventional, may confuse students (Csikszentmihalyi, 1996). Dacey and Packer (1992) make the argument that standardised routines in the classroom, inflexible rules, and a dearth of divergent thinking retard creativity. John-Steiner (1997) describes these teachers as practitioners of seated learning, and students need to be proactive; following Albert (1996) and Al-Pakistani (2007) who argue that substantial creativity is not being developed in a majority of children. Pollard and Triggs, (1997) and Posner (1993) propose that the socialisation process fostered in schools has an impact upon how the teachers present the curriculum. When employed at a particular school, a teacher must acquiesce to its norms, societal standards, and policies and thus teachers can find these restrictions hinder their ability to foster creativity. The necessary conditions for creative thinking in teachers and students are not enough and failure may still result (Kimbell, 2000). Arguably, a teacher's identification and nurturing of creativity in students may be impacted by regulatory and school environments.

***Traits.*** The capacity or potential necessary for a creative process emanates from an individual's group of ideas or collection of psychological factors (Cropley, 2001). This psychological collection is accompanied by values, abilities, attitudes, skills and knowledge, and is often augmented by personal traits such as flexibility, courage and openness. Interest in the area of personal characteristics appropriate to creative achievement has spawned a substantial body of literature (Al-Attas, 2005; Barron & Harrington, 1981; Davis, 1989). Researchers in the 1980s explored a broad spectrum of personal characteristics that addressed biological factors and measures of cognitive styles and intelligence (Amabile, 1983b; Barron & Harrington, 1981; Davis, 1989; Woodman & Schoenfeldt, 1989). These studies present a common origin of core personal characteristics such as broad interest, aesthetic sensitivity, tolerance, intuition, affinity towards complexity, varied interest, and a belief in self. These correlate positively and consistently in the measurement of creativity in numerous domains (Barron & Harrington, 1981; Gough, 1979; Martindale, 1989). The literature describes a number of characteristics which depict the creative individual, although there is a debate on the nature and efficacy of the measures and their outcomes (Al Soulam, 2004; Barron, 1968; Dacey, 1989; Isaksen, 1987; MacKinnon, 1978; Torrance, 1963). Starko (2005) reports that the cognitive and personality characteristics are similar to those defined by Tardif and Sternberg (1988).

Creativity, according to Feist (1998), is individualistic: "creative people are prone to be more introverted, autonomous, suspicious of norms, possess high self esteem, prefer to work alone, willing to engage in risk, highly motivated, aggressive, comfortable with themselves and are (willing) to act without reflection" (p.299). Nevertheless, Martindale and Dailey (1996) and others find in creative individuals a

correlation between divergent thinking and extraversion (McCrae, 1987; Sen & Hagtvet, 1993; Stavridou & Furnham, 1996; Zabelina and Robinson, 2010). Creative individuals have also been found to show a correlation between verbal creativity and extraversion (King, Walker, & Broylse, 1996). In their research to clarify the diverging views regarding the traits of extraversion and introversion in creative people, Wolfradt and Pretz (2001) view introversion at a higher level of creativity. Also, Joy (2008) finds that there is a negative relationship between extraversion and creativity, specifically with originality.

According to Costa and McCrae (1985), openness is manifested by one's willingness to approach new ideas and to be comfortable with the concept of exploration. McCrae (1993), further states that openness to experience includes a desire for an experience simply as an end to itself. Such individuals have a high tolerance of others, unconventional attitudes and seek out novelty. Openness is correlated with liberal thinking and the tendency to immerse oneself in a task, while also exhibiting a special sensitivity towards the matter at hand (Martindale & Dailey, 1996). An intuitive individual's self assuredness is manifested in an eagerness to accept challenges and an ability to cope with doubt and uncertainty. Self assessment encompasses being alert, spontaneous, independent and confident (Eysenck, 1993).

The creative personality shows consistency, irrespective of age and varying conditions (Helson, Agronick, & Roberts, 1995). There are innumerable individuals who possess creative traits without notable achievements as they are either susceptible to environmental influences or they possess traits which inhibit achievement. Genetic variations lead to inevitable differences among humans. The human mind evolved as an

organism that is radically influenced by diverse cultural and environmental opportunities and demands during an individual's life (Howe, 2001).

According to Al-Pakistani (2007), financial security may be an indicator of intelligence. Socio-economic status impacts a person's development through access to education, although poverty does not preclude an individual from being creative. However, poverty necessitates higher motivation, greater focus and harder work (Eysenck, 1993). Nevertheless, creativity stems from interdependence of different factors which may be enabling or inhibiting, and opportunity for creativity must be present to enable ideas to evolve in projects (Feldhusen, 1995; Simonton, 1984). Eysenck (ibid.) identifies these variables as cognition, environment, and personality and they have a direct correlation to cognitive ability including intelligence, knowledge, special talents, and technical skills. The environmental variables as previously stated include cultural, political-religious, economic, and educational factors.

Personality traits such as confidence, originality and especially motivation play a vital role in creativity (Helson et al., 1995). Eysenck (1993), however, suggests that each of these variables is necessary for a creative achievement, although some will be more influential in a given situation. For example, an individual's perception of the prevailing attitudes within an environment impacts on a decision to make a contribution (Garfield, Taylor, Dennis, & Satzinger, 2001).

Debate on creativity was especially vigorous late last century. Eysenck (1993) takes the stance that psychoticism is the cause of creativity. On the same note, Rawlings, Twomey, Burns and Morris (1998) report that they found correlations between creativity, psychoticism and openness to experience, and Martindale and

Dailey (1996) found that creativity is linked to psychoticism and extraversion. Creative behaviour can be complex: Aguilar-Alonso (1996) offers that creativity in drawing can be anticipated through extraversion and differences, not on the basis of psychoticism and intelligence. On the other hand, verbal creativity can be predicted by psychoticism and intelligence. Whilst Eysenck denotes creativity through psychoticism at all levels, Kline and Cooper (1986) find no evidence linking the two dimensions.

Another theme in the debate is intelligence. Sternberg (2001) argues that it takes more than intelligence to foster creativity; wisdom is the medium between intelligence and creativity that positions the novel ideas. Novel ideas are readily available; however, it is a person's inherent wisdom which dictates the appropriateness or otherwise of an idea (Sternberg, 2001). Whilst it can be argued that psychoticism can generate novel ideas, it does not necessarily follow that there are suitable outcomes.

A set of antithetical traits which are usually present in the creative person has been defined by Csikszentmihalyi (1996). Creative individuals often possess a high level of physical energy; they also enjoy solitude and downtime. When committed to a project they will devote long hours with a strong focus, projecting continuing freshness and enthusiasm. Creative people in this paradigm control their environment; activities are not dictated by time or date. They have structured their lives and self direct routines towards a sharp focus. Creative persons are of an independent spirit, and perhaps somewhat naive. Csikszentmihalyi (1996) claims an IQ of at least 120 for a person to be capable of creative endeavours. Nevertheless, the theorist holds that a higher IQ does not guarantee success in creative achievements; that the better command one has over two opposing thinking processes, divergent and convergent, the more capable one is of

producing an acceptable novelty. Convergent thinking is measured by IQ tests, and it involves the solving of rational problems; whilst divergent thinking may lead to no agreed solution. Without the inherent wisdom from convergent thinking, one cannot distinguish a good idea from a bad idea (Csikszentmihalyi, 1996; Sternberg, 2001). Creative people combine light heartedness and rigidity, or maturity and immaturity (Csikszentmihalyi, 1996). Creative individuals consider the nonexistent and the pretend; however, this is based on a sense of reality which fosters innovations or produces artistic masterpieces. Other trait opposites include aggressiveness and shyness; modesty and impressiveness; non-conforming and traditionalists; emotional about their work and at the same time objective; open and vulnerable yet sensitive and capable of enjoyment. Whilst these trait claims may be supported, they may also be applicable to a wider proportion of humanity than Csikszentmihalyi's elites.

**Age** In attempting to establish links between creative thinking and age there is again a division in informed opinion; that creative thinking is manifest at a pre-school age, or older. The first group asserts that creativity initially appears in preschool students. For example, Gardner (1982) finds artistic creativity in preschool children. The researcher held to the prevailing view that the development process in younger children followed a U-shaped pattern, with initial high levels of creativity that were later suppressed by the constrictions of the traditional classroom. Thus Gardner offers the idea that this forced conformity is internalised in preadolescence and there is a subsequent re-emergence of creativity through adolescence to adulthood.

The second group of researchers, including Claxton, Pannells, and Rhoads (2005), and Ponomarev (2008) focus on creative thinking at the secondary school stage.

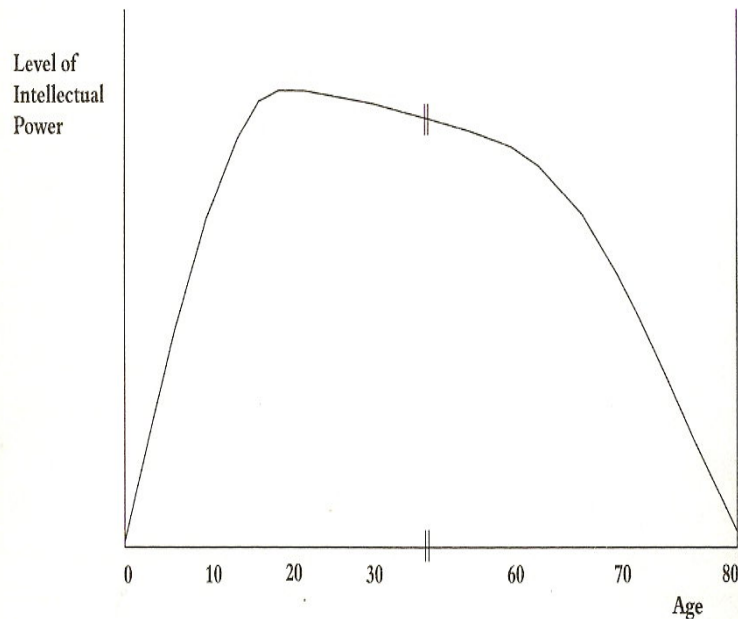


Piaget's (1972) developmental theory posits that formal operational (abstract) thinking begins around 12 years of age, that is, early high school level. The ability to employ hypothetical abstraction also emerges at this time (Moses & Baldwin, 2005). In keeping with Gardner's (1982) observations, Smith and Carlsson (1983) show creativity decreasing at 7-8 years of age, increasing again at 10-11 years. Creative thinking decreases again slightly at 12 years of age after which it gradually increases until a second peak around 16 years. In addition, Reed (2005) interviewed 21 mature artists, finding that the creative thinking of an individual peaked over time, because an individual's accumulated experience is increased with time. Therefore, to develop a student's creative abilities, a range of circumstances and characteristics is necessary, such as willingness, a friendly school environment and the appropriate age for students (that is, targeting the age period during which creative thinking can be facilitated).

Cropley (2001) reports that

early psychological research on the relationship between age and intellectual performance in general supported the still-widely prevalent stereotype encapsulated in the adolescence peak hypothesis. This can be summarized in a simple manner: a rapid increase in early life is thought to lead to a peak in performance in adolescence or early adulthood (pp.75-76).

Also, Cropley suggests that after early adulthood a decline occurs in intellectual growth, leading to a very low level in old age (80 years old), and this is illustrated at Figure 2.4.



Source: Cropley 2001, p.76

Figure 2.4 *Relationship between intellectual growth and age*

This adulthood peak is confirmed in a cultural dimension by Vygotsky (1967) and Capossela (2000) who states that “(c)ertainly adolescence is the most vulnerable time for creativity” (p. 55). Confirmation of this stance comes from Camp (1994), who adopted the Williams (1969) cognitive-affective model of creativity for a longitudinal study, concluding that as the students advanced in grade, there was an associated increase in their divergent thinking. In a comparative study on music improvisational creativity, Kiehn (2003) conducted a study for students in elementary school (Gr 2, Gr 4, and Gr 6) by using the Vanghan test and Torrance tests. The findings showed there were significant differences between students, as the students advanced to grade 4; however, between grades 4 and 6 creativity acquisition reached a peak. Further, the creative test scores of the boys were higher than that of the girls.

In addition, Mouchiroud and Lubart (2002) studied the social creative thinking of students in elementary school stage (6-11 years). The authors used two tests: the social creativity tasks (peers, parents, and dyad) and Torrance tests. The findings showed that the fluency, originality, and creativity indices all improved with age: children in the 10-11 years cohort scored higher in all sub tests than younger children (6-9 years old).

In this section, influencing factors for creative thinking were postulated as motivation, environment, traits, and age. Researchers initially predicted that intrinsic motivation was a factor in creativity; however, under certain conditions, extrinsic motivation is positively related to creativity (Amabile, 1988; Mumford et al., 2002). Intrinsic motivation occurs with an interest to engage in an activity (Csikszentmihalyi, 1988). Hennessey (2003) notes that the expectation of reward, expected evaluation, surveillance, time limits, and competition are generally negatively associated with intrinsic motivation.

Research shows that the social environment is important in creative thinking: children are better suited to learning and creativity when they have social support (Anning, 1988; Kharkhurin & Samadpour Motalleebi, 2008; Wentz-Gross et al., 1997). Familial, cultural, and socioeconomic factors affect students' creative thinking (Feuerstein, 2000; Lee, 2008; Whitelaw, 2006). A stimulating family environment that provides creative and cultural activities appreciably assists in promoting creativity (Harrington et al., 1987; Lee, 2008; Rogers, 1954; Simonton, 1984; Whitelaw, 2006). Similarly, the suitable classroom environment encourages students to bring new ideas

that are novel, diverse, and accepted in their society (Al Soulami, 2004; Anning, 1988; Csikszentmihalyi, 1996).

Inherent traits are factors giving rise to the creative process (Cropley, 2001). Characteristics such as broad interest, aesthetic sensitivity, tolerance, intuition, affinity towards complexity, varied interest, and a belief in self, addresses measures of cognitive styles and intelligence (Amabile, 1983b; Woodman & Schoenfeldt, 1989). Similar traits such as motivation, originality, and self confidence are important with regard to the creative thinking of individuals (Helson et al., 1995). Sternberg (2001) argues that there is a relationship between intelligence and creative thinking, while wisdom is located between them.

Age may be a criterion of creative thinking. Gardner (1982) finds artistic creativity in the preschool stage; however, Rhoads (2005), and Ponomarev (2008) focus on creative thinking at the secondary school stage. Piaget's (1972) developmental theory posits that formal operational (abstract) thinking begins at early high school level, and hypothetical abstraction also emerges at this time (Moses & Baldwin, 2005; Mouchiroud & Lubart 2002).

The results of the literature survey on influencing factors for creative thinking lead to the conclusion that, whilst intrinsic factors are important, extrinsic factors such as rewards can assist students' motivation towards creative thinking. The social environments of family, school, and peer contact are strong variables for creative thinking, two of which are assessed within this study (family and school environment). While the characteristics identified in the literature associated with creative thinking are subject to the TCTT and MFFT, traits can be derived from the sample for this study.

Finally, Piaget's 1972 developmental theory on emergence and peak of creative thinking informs the decision for the sample cohort. The next section considers creativity measurement opportunities and constraints.

#### **2.2.4 Measurement**

There are seven different and convergent tests which can be used to assess creative thinking. Sternberg & Lubart (2000) offered the analysis that these seven approaches, though the features are different, enjoy a symbiotic relationship. The inherent differences of the seven features, coupled with their association, point to the fact that creativity can be defined in many ways, and this concept permeates culture. Lubart (2000) also notes the numerous variances in the approaches stemming from a lack of definition for creativity. The established approaches are "mystical, pragmatic, psychodynamic, psychometric, cognitive, social-personal and confluence" (p. 4).

The mystical approach to creativity as described by Sternberg and Lubart (2000) is intangible, and the pragmatic approach is concerned with development of creativity at the expense of understanding it. This approach is associated with De Bono (1992) and earlier with Osborn (1953). The early psychodynamic approach, associated with Freud (1908/1958), is based on the tension between conscious reality and unconscious drives. Freud's analysis relied almost exclusively on case studies. Lubart (2000) suggests that Guilford (1950) and Torrance (1974) made use of the psychometric approach in their attempts to gauge creative thinking and divergent thinking. Haensley and Torrance (1990) listed multiple (200) means which could be used to measure various aspects of creativity. Houtz and Krug (1995) presented literature on numerous tests which were developed for creative assessment. These tests were patterned after those of Hocevar

(1981) whose classifications came from a broad spectrum of tests: personality, attitude, and divergent thinking (creative thinking).

The focus for measurement in this thesis is the Torrance Test of Creative Thinking (TTCT), which is one of the most widely used tests for divergent thinking (Al Soulami, 2004). Developed by Torrance in 1966, the TTCT measures five skills of creative thinking (fluency, originality, abstractness of titles, elaboration and resistance to closure) (Stephens, Karnes, & Whorton, 2001). The test is useful for eliciting creativity from all who are examined, not merely the gifted. Kim (2006) notes that “TTCT appears to be a measure, not only for identifying and educating the gifted, but also for discovering and encouraging everyday life creativity in the general population” (p. 11). The Torrance test contains two verbal forms, A and B, and two figural forms, A and B (Rudowicz et al., 1995). Clark (2008) states that the TTCT-figural is based on Torrance’s holistic advocacy, which makes it an appropriate tool for measuring students who have varying potentials, ages and abilities. Whilst the test was initially intended by Torrance (1974) to be administered on a one-to-one basis, Treffinger (1985) is critical of the use of the TTCT-figural when used for broad spectrum testing, asserting that it requires critical appraisal for interpretation.

The multi-lingual translations of the TTCT illustrate its adaptability and ability to assess creative potential across cultures, gender, age and ethnicity (Millar, 2001). This test is an outcome of the work of Guilford (1962) who measured creative thinking and divergent thinking. Cropley (2006a) dealt with differentiated counselling and suggested the use of the TTCT when making assessments of potential. Runco (1986) asserted that the indicators of creativity should not be limited.

As noted, there are four types of TTCT tests, verbal and figural, A and B for each, which were initially designed to measure four creative abilities. (1) Fluency: (The number of ideas) total number of relevant responses; (2) Originality: (atypical generation of points of view) number of ideas with low frequency occurrence. Whenever the idea is non-novel, it does not receive a score. A score of 1 is afforded all qualified responses; (3) Elaboration: ideas which are added; and (4) Flexibility: categorisation for responses which have reference to the matter at hand.

Due to a high correlation between fluency and flexibility, fluency was eliminated in 1990, and Torrance then added measures of creative potential; abstractness of titles, and resistance to premature closure (Hébert, Cramond, Neumeister, Millar, & Silvian, 2002). Abstractness of titles measures the degree a title moves beyond descriptive labelling of drawn pictures. Resistance to premature closure measures psychological openness. The TTCT test now consists of three drawing activities to measure a student's creative thinking in five different skill areas including fluency, originality, abstractness of title, elaboration, and resistance to closure. Normally it takes approximately 30 minutes for each student to complete the test (Kim, 2006).

This study uses the TTCT figural form (B) as this test minimises culture, gender, race, language, and socio-economic effects (Cramond, Matthews-Morgan, Bandalos, & Zue, 2005; Torrance, 1979). The universal-verbal forms of the test require knowledge of a particular language. Further, the TTCT figural form (B) has a high predictive validity over a wide age range and has been extensively developed and evaluated over a long period (Cropley, 2000; Millar, 2001).

The TTCT was first used by Soliman and Abo Hattab (1971, cited in Al-Solimani 1992) and the researchers found that the test was effective for use in the Arab community especially in Saudi culture. Al-Solimani (1992) used the TTCT figural B and A in Makkah area and found that the test was valid as a test, and this view was confirmed by later researchers (e.g.: Al-Nokali, 2004; Al-Pakistani, 2007; Al Soulami, 2004).

The varying approaches to creative thinking are explained in this section. Theorists can have a rational approach, focussing on production analogies (Brown, 1989; Tegano et al., 1991); others a psychological approach (Guilford, 1954; Weisberg, 1986); whilst modular theorists (Harris, 1998; Lipman, 2003) pursue an intrinsic/extrinsic theme.

The relationship between creative thinking and the reflective impulsive style adopted for this study is a hybrid of the intrinsic model and the psychological approach, placing the person at the focus rather than the technical using Furnham's (1992) personality characteristics of traits, cognitive styles, and coping behaviour. This research focuses on cognitive style, particularly the reflective-impulsive dimension and a comparison of the creative thinking skills of students in rural and urban schools.

Theories on creative thinking are placed in several disciplines. Biological theorists locate creativity in the brain (Katz, 1997; Herrmann, 1991; Runco, 2007). Constructivist theorists state that creative thinking occurs with learning and solving problems (Bruner, 1975; Vygotsky, 1978), although behaviourist researchers suggest that creative thinking occurs through new stimuli and responses (Runco, 2007; Slavin, 2009). Humanistic theorists seek to quantify levels of creativity, whilst factor structure



researchers tend to meld a number of divergent thinking abilities and factors that can be measured. Factor structure theory is adopted for this study.

Influencing factors for creative thinking were postulated as motivation, environment, inherent traits, and age. Although intrinsic motivation is a factor in creativity, extrinsic motivation is also regarded as a determinant (Amabile, 1988; Mumford et al., 2002). The social environment is also important and children can be drawn to creativity when they enjoy family, cultural, and socio-economic support (Feuerstein, 2000; Lee, 2008; Whitelaw, 2006). This also occurs in the classroom (Anning, 1988; Csikszentmihalyi, 1996). Traits are also factors in the creative process, as well as intelligence (Cropley, 2001; Sternberg, 2001). Age is also a dimension in creative thinking, Claxton et al. (2005), and Ponomarev (2008) focus on creative thinking at the secondary school stage and suggest hypothetical abstraction also emerges at this time. The results of the discussion for this research are that extrinsic factors such as rewards, social environments of family and school, traits, and mid-adolescence are criteria which can be adopted for this study, subject to the constraints of the TCTT and MFFT (c.f. Cropley, 2000; Millar, 2001). The next section discusses the second part of the research question, that of determining and analysing results from students using the reflective-impulsive test, MFFT.

### **2.3 Cognitive Style**

A relationship between cognitive style and creative thinking emerges from a review of the research; the link between intelligence and personality is crucial for creative thinking (Lloyd-Evans, Batey, & Furnham, 2006). Creative thinking emerges from processing information, and the nature of the cognitive style which plays an

important role in an individual's versatility and creativity. Historically, creativity was associated with artists, musicians, and inventors who were admired as gifted or genius. Weisberg (1993) suggests that creative thinking is a hard task to understand, because it is influenced by a complex set of psychological and social forces.

The first part of this chapter examined the literature pertaining to creative thinking, and the approaches that theorists have pursued to define, categorise, and measure aspects of creativity. Similarly, cognitive style is explored in this part. First, there is a selection of the research to categorise or define cognitive style, followed by the classification of the approaches adopted, and an explanation of these groups, holistic-analytic, verbal-imagery, and merged groups. This is followed by a discussion on reflective-impulsive style, and its relationship to creative thinking.

### **2.3.1 Definitions**

“Cognitive styles reflect the ways in which individuals process information and make sense of their world” (Price, 2004, p.683). Cognitive style is displayed when two persons solve the same problem with different results (Kirton, 2003). Löfström (2008) states that cognitive style appears in all areas of a person's life where decisions are required. Saracho (1998) describes cognitive style as an aspect of personalised traits which are comprised of conformity, paths of pursuit, retention of information, and one's approach to problems, and in tasks such as dispute resolution or information gathering (Messick, 1978). Atkinson (2004) suggests that cognitive style is “a distinct and consistent way for an individual to encode, store and perform” (p. 663), and is thus related to approaches in learning situations. The focus of cognitive style relates to behaviour, not the task itself (Furnham, 1995; Messick, 1978). It can be defined as the

means of processing information; consistent with individual differences in experiences and perceptions; the manner in which information is organised and processed; and the types of problem-solving strategies employed (Martinsen & Kaufmann, 1999). A considerable amount of the literature which concerns cognitive style focuses on dichotomies, or bi-polar structures (Entwistle, 1981). Miller (1987) offers the opinion that cognitive styles are broad dispositions and higher order meta-strategies which are influential in the individual's quest to deal with circumstances. Some definitions of cognitive style cover a considerable area, including a link between style and personality. Cognitive styles are independent of personality; however, they interact (Riding & Rayner, 1998; 2000).

The connection between cognitive style and creative thinking was pioneered by Kirton (1976, 2003) as the adaptive-innovation theory, which dealt with an individual's means of solving problems. The types of preferences range from adaptive, within a paradigm, to innovative, outside the paradigm. The adaptive-innovative theory and the cognitive style use a unit of measure to assess the particular creative problem solving paradigm. Miller (2007) studied the relationship between creative thinking and cognitive style in regard to the field dependence-independence style, finding a significant difference between creative thinking and cognitive style for those displaying a field-independence style.

Creativity is an important construct in psychology, education, business and beyond. Awareness of cognitive style may be greatly beneficial for teachers, employers and even acquaintances to identify how one might function within the environment. The interest in both cognitive style and increasing creativity within

the field of education provides an especially compelling application of this line of research, as combined investigations can work to clarify the best practices for education, in terms of individual differences and environmental situations (ibid. p. 245).

### **2.3.2 Classification of Cognitive Strategies**

A functional means of classifying research outcomes in this area is a combination of cognitive, meta-cognitive, and resource management strategies. Cognitive style comprises processing material and retrieving memories for information. Cognitive strategy consists of the action of rehearsal, elaboration, and organisational strategies (Güven, 2008; Pintrich, 1989; Weinstein & Mayer, 1986). A rehearsal strategy is to encrypt all messages and transfer it to working memory (e.g., naming and note taking). Elaboration strategies are considered as a store of the information that related to the long term knowledge such as general writing, clarifying information, and providing a synopsis (Güven, 2008; Hemmeyer, 2004).

An organisational cognitive strategy helps the individual to choose the suitable information that connects with previous information; maybe identifying the idea from the text or the structure. While it is not necessary to be cognisant of the strategies undertaken to achieve a task, the process being used can differ with the situation and represents choice of action and thought; abandonment, or non-use, of irrelevant cognitions is equally important. Any strategy can be adopted without conscious effort by an individual; however, the emotional resistance of unimportant or inaccurate elements should be examined, as the element may in fact be pertinent to the task cognitions (Lohman & Bosma, 2002). The meta-cognitive category consists of

strategies such as strategy mapping, observing and adjusting cognitive processes. Resource management consists of mixed strategies; efficiency of time, energy expenditure and a number of ancillary items which impact on task involvement (Pintrich, 1989).

The investigation of truth in science is usually initiated by a relatively simple hypothesis, which has the tendency to become more intricate, thus the literature on cognitive style is extremely broad (Shah & Kruglanski, 2000). The cognitive style continuum is defined as approaches of holistic-analytic and verbaliser-image dimensions (Riding, 1991) and analytic-intuitive dimension (Hayes & Allison, 1994). Sternberg (1995) and Riding & Rayner (1998) use three main approaches relating to aspects of information processing. These are: 1) - cognition-centred; 2) - personality-centred; and 3- activity or learning-centred approach (Löfström, 2005). The cognition-centred approach focuses on one dimension, while cognitive style is diffuse. The methodology for this study thus adopts cognitive style to draw in theory from the other dimensions. This is discussed below.

The majority of researchers traditionally select cognition-centred functionality, which involves a holistic-analytic dimension of style to refer to an individual's typical method for organising new information (Riding & Rayner, 1998). However, a superordinate style within the cognition-centred tradition focused on the holistic-analytic dimension (Hayes & Allinson, 1996a; Miller, 1987). It is possible that several threads of cognitive functioning research relate to only one dimension of cognitive style, the holistic-analytical (Rayner & Riding, 1997; Riding & Cheema, 1991). The extent of late twentieth-century research is shown in the next table, 2.2, which details

three analytic dimensions: holistic-analytic, verbal-imagery, and integrated and are discussed below.

Table 2.2  
*Descriptions of cognitive style dimensions*

Cognitive Style Element	Description	Proponent/s
<b>Holistic-analytic</b>		
Field dependency/ independency	Individual dependency on a perceptual when analysing a structure or form part of field.	Witkin, Oltman, Raskin & Karp (1971)
Levelling-sharpening	Assimilates detail rapidly, loses or emphasises detail and changes in new information.	Klein (1954); Gardner et al. (1959)
Impulsivity-reflective	Tendency for quick, not deliberate, response.	Kagan et al. (1964); Kagan (1966)
Converging-diverging thinking.	Narrow, focused, logical, deductive thinking rather than broad, open-ended, associational thinking to solve problems.	Guilford (1967); Hudson (1966, 1968)
Holistic-serialist thinking.	Tendency to work through learning tasks or problem solving incrementally or globally and assimilate detail.	Pask and Scott (1972); Pask (1976)
Concrete sequential/ concrete random/ abstract sequential/ abstract random.	Learns through concrete experience and abstraction either randomly or sequentially.	Gregorc (1982)
Assimilator-explorer	Individual preferences for seeking familiarity or novelty in problem-solving and creativity.	Kaufmann (1989)
Adaptors-innovators	Adaptors prefer conventional, established procedures; innovators restructuring or new perspectives in problem solving.	Kirton (1976)
Reasoning-intuitive Active-contemplative.	Preference for developing understanding through reasoning by spontaneity or insight and learning activity which allows active participation or passive reflection.	Hayes and Allinson (1996a)
<b>Verbal-imagery</b>		
Abstract versus concrete thinker	Preferred level and capacity of abstraction.	Harvey et al. (1961)
Verbaliser-visualiser	Extent that verbal/visual strategies used to represent knowledge and in thinking.	Paivio (1971); Riding & Taylor (1976); Riding & Calvey (1981)
<b>Integration of holist-analytic and verbal-imagery</b>		
Holistic-analytic, verbal-imagery.	Tendency to process information in parts or as a whole and think in words or pictures.	Riding (1991); Riding and Cheema (1991)

Source: Rayner and Riding (1997, p.20)

***Holistic-Analytic Group.*** The holistic-analytic cognitive dimension resulted from a large number of research findings (Löfström, 2005). The holistic-analytic dimension includes several styles such as: impulsivity-reflectivity, convergent-divergent, holistic-serialist, and random or sequential styles (Löfström, 2005; Witkin, Dyk, Faterson, Goodenough, & Karp, 1962; Witkin, Oltman, Raskin, & Karp, 1971; Witkin & Goodenough, 1981).

The impulsivity-reflectivity dimension, the decision making rate, was produced by Kagan et al. (1964) and is measured by the Matching Familiar Figures Test (MFFT). It can be argued that, due to its functionality limitations, the impulsive-reflective dimension is more restricted than the holistic-analytical dimension. It is however more adaptable to personal and social experiences (Jones, 1997). The main difference is that the holistic-analytic dimension is abstract and flexible, as it is a high-level function with the capability to organise and control in a more demanding context, whereas impulsivity-reflectivity is concrete (Jones, 1997, p.74). Guilford (1967) pioneered the concept of convergent-divergent thinking relating to thinking and problem solving. The Guilford model was enhanced by Hudson (1966, 1968) and by Pask & Scott (1972) when they introduced the concept of a holistic-serialist dimension.

Basing cognitive style study on the visual imagery and problem solving of Kaufmann (1979, 1980), Martinsen (1994) developed a measure of novelty-familiarity, a derivative of the assimilator-explorer dimension that highlights behaviour in problem solving. The adaptor-innovator dimension of Kirton (1976) is also evident in problem solving and creative thinking. The Hayes and Allinson (1996) cognitive model forms a significant link in this study and is discussed further in this section. The cognitive style



index was developed to measure intuitive and analytic style and is social in nature due to its reliance on external input, as opposed to the self reliant nature of the analytics. There is a correlation between field-independence and analytic cognitive style, while intuitive style correlates with field-dependence.

**Verbal-Imagery Group.** Riding and Cheema (1991) suggested that verbal-imagery contains principal modes in the presentation of information. In addition, Paivio (1971) believed that this model of cognitive style is based on the dual-coding theory. In this theory, the individual utilises an imagery process and as such the visualising process as a cognitive style. On the other hand, individuals who depend upon information by verbal-logical means are ‘verbalisers’ (Kozhevnikov, Hegarty & Mayer, 2002). Also, Riding and Taylor (1976) (cited in Riding and Rayner 1998) suggested that learning performance may be affected by two different basic sets in thinking which is either visual or verbal. Furthermore, Riding and Cheema (1991) reported there are several imagery questionnaires regarding imagery and imagining abilities. They suggested that the most known of these questionnaires are: *Bett’s Inventory*, *Mark’s Vividness of Imagery Questionnaire*, and the *Gordon Scale of Imagery Control*.

**Merged Holistic-Analytic and Verbal-Imagery Group.** Both holistic-analytic and verbal-imagery dimensions are used to demonstrate the information process (Rayner & Riding, 1997; Riding & Rayner, 1998). Riding (1997) states that it is essential for constructs to originate from opposite dimensions (verbal-imagery) or to be complementary as a criterion of dimension. However, Kozhevnikov et al. (2002) argue against the unitary dimension theory, where an individual is a visualiser, concluding that the cognitive dimension is composed of degrees of visual imagery. Visual-pictorial

imagery in problem solving describes a low-spatial visualiser followed by high-spatial energiser (spatial type), thus involving spatial semantic imagery. The call by the researchers for further work in the area supports the conclusions of Sternberg (1995): that the abundance of experimental data detracts from the general principles and organisation in an under-theorised field of cognitive style.

As a consequence of consideration of all dimensions, this work is grounded in the reflective-impulsive style from the holistic-analytic dimension.

### **2.3.3 Reflective-Impulsive Style**

As noted above (see s.2.3.1), the reflective-impulsive dimension was developed by Kagan et al. (1964) using the MFFT test to describe individual differences in problem-solving (Davies & Graff, 2006; Finch et al., 1982; Yu, 1997). The reflective-impulsive style can be viewed “as a property of the cognitive system that combines individuals' decision making time and their performance in problem-solving situations, which involve a high degree of uncertainty” (Rozenchwajg & Corroyer, 2005, p. 451). Reflective individuals are fastidious and deliberate, whilst impulsive individuals prefer to respond faster without accuracy (Gullo, 1988; Kagan, 1966; Yu, 1997).

As the instrument most used for this phenomenon, the MFFT was developed to measure cognitive tempo on an impulsive-reflective axis, and was converted to a 20-question version by Cairns and Cammock (1978). The MFFT consists of a stimulus object with eight associated variants and the respondent must associate the correct variant with the stimulus object; thus there are 20 test items each with eight similar

variants, plus practice items. The total number of errors and the latency of first response for each test item are recorded in figure 2.5 below.

Impulsive	Slow-Inaccurate	→	Median number of errors
Fast-Accurate	Reflective		
↓			
Median latency (seconds to first response)			

Source: Kenny, 2009, p.53

Figure 2.5 *Matching familiar figures test: scoring*

Latency and accuracy scores are used to classify participants into four groups:

(1) Impulsive: respondents who were quicker and therefore whose latency score was below median; however, with an error rate above the median; (2) Reflective: respondents with a latency score above the median with fewer errors; (3) Fast-accurate: fast and accurate respondents, and (4) Slow-inaccurate: slow respondents with a higher error rate (Egeland & Weinberg, 1976; Kenny, 2009).

Thus the measured cognitive tempo classifies subjects as impulsive (those who sacrifice accuracy for speed), reflective (those who sacrifice speed for accuracy), fast accurate (those who sacrifice neither) or slow inaccurate (those who sacrifice both).

“Based on how subjects score on errors and latency, their results are placed along intersecting horizontal and vertical axes” (Kenny, 2009, p.49).

Several historical studies use variables other than creative thinking to analyse the reflective and impulsive styles; Barrett (1977) finds differences between these styles and achievement: grade four students classified as reflective were found to achieve

higher results in later grades than students who were identified as impulsive. This finding is confirmed by Zelniker and Jeffrey (1979) and van Merriënboer (1988) who report that reflective students' performance is superior to impulsive students on detail oriented tasks and comprehension tests. However, Yu (1997) studied reflective-impulsive style on variables including students' navigation patterns, learner achievement, and self-efficacy with multimedia learning environments. Using a range of instruments; MFFT, achievement tests and self-efficacy scales, the researcher found no significant differences between student types and the variables. Yu's analysis included the observation that the instructional lesson was insufficiently complex to allow differentiation; a probable lack of motivation to pursue a new topic, and importantly,

the resource icons may not have expressed the meanings intended by the researcher, so students may not have been able to associate these resource nodes with problem solving activities or skills. Consequently, these resource nodes would not be considered and utilized differently by students with different cognitive tempo (Yu, 1997, pp. 83-84).

A significant correlation was found between the reflective students and a range of intelligence quotient (IQ) scores: verbal, performance, full scale and Kaufman's perceptual organisation factor, although not with regard to impulsiveness (Finch et al., 1982). In a cultural comparison, Resendiz and Fox (1985) find that Mexican children make more errors with less latency than children from USA, Israel, and Japan; however, same-age children from all four cultures develop from fast-inaccurate through to slow-accurate, with Japanese children maturing at a faster rate.

While cognitive styles are important for students, culture, IQ and age may affect the student's style. The reflective/impulsive quanta holds for adults: Finch, Kendall and Hook (1980) administered the MFFT to 20-year-olds with a positive result for reflective students in verbal behaviour on the basis of speed (impulsive) against accuracy (reflective). Oas (1985) and van Merriënboer (1988) advocate the reflective approach in the acquisition of knowledge and the ability to resolve problems, especially when a range of responses was offered, as in the MFFT. Studies on social reasoning and reflection-impulsivity demonstrate a tendency among reflective children to choose assertive and physically aggressive modes, while impulsive children chose yielding responses and appeals to authority (Yu, 1997). In addition, Wright and Vlietstra (1977) state that reflective performance involves a more active problem solving style, whereas impulsive performance results from a passive exploratory problem-solving strategy. In Saudi Arabia, El-Faramawy (1986) was the first researcher to apply the MFFT in an Arab community, finding it relevant and effective; this was followed by Al Soulami (2004), who reported successful use of the test within the Makkah community.

### **2.3.4 Reflective-Impulsive Style and Creativity**

Of the few studies that used the variable creativity in assessing reflective-impulsivity Al Soulami (2004) and Olaseinde (1994) find in their studies that reflective participants display greater creativity than those who display impulsiveness, while Olaseinde also confirms that gender was not significant. Fuqua, Bartsch, and Phye (1975) earlier conducted a study of preschool age children with similar findings that children who were reflective scored higher on fluency, flexibility, originality, and

elaboration, with the addition that “the modified MFFT and TTCT are useful research instruments with preschool- age children” (p.781).

The MFFT was used by Frare (1986) to examine creative and critical thinking in grade 10 Egyptian children with no significant gender, intellectual fluency, or verbal fluency differences for reflective-impulsiveness. However, the study finds that reflective participants were higher scoring than the impulsive category in elaboration, originality, and overall capacity for critical thinking. Findings include a negative relationship between the number of errors in MFFT and originality, verbal fluency, automatic flexibility, argument, and evaluation. The relationship between reflective-impulsivity and creativity holds throughout childhood to secondary school level so that the MFFT and TTCT are appropriate for these age ranges (Frare, 1986; Fuqua et al., 1975).

In their substantial study of cognitive style and creativity in rural and urban Chinese secondary school students, Hongli and Yulin (2006) find that the participants who were field independent in the cognitive dimension scored higher than those categorised as field dependent, noting the rural-urban differences.

Over decades, an intense debate has emerged, briefly summarised herein, of different theorists’ approaches to define the process of thought or cognition, categorise the outcomes of thought, and rank its quality. For the purposes of this study, there is a need to identify superior outcomes of cognition in enquiry through learning. In the previous section of this chapter, it was established that creativity is a desirable learning factor and a relationship between creativity and the preferred reflective-impulsive style of the cognitive dimension was identified. The MFFT was selected for this study

because it is the more conventional measure of cognitive tempo, consistent with the Fuqua et al. (1975) study. In regard to creative thinking the current TTCT was selected following the observation of Fuqua et al. (1975) that “the Torrance Tests of creative thinking would permit children to express their creativity in a familiar medium in which they are relatively skilled” (p. 80). This is the preferred path for the study’s methodology, in particular the data for the quantitative analysis, which may lead to outcomes which could assist the fundamental change required in Saudi Arabia to redirect learning and teaching toward a naturalistic enquiry style from traditionalist text memorising.

This thesis is a comparison of creative thinking and cognitive style (reflective–impulsive) in a select sample of grade 10 male students in rural and urban Saudi Arabia. Whilst the following chapter presents the Saudia Arabian context of this study, there are pedagogical aspects of theory in creative thinking and cognitive style which are the foci of the following section.

## **2.4 Teaching Creativity**

The research question of this thesis concerns the effect of the rural environment on the creativity of students. The sub-questions concern the administration of the creative thinking test TTCT figure B, and the reflective-impulsive test MFFT, which comprise the first two sections of this chapter. Further, the aim is to determine the standard of creativity of Saudi male students and the factors underlying their level of creative thinking. The teachers’ role in identifying and nurturing creative thinking is discussed in the following section.

### 2.4.1 Influences

Creative thinking and cognitive style theories are grounded in classroom activity. Assessing the role of teachers is essential in furthering the social asset of creativity development (Sosa & Gero, 2003). There is an argument that differentiation in teaching styles towards a defined creative group could in some manner be unfair; this notion can be readily addressed through optimising learning processes, instructional preferences, and cognitive skill development to meet the needs of all children as they develop (Riding & Rayner, 1998). Not all children are served by the singular teaching delivery style that is common in traditional Arabic society and Fleith (2000) and Al-Suleiman (2009) show that the school environment can be a catalyst in student creativity. However, teacher attitude plays an important role by: “not imposing too many assignments and rules on students, giving students choices, providing students with opportunities to become aware of their creativity, accepting students as they are and boosting student's self-confidence” (Fleith, 2000, p.4). This is confirmed by Sternberg, (2003) who finds that teaching creativity contributes to academic achievement, maintains inherent creativity, and encourages those who may not otherwise display creative thinking. Creativity, according to Sternberg, needs to be encouraged in all its forms, not just incremental. “Teachers who reward all kinds of creativity . . . find among their students those who have made . . . the decision to be creative” (p.337).

In an apparent contradiction with Al Soulami (2004) and Olaseinde (1994) who associate reflective traits with creativity, Snowden and Christian (1999) emphasise the role of parents in creative thinking, noting that more educated parents try to develop



children's skills in that regard. Furthermore, Zhou (2003) states that supervisors can motivate individuals' creative thinking to improve performance. However, Scott (1999) illustrates problems relating to the teacher's perception of student creativity due to overcrowding and time constraints, leading to "the inability to attend to each child's individual needs"; also the teacher experiences pressure to "prepare students for the next grade level" (p. 327). This places the teacher as an important factor in the development of creative thinking, a factor that may be positive or negative (Torrance, 1981).

#### **2.4.2 Classroom Motivators**

Research suggests that teachers must remain sensitive to creativity, as a rigid attitude towards innovation and novelty creates isolation in the classroom (Oral, 1997; Stoycheva, 1996; Torrance, 1970), and this attitude remains in some cultures, including Arabic. Nevertheless, Runco (2003) and Sternberg (2003) assert that it is not the norm for teachers to support creative expression in their classroom. St. John (2001) claims that creativity through teacher-student dialogue or bonding can take place with a minimum of resources; a learning environment can be created on the basis of readings. "Teachers who creatively sustain meaningful connection through the use of a teaching stance such as the Person-to-Person Learning model can revive hope and build community in relational conditions otherwise characterized by despair" (Ferch, St. John, Reyes, & Ramsey, 2006, p. 162).

For teachers to enhance students' creative thinking, Torrance (1994) suggests a three stage model of creative thinking. The first stage consists of building curiosity in the learner towards the incoming information, before the creative thinking abilities are activated. At the second stage, it is necessary to help the learner approach the problem

and deepen his or her expectations toward it. At the third stage, the information obtained at the previous stages must be addressed. For the process to be completed at each stage, teachers must have creative thinking skills and techniques which promote and develop the creativity of their students. Cropley (2001) reports that encouraging and fostering creative students in the classroom is a goal of education that aims to develop the full capacities of individuals.

The South Korean government introduced legislation to lift the profile of creative thinking in 2002, noting that creativity is an important element in Korea's future prosperity (Kim, Shim, & Hull, 2009). To illustrate this commitment in a Korean project study, Lee and Seo (2006) find that when a teacher supported creativity, there is a tendency for the students' creativity to increase, which did not occur when teachers were ambivalent regarding creativity. This was supported by Pleschová (2007) who finds unusual assignments act as a motivational tool. Cropley (2001) reports that teachers who foster creativity:

- encourage independent learning
- display a cooperative, socially integrative style of teaching
- emphasise factual knowledge
- tolerate 'sensible' or bold errors
- promote self-evaluation
- take questions seriously
- offer opportunities to work with varied materials under different conditions
- help students learn to cope with frustration and failure
- reward courage as much as being right (p. 138).

In Saudi Arabia, however, Al-Enezi (2003) finds two factors which adversely affect the teachers' role in students' creativity, especially in rural schools. The lack of

adequate resources, and the practice of renting residences as temporary school accommodation, instead of providing purpose-built schools, invariably leads to overcrowding.

### **2.4.3 Teaching Styles**

A teacher's style of classroom management affects creative thinking in students (Al- Suleiman, 2009; Westby & Dawson, 1995), although "a qualified teacher has the methodological competence to enable students to develop skills for creativity and understanding" (Ololube, 2006, p. 41). Deci, Nezlek, and Sheinman (1981) also pursue the classroom management paradigm, stating that teachers who exercise more freedom were prone to find more creativity than those teachers who minimised independence of students. Whilst creativity was initially viewed as a somewhat asocial means of individual expression, Cropley (2006b) regards it as a social approach with levels of novelty that can be managed. Whilst school administrations, teacher perceptions, and student capacities differ, the social approach to creativity "emphasizes the importance of groups, role models and mentors and classroom climate, all of which teachers can influence. A social analysis suggests guidelines for instruction and assessment that differ from those derived from cognitive or personal approaches" (Cropley, 2006b, p.125).

Factors impacting student learning include teacher's training, experience and interactions with students. Experienced teachers with careers of over 15 years seek to encourage creativity in the classroom more than those who have less than half that experience (Lee & Seo, 2006). However, prospective teachers who are trained in thinking and teaching creatively are better prepared to nurture creative thinking

(Abdallah, 1996; Beghetto, 2006; Sternberg 2003; Whitelaw, 2006). Reisman et al. (2002) find that a teacher's depth of understanding of a pupil underpins student learning; however, Whitelaw (2006) suggests that teachers must deal with students in total neutrality in order to understand their views. The NACCCE (1999) report notes: "(young) people's creative abilities are most likely to be developed in an atmosphere in which the teacher's creative abilities are properly engaged" (p. 90). In addition, Yeh (2004) argues that the school may have an effect on the students' development of creative thinking through curriculum, evaluation, classroom climate, and teacher behaviours.

In this section, the practical aspects of exploring and nurturing creative thinking in students are considered. Creativity assists academic achievement and encourages children to explore new paths (Sternberg, 2003). The factors supporting creative thinking are explained by Snowden and Christian (1999) as parental encouragement, and by Yeh (2004) as curriculum, evaluation, classroom climate, and teacher behaviours. Nevertheless, Scott (1999) notes that teachers face issues in consideration of their students' creative thinking due to overcrowding and time constraints. Scott's view was supported by a Saudi study by Al-Enezi (2003) who finds a lack of adequate resources, and the practice of renting residences as temporary school accommodation as significant barriers to teachers when nurturing creative thinking in students.

To enhance creative thinking, Torrance (1994) suggests a three stage model of creative thinking: building curiosity in students, then expectations towards attainment; then delivering a new experience. Teachers must therefore have creative thinking skills and techniques which promote and develop the creativity of their students (c.f. Deci et

al., 1981; Yeh, 2004). Teachers' competence in this regard is facilitated by experience (Lee & Seo, 2006). However, pre-teacher training in thinking and teaching creatively better prepare teachers to nurture creative thinking (Abdallah, 1996; Beghetto, 2006; Whitelaw, 2006).

## **2.5 Summary**

This chapter is presented in three sections. The first section explored definitions of creative thinking, explaining that there are a number of different research viewpoints. Some researchers take a technical approach to creative thinking, focusing on production analogies of inputs (Amabile, 1996; Ausubel, 1963; Boden, 2001; Kharkhurin & Samadpour Motalleebi, 2008; Lubart, 1994; NACCCE, 1999; Onda, 1994a; Rogers, 1954), or process and outputs (Brown, 1989; Tegano et al., 1991). Others adopted an organic or psychological approach (Guilford, 1954; Weisberg, 1986); whilst modular theorists (Harris, 1998; Lipman, 2003) pursued an intrinsic/extrinsic theme. While the literature on creativity considers terms of product, process, or person in regard to student creativity, the focus of creative thinking in this research remains on person (Brown, 1989; Piirto, 1998; Tegano et al., 1991). As well, this part of the chapter introduced theories of creative thinking: biological, psychoanalytic, constructivist, behaviourist, humanistic, and factor structure. The researchers in biological theory (e.g., Runco, 2007; Torrance et al., 1977) explain that the brain is divided into two hemispheres, and that although creative abilities are located in the right hemisphere, creative thinking requires logic and intuitiveness from both hemispheres (Al-Solimani, 1992; Al Soulami, 2004). Psychoanalytic theorists posit that creative thinking is a defence mechanism (exaltation), and also theorise that the content of the pre-conscious

is required for creative individuals (Freud, 1920; Kubie, 1958). In regard to the perspective of the constructivist theorists, they suggest that the person can be creative when he or she presents a problem and solves it immediately. However, in relation to behaviourist theory, the researchers Runco (2007) and Slavin (2009) state that learning and creativity occur when the individual's behaviour changes (stimuli and responses). Skinner (1966) determines that both genetics and environment are important for creative behaviour. Furthermore, in humanistic theory the researchers (Maslow, 1968; Rogers, 1976) suggest that all individuals have the ability to be creative, but they differ in the level of their creativity. Factor structure theorists' position is that creative thinking comprises factors of ability, mental, or characteristic traits as well as fluency, originality, and flexibility; all aspects also of divergent thinking. Other elements contributing to motivation which are characterised as intrinsic and extrinsic are social environment, traits, and age. Amabile and Conti (1997) propose that only intrinsic motivation positively affects creativity, while extrinsic motivation usually has a negative effect. Others find that extrinsic and intrinsic motivation also positively affect creativity (Choi, 2004; Prabhu et al., 2008).

In regard to the social environment's place in creativity, this review discussed several factors that affect children. Firstly, the home environment, that is, the parental role in encouraging creativity is crucial (Feuerstein, 2000; Kharkhurin & Samadpour Motalleebi, 2008; Lee, 2008; Whitelaw, 2006). Furthermore, the school environment plays an important role in improving and encouraging the creative ability of students (Frasier, 1989; Maker & Schiever, 1989; Ngara 2008; Ngara & Porath, 2007; Niwa, 2005). Moreover, many researchers find that personality traits play an important role in the creativity level of students (Garfield et al., 2001; Helson et al., 1995). The

personality characteristics which depict the creative individual are directly correlated with cognitive style (Dacey, 1989; Starko, 2005). Also, age is considered as a factor that affects creative thinking. Creative thinking may appear in preschool students; however, others focus on creativity at the secondary school stage (Claxton et al., 2005; Gardner, 1982; Ponomarev, 2008). Cropley (2001) confirms that creativity appears to peak in performance in early adulthood.

The second section in this chapter discussed cognitive style. Researchers describe cognitive style as the processes individuals use to achieve different results when solving a problem (Kirton, 2003; Price, 2004). Cognitive styles are classified into three groups: holistic-analytic, verbal-imagery, and the integration of holistic-analytic and verbal-imagery (Rayner & Riding, 1997). Also, this section discussed the relationship between reflective-impulsive style and creative thinking: a reflective person analyses all information, while an impulsive person responds quickly (Kagan, 1966; Rozenzweig & Corroger, 2005). Few studies were found that examined the relationship between creative thinking and the reflective-impulsive style, with those researchers finding that reflective students have more creative abilities than impulsive students (Al Soulami, 2004; Frare, 1986, and Olaseinde, 1994).

The last section considered the factors supporting creative thinking: parental encouragement; and curriculum, evaluation, classroom climate, and teacher behaviours (Snowden & Christian, 1999; Yeh, 2004). However, teachers confront issues in nurturing creative thinking in overcrowding, inappropriate buildings, and experience time constraints (Al-Enezi, 2003; Scott, 1999). Torrance (1994) proposes a model of creative thinking which requires enhanced teacher competence in creative thinking

skills and techniques, acquired through experience and thorough pre-teacher training (Abdallah, 1996; Beghetto, 2006; Deci et al., 1981; Lee & Seo, 2006; Whitelaw, 2006; Yeh, 2004).

This thesis focuses on the relationship between creative thinking and the reflective-impulsive style. This relationship has been the focus of extant research; however, previous researchers did not consider the differentiation between urban and rural students (Al Soulami, 2004; Al-Sulamani, 1998). This study adds to the body of knowledge in this important aspect by comparing rural and urban Saudi students in Makkah in regard to creative thinking and the reflective-impulsive style. The next chapter considers the nature of the Saudi Arabian experience in education, and influences of urban and rural environments on creative thinking.



## **CHAPTER 3: PEDAGOGY AND CREATIVE THINKING IN SAUDI ARABIA**

### **3.1 Introduction**

This thesis reports on the creative thinking and cognitive style (reflective-impulsive) in a select sample of Grade 10 male students in rural and urban schools in Saudi Arabia. The previous chapter established the theoretical framework for the study, discussing the approaches theorists have taken to creative thinking, and the characteristics of cognitive style. The theory and practice of teaching students to think creatively was also presented.

Theoretical studies are typically based in European and United States environments and then tested globally. In this chapter, theories relating to creative thinking, cognitive style, and teaching creatively are placed in the different context of the Saudi environment. Saudi Arabia can be regarded as a modern state that has developed greatly since the mid 20<sup>th</sup> century from a traditionalist trading region. It remains the cross-roads of Asian, African, and European commerce and the focus of pilgrims to the two holy cities of Makkah and Madinah. Makkah and Madinah have a long history of scholarship and this also has an effect on the nation of young people.

The Kingdom of Saudi Arabia is a paradox; an ancient country that is an emerging economy taking its place in the world's forums. Over the last decades, the Saudis have either established full membership or aligned internal policies and practices with all major recognised international organisations. For education, Saudi Arabia was a founding member of the United Nations Education, Scientific and Cultural Organisation

in 1946. Education is recognised in Saudi society as the path to the future security and prosperity of the nation

This chapter presents an overview of learning and teaching in Saudi Arabia. It includes a profile of the country, a description of the educational systems prior to and during the Saudi regime, types of education in Saudi Arabia, existing education policies and pedagogy in secondary schools. Existing and emerging issues facing the nation in educating its youth are explored, along with a comparison between rural and urban areas in relation to creative thinking in Saudi Arabia. Lastly, education policy in regard to fostering creative thinking in Saudi Arabia is presented.

## **3.2 Profile of Saudi Arabia**

This section introduces the natural, social and economic environment of Saudi Arabia. First, Saudi Arabia's physical characteristics are noted, followed by a brief history, and the structure of government of the state. Next, the effects of oil production and trading on the economy are examined, along with global economic conditions on their effect on the ability of the Saudi government to minimise disruptions to its ambitious socio-economic programs.

### **3.2.1 Geography**

King Abdul-Aziz Al-Saud unified the Arabian Peninsula and the Kingdom of Saudi Arabia was proclaimed on 23 September, 1932, which is now Saudi Arabia's National Day (Al-Issa, 2005). Thus the present-day Saudi Arabia is bound to the west by the Red Sea, to the east by the Arabian Gulf, United Arab Emirates (UAE), and

Qatar, to the north by Kuwait, Iraq and Jordan, and to the south by Yemen and Sultanate of Oman (Al-Issa, 2005; Al-Salom, 1990).

The area of Saudi Arabia is approximately 2.2 million square kilometres. It consists of a hot sandy desert without rivers or lakes, coastal plains and cooler mountains and highlands. The desertification occurred some 15,000 years ago after the last ice age, when grasslands gave way to scrubland and deserts, and wild animals vanished. River systems also disappeared, leaving in their wake the dry river beds (wadis) that are found in the peninsula today (Ministry of Foreign Affairs, 2010).

The Tihama coastal plain along the Red Sea is 1155 km long and 60 km wide towards the south, narrowing in the north at the Gulf of Aqaba. East of the Tihama are the dominant Sarawat Mountains which rise between 2100m and 3300m (Sonbul, Al-Katepe, & Moawali, 1998). The central region of Saudi Arabia is valleys and deserts including the Great Sandy Desert (Rub al-Khali), an area of 640,000 km<sup>2</sup>. To the east is another sandy coastal plain some 610 km in length. There is less than 2 per cent of the country with arable land (Ministry of Foreign Affairs, 2008). See Figure 3.1.



Source Saudi Network. Accessed 6 November 2009 from <http://www.the-saudi.net>

*Figure 3.1. Map of Saudi Arabia*

The capital city of Saudi Arabia is Riyadh, located in the centre of the Kingdom, while the holy cities of Makkah and Al Madinah are to the west.

### 3.2.2 History

After the last ice age, humans on the Arabian Peninsula turned to agriculture in the mountain valleys and oases. Trade across the Peninsula, however, was crucial to the area's development, with a complex network of trade routes to transport agricultural goods to Mesopotamia, the Nile Valley, and the Mediterranean Basin. These items included almonds from Taif, dates from the many oases, and aromatics such as frankincense and myrrh from the Tihama plain. Spices were also important, shipped across the Arabian Sea from India and then transported by caravan along the great trade routes running through Asir Province and then through Makkah and Al-Madinah, to the

urban centres of the north and west. The great expanse of desert formed a natural barrier that protected the sparse population of the Peninsula from invasion by powerful neighbours (Ministry of Foreign Affairs, 2010).

Islam developed between 610 and 628 CE, when Muhammad unified the tribes of Madinah and Makkah. Trade remained important to the area; however, pilgrims began regularly visiting the two holy cities, some settling in the area. The Arabic language emerged as another factor in the cultural development of the Peninsula, with Islamic scholars, particularly in Makkah, making major contributions in many fields, including medicine, biology, philosophy, astronomy, arts, and literature. In the 17th century, the Islamic Empire broke into smaller sheikdoms, and the area remained in conflict until united under King Abdulaziz bin Abdurrahman Al Saud in 1932. Under the Saudi regime the country's infrastructure began: roads, communications systems, modern technology and agriculture; and universal education, housing, and health care. Initially, this was funded through trade and by services to pilgrims on the *hajj*. The discovery of oil in 1937, and its exploitation after World War 2 financed a massive national development program (Ministry of Foreign Affairs, 2010; OPEC, 2007).

### **3.2.3 Government and People**

Saudi Arabia's constitution is Islamic, and the government's rights and responsibilities are set out in the 1992 Basic Law. The King and Prime Minister is Abdullah bin Abd al-Aziz Al Saud; a Council of Ministers is appointed by the King for four years as advisors, and there are 22 Ministries, including the Ministry of Education and Ministry of Higher Education (Royal Embassy of Saudi Arabia, 2010). The larger Consultative Council, or *Majlis al-Shura*, has 150 members, half of which are

technically elected, and represent the cities and districts (Aba-Namay, 1993). Saudi Arabia is divided into 13 regions, or emirates, and each region is further divided into a number of cities and villages. Each emirate has a provincial Council System (Al-Ghamdi & Abdaljoad, 2002).

According to the Central Department of Statistics and Information, the population in June 2009 was 25 million, with 18.5 million Saudis and 6.5 million expatriates (Arabian Business, 2009). The birth rate, at 1.8 per cent, ranked the Kingdom 51<sup>st</sup> and in the top quartile of countries, and its citizens have a median age of 21.6 years (World Fact Book, 2010). Literacy was estimated in 2007 by the World Bank (2009) at 85 per cent. Economically, the country in 2009 ranked 60<sup>th</sup> by gross domestic product per capita, with a labour force of less than seven million, although 80 per cent of these were claimed to be expatriates (World Factbook, 2010). The International Labour Organisation (2008) claimed nearly eight million in Saudi Arabia in employment in 2008, with an active workforce of 8.4 million: 7.1 million men and 1.3 million women. Of these, 830,000 Saudis work in the private sector, 13 per cent of the total Saudi employment, with the remaining either in the public sector or out of work. Further, 6.9 per cent of the Saudi male labour force was unemployed, as well as 24.9 per cent of women (Saudi Arabia News, 2009). Three-quarters of unemployed women have a 'first stage' tertiary qualification (ILO, 2008).

Whilst Saudi Arabia is a rich country with a large work force, this does not deliver young Saudis the jobs they desire, which are overwhelmingly in the public sector with its high salaries, excellent working conditions and tenured employment. Consequently, the public services are over-staffed, and the Ministry of Labour has

several programs in place to assist the large cohorts of school leavers and graduates to reach the private sector job market each year (Al-Ali, 2008). Unfortunately, expatriates, with superior qualifications and experience, take the majority of the available jobs. The situation that education must be designed to address is that Saudis are to be adequately educated and trained in order to replace the foreign workers.

### **3.2.4 Economy**

This part briefly examines the role of oil in establishing and maintaining the Saudi economy. Oil was discovered in 1938 and gave the new Saudi government the opportunity to move from a subsistence economy to facilitate high continued expenditure. As an example, annual government revenue grew from \$US15 million in 1946 to \$US100 million in 1950; and then to \$US338 million by 1960 (Niblock, 2006). In 1972, the Saudi government obtained a 25 per cent equity share of the oil producer, Aramco, and in 1980, the company became 100 per cent Saudi-owned (Moliver & Abbondante, 1980). With little industry diversification, oil continues as the main income of the country, contributing up to 90 per cent of total revenues during the last half-century (Choudhury & Al-Sahlawi, 2000; Niblock, 2006). The Saudi Minister of Petroleum and Mineral Resources reported to the 6th International Oil Summit Conference in Paris in April 2005 that Saudi oil represented 25 per cent of the world's proven oil reserves, 261 billion barrels, plus probable further reserves of some 100 billion barrels.

Natural gas production is estimated to be 35.6 billion m<sup>3</sup> with 5,250 billion m<sup>3</sup> of reserves (Ministry of Foreign Affairs, 2008). Table 3.1 shows a comparison of OPEC Gulf Cooperation Council (GCC) countries over five years (OPEC<sup>3</sup>).

Table 3.1

*OPEC values of petroleum exports, 2004 to 2008 (\$US m.)*

Gulf Consultative Council countries	2004	2005	2006	2007	2008
Kuwait	26,675	42,441	53,178	60,019	84,438
Qatar	11,694	17,585	23,350	29,130	38,950
Saudi Arabia	110,896	161,784	188,468	206,480	283,215
UAE	38,801	55,079	70,100	84,390	102,500
Total GCC OPEC	188,066	276,889	335,096	380,019	509,103
Total OPEC	375,024	555,882	662,510	745,893	1,006,850

Source OPEC<sup>1</sup>

Table 3.1 shows that revenues from exports for Saudi Arabia rose over 2.5 times in the five years to 2008, although fluctuating demand and oil prices through the global economic crisis impact on subsequent years. The other GCC OPEC producers also showed significant increases in revenue, with Kuwait and Qatar receiving over three times the 2004 revenue in 2008, and 2.7 times that of the UAE. These figures relate to the average OPEC member countries' increase in revenue for 2008 of 2.7 times that of 2004. The Saudi economy will be dependent on oil revenue for at least fifty years, although it is diversifying into the chemical and service industries. Hamed, Zeadh, Al-Otabi, and Motuali (2007) note that this wealth led to development in all socioeconomic areas, such as education, health, infrastructure, agriculture, and industrial production.

This research tested Saudi school children against selected international standards. Whilst standardisation may affect all nations, these tests evolved from mid-

<sup>1</sup> OPEC Annual Statistical Bulletin. Accessed 6 November 2009 from <http://www.opec.org/library/Annual%20Statistical%20Bulletin/interactive/2008/FileZ/Main.htm>



20<sup>th</sup> century United States' authors. The tests have been heavily adapted over the years to accommodate different cultures and different socio-economic circumstances. In this section, there is an attempt to place these matters in context. Saudi Arabia is a rich country, moving into the international environment. It is thereby adopting global concepts and instruments, and using standardised forms of comparison for its students.

The government's ability to change the social and religious environment is limited and the pace of change reflects this. However, comparisons against regional and global standards give benchmarks for debate where none existed in decades past. The next section presents the antecedents of Saudi education.

### **3.3 Development of Education**

Due to ongoing conflict and a subsistence nomadic economy, the Arabian Peninsula supported only basic education prior to 1932 and the subsequent rise of the Saudi regime. The exceptions were the holy cities of Makkah and Al-Madinah to the west, and Al-Ahsa to the east (Faraj, 2005). At that time Makkah and Al-Madinah were under Turkish rule (Ottoman) and they were, and remain, advantaged both through the hajj-based economy and educational opportunities from the scholars who congregate in the mosques and centres of learning (Abdulla, 1982; Obeidi, 1995). These cultural and religious advantages attract Muslims from many other countries, and the emirates of Makkah (including Jeddah) and Al-Madinah have a more diverse population than other parts of Saudi Arabia (Ibrahim, 1985).

The following section examines the growth of education from these early learning and teaching centres, and the means of transferring literacy and numeracy through rote learning of the Qur'an. Secular training for traders and tradespersons grew

from an apprenticeship basis and a few private schools into economic importance in mid-century, and from there oil revenues allowed the substantial investment into full and free educational opportunities for every Saudi.

### **3.3.1 Education Prior to Unification**

Prior to the unification of the emirates, there were three forms of education on the Peninsula: traditional learning and Qur'anic education; public education; and private education. The inherited traditions were either taught at mosques or by an imam and centred on literacy based on the Qur'an. Public education at the time was delivered by the Turks through the Ottoman empire, and private education was organised by parents. These are discussed in turn.

**Traditional Learning.** This type of education comprises mosque instruction and an informal system to transfer literacy and learn the Qur'an. Traditional learning was delivered at a mosque, the focus of a Muslim's education. Mosques were not only a place of worship, they were, and remain, a school of knowledge and literature, where the principles of the Islamic faith, values and morality were imbued. Mosques varied in size and location and serviced different worshippers (AL- Aqeel, 2005; Salloum, 1988). Al-Shameck (1984) notes that the prestige mosques of Makkah and Madinah attracted the foremost scholars in Islam and the Arabic language; these mosques provided superior resources and study environments. The Qur'anic form of teaching, at the time, equated with an informal school and was available throughout the Peninsula (Abdulla, 1982; AL- Aqeel, 2005). The class was taught by a *Motawaa*, who was usually an imam, and this type of teaching was instructive, where students learned the alphabet and to transcribe Qur'anic verses (Salloum, 1988).

**Public Education System.** Public or formal education was introduced by the Turks, using Turkish language and pedagogy to deliver education to the western emirates of Al-Madinah and Makkah (including Jeddah) and to Al-Ahsa in the eastern region of the Arabian Peninsula (Abdulwasa, 2002; Al-Shameck, 1984). The public education system was based on three stages: primary for three years, *Al-Rushdia* for a further three years, and a final preparatory period of five years. This pattern of education first emerged in Makkah, where an Al-Rushdia school was established in 1880, followed by another in Madinah (Faraj, 2005). In 1907, Jeddah received an Al-Rushdia school; a further public school for the Turkish language, and two primary schools. The Turkish language school was established due to the difficulties experienced by Arab students with the use of Turkish in public schools (Ibrahim, 1985).

**Private Education.** Private education during the Ottoman era was funded and delivered by parents (Al-Hugail, 1998). These schools were widely established in the western regions of Saudi Arabia and, despite attempts for reform, remained traditionalist in teaching literacy and the Qur'an. Researchers Al-Shameck (1984), Hamed et al. (2007), Ibrahim (1985), and Mosleh (1981) identify the principal schools that emerged in that period:

1. The Al-Sawlatiyah School was established in Makkah in 1871 by Muhammad Rahmatu-Allah, an expatriate from India. The curriculum, influenced by Islamic schools in India, included the Qur'an, religious and Arabic studies, and history;
2. The Al-Fakhriya School founded by Abdul Haq Qaree in 1877, also in Makkah, followed the lead of Al-Sawlatiyah school in its curricula;

3. The Al Najah School was established in Jeddah in 1896 to concentrate on Arabic sciences;
4. The Khayriya School was set up by Mohammed Hussein Al-Khayat for religious studies; and
5. The Al-Falah School was founded in 1902 by Mohammed Zainal to disseminate knowledge.

Upon unification this array of teaching systems became more organised, although until the discovery of oil little funding for education was available.

### **3.3.2 Evolution of the Education System**

The first regulatory action by King Abdul Aziz after his entry into Makkah in 1922 was to call for a meeting on education, where scholars were requested to improve the dissemination of knowledge through education. To formalise the process, the Directorate of Knowledge and Education was established in 1923, whereupon a framework of pedagogy was established including standards for curricula, and education formalised into a system (Ibrahim, 1985; Salloum, 1988). This facilitated the establishment of primary schools for boys in other emirates. The following points identified by the researchers (Al-Aqeel, 2005; Ibrahim, 1985; Mosleh, 1981; Shalabi, 1986) show the progress in education by the Directorate over the next decades.

1. The establishment of regulations for schools, teachers and curricula;
2. The opening of the Saudi Educational Institute in Makkah in 1924 to train teachers for the expansion of primary schools;

3. A school was opened in Makkah in 1935 to educate young Arabs over a period of six years in preparation for studying abroad. This was the first secondary school; and
4. Establishment of the Islamic Dar-Attawheed School in 1943 to educate aspirants to the Faculty of Sharia in Makkah; enabling graduates to become eligible for a government position.

By mid-20<sup>th</sup> century, some education was available throughout Saudi Arabia.

Table 3.2 shows the pattern of introduction of public schools, noting that the majority were primary schools for boys.

Table 3.2

*Establishment of public schools, by emirate*

Emirate	Year
Makkah	1923
Al-Madinah	1924
Al-Riyadh	1935
Al-Baha	1933
Jizan	1934
Al-Ahsa	1934
Asir	1934
Al-Qassim	1935
Ha'il	1935
Tabuk	1939
Najran	1941
Al-Jouf	1941
Arar	1951

Source Al-Issa, 2005, p.133

Girls' education mid-20<sup>th</sup> century was primarily private schooling provided by their parents; the Directorate of Knowledge had no charter for girls' education (Al-Zeiber, 2000). Al-Aqeel (2005) reported that the important private schools for girls during that period were:

1. Makkah Girls' Private School, founded in 1941;
2. School for Education and Housekeeping, established in Makkah in 1946;
3. Al-Zahra Girls' School, again in Makkah, opened in 1957; and
4. School of Dar Al-Hanan in Jeddah. This school was established by King Faisal Al Saud in 1954 to care for female orphans.

The emerging interest in education by the government was partly due to a United Nations report in 1952 which pointed out that the 306 primary schools available at the time were not impacting on the country's illiteracy rate which was as high as 95 per cent in regional areas. The Ministry of Knowledge (later changed to Education) was formed in 1953 to provide public education for boys, and to establish programs for adult literacy and skills acquisition. It later took control of private sector education. The Ministry was directed to instil Islamic culture in boys, and provide them with work skills for the labour market (Al-Ghamdi & Abdaljoad, 2002; Al-Issa, 2005; Faraj, 2005; Hamed et al., 2007; Ramadan, 1994). The Supreme Council of Education was established as the decision-making organisation to oversee curricula and standards, and this included a diversification from the traditional curriculum to include sport and physical education. Student services were introduced, including health and welfare, and the establishment of the Al-Marifaa educational journal (Salloum, 1984). To achieve these aims, the ministry's budget increased significantly and this is discussed in the next section. A six-year compulsory primary education was introduced for boys in 1958, plus an optional three years for an intermediate education, and a further three years for a secondary education (12 years). Secondary certification assisted in obtaining a semi-skilled job or moving on to tertiary education (Lal & Aljondy, 2004; Ramadan, 1994).

In 1960, against resistance, the General Directorate for Girls' Education was established to supervise all public girls' schools and education. The directorate faced strong opposition from traditionalist parents; nevertheless, the government reinforced its intention to educate girls (Al-Baadi, 1995). The stipulation that, at all stages of education, there was to be no contact between boys and girls was influential in parents sending their daughters to study in government schools (Al-Sadan, 2000; Sonbul et al.,

1998). With little initial organisational structure for the General Directorate, it established a presence sufficient to administer 15 primary schools and one institute to train female teachers. Whilst there were only 5,800 female students in 1970, girls' education proliferated; by 1995 there were 3,600 primary schools and 6714 a decade later; the number of primary female students also increased to 1,176,000 by 2006 (Al-Aqeel, 2005; Al-Madhi, 2003; Al-Hugail, 1998; Al-Yahya, 2004, Hamed et al., 2007). This growth was also seen in the intermediate and secondary girls' schools: in 2006 there were 3,452 intermediate schools with 515,800 students and 2,189 secondary schools with 462,451 students (Hamed et. al, 2007). Al-Baadi (1995) commented on the rapid development of teacher training establishments to provide sufficient teachers.

This growth in education in Saudi Arabia is compared to the other Gulf Cooperation Council countries, in Table 3.3 below, for the 1990, 2000, and 2015 time periods (Thomas and Cassidy, 2003).



Table 3.3

*GCC school student numbers: 1990, 2000, and 2015 (projected)*

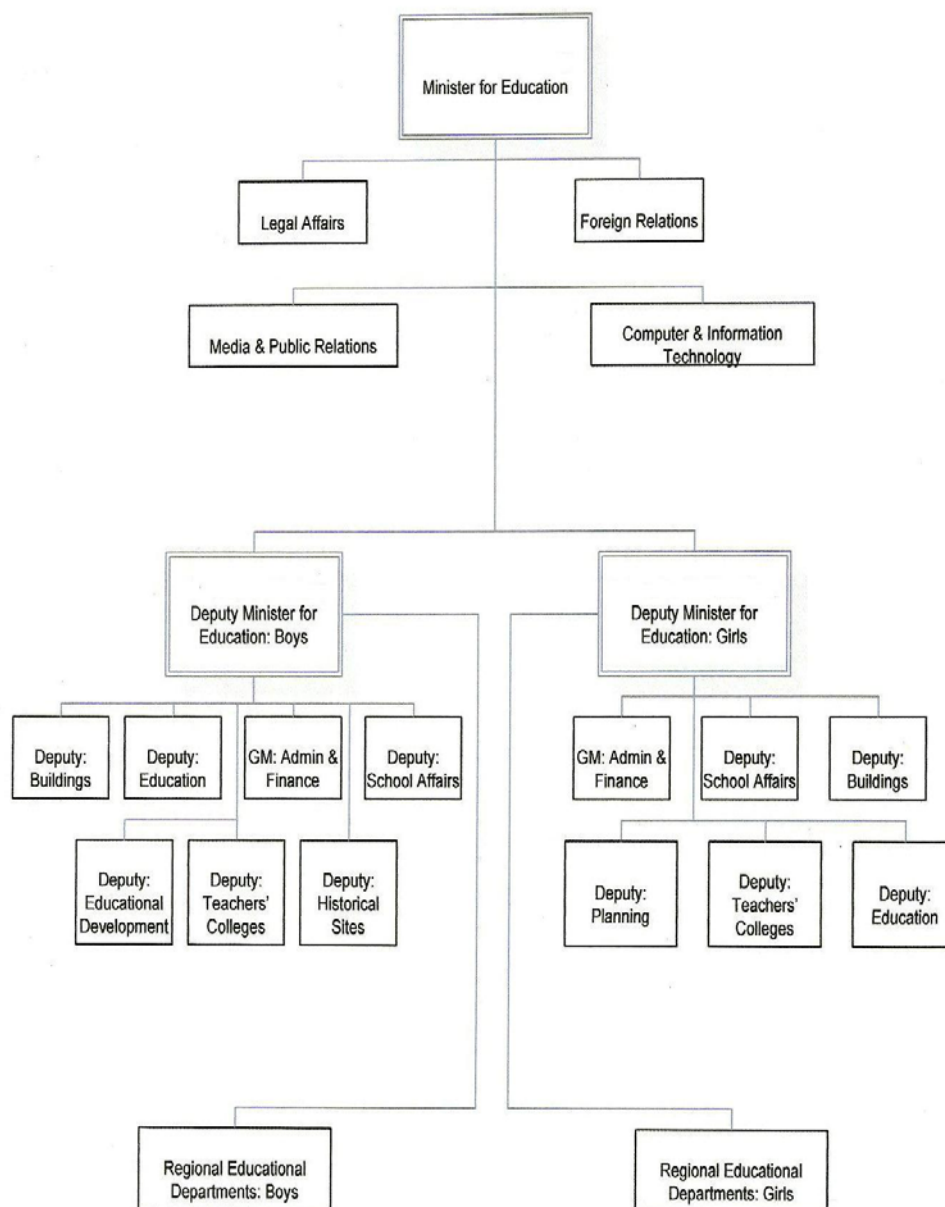
Gulf Co-op. Council Countries	1990				2000				Projected 2015			
	Thousands				Thousands				Thousands			
	Years of age			Total	Years of age			Total	Years of age			Total
	0-4	5-14	15-17		0-4	5-14	15-17		0-4	5-14	15-17	
Bahrain	58	97	21	176	57	124	32	213	57	103	33	193
Kuwait	304	481	111	896	144	455	159	758	266	451	92	809
Oman	342	486	101	929	404	715	173	1292	651	1056	247	1,954
Qatar	52	78	16	146	53	98	25	176	54	103	32	189
Saudi	2,669	3,950	861	7,480	3,187	5,548	1,300	10,035	4,516	7,746	1,947	14,209
UAE	244	354	82	680	199	479	138	816	231	451	123	805

Source: adapted from Thomas and Cassidy, 2003, p. 233

There are four stages to a general education in Saudi Arabia, the first of which is pre-school, and is limited to the larger cities. A six-grade primary school admits children at six years of age; and a three-grade intermediate school is available for children at 12 years of age. Students reach the next class through an examination process. The fourth stage, secondary school, begins at 15 years of age for three years of classes and allows diversity into specialised studies; it also prepares students for entering university. As noted, there are also separate private institutions for boys and girls; and Islamic schools for boys and girls. The school year for all stages is two semesters of fifteen weeks each. The number of classes each week begins at 28 and grows to 36 per week, each for 45 minutes (Al Hakmi, 2000).

The Ministry of Education absorbed the Ministry of Education for boys and the General Directorate for girls in 2002, partly because of the high growth factor coupled

with the administration and control of the separate education systems (Ministry of Education, 2003). Within the ministry the systems remain distinct, each administration with a Deputy Minister and very few shared resources. The Ministry of Education now encompasses 42 regional district school systems. It has ultimate power over the pedagogy and the curricula, providing public schools with all educational resources, curricula plans, national examinations, teacher recruitment and selection. The Ministry, as noted, controls all aspects of public education, and sets standards for the growing private sector, the preferred source of girls' education. Figure 3.2, highlights the structure of Ministry of Education and shows how its structure remains largely divided.



Source: Ministry of Education, 2006, p, 7

Figure 3.2. Structure of Ministry of Education

### 3.3.3 Budget Allocation

Education is free for all citizens and expatriates, although as noted there are private schools for which fees must be paid (Al-Aqeel, 2005; Al-Issa, 2005; Hamed et al., 2007). The Ministry of Education's budget has increased over the seven of the last nine Saudi five-year development plans thus providing evidence of the government's focus on education (Hamed et al., 2007). The education sector of the annual government budget rose in percentage terms through the years from 9.8 per cent in 1969 to 25.44 per cent in 2005, as shown in table 3.4.

Table 3.4

*Budget allocation for education, 1969 to 2005*

Financial year	General budget SR m	Education sector SR m	Education sector Percentage	Ministry of Education Percentage of General Budget*
1969	6780	666	9.8%	6.3%
1974	110935	12941	11.7%	8.1%
1979	245000	21294	8.7%	3.9%
1984	200000	2354	11.8%	5.2%
1989	135908	25460	18.8%	7.9%
1994	150000	26541	17.7%	7.4%
1999	185000	49381	26.7%	10.9%
2004	215000	53300	24.8%	9.8%
2005	380000	96700	25.4%	-

\*Ministry assumed responsibility for girls' education in 2005.

Source: Hamed et al., (2007, p.43).

Since the millennium, the Saudi government has used significant financial resources for its education portfolio. As noted, the Saudi government provides its

students with free learning tools, health services, and living expenses if required. The 2010 budget allocated Saudi Riyal (SR) 137 billion (\$AU39.6 billion), over 25 per cent, for Education and Manpower Development (US-Saudi Business Council, 2010).

This section is a brief discussion on the antecedents of education on the Arabian Peninsula, and the strong rise in interest in education over the last decades. The history of education in Saudi Arabia rests on the tenets of the Qur'an, and the devout lifestyle of Saudis. Social change, and thus acceptance of change to schooling practices, comes slowly; however, the economic conditions are robust and the citizens increasingly enjoy a modern lifestyle.

Originally, oral learning was the basis of education, memorising and reciting passages from the Qur'an, and learning basic reading, writing, and arithmetic for skilled workers and traders. Mindful of their duty to Islamic society, Saudi teachers then followed the same pedagogical practices, with emphasis on memorisation. Upon unification of the country, and the advent of oil revenues, literacy standards forced the issue for the government to achieve better outcomes for all citizens. Saudi Arabia now has one of the world's highest allocations of its budget directed towards education, and its once high birth rate is slowing, so that oil revenues can be directed towards a quality education rather than the previous race to provide ever-growing numbers of students with accommodation, teachers, and materials.

The Ministry of Education controls education in Saudi Arabia, and it is increasingly focussed on secular outcomes for Saudi children emerging from the school system – to move into jobs, or preferably to attend the growing number of trade institutes and universities. The quality of education is improving through the advice and

assistance of international and regional organisations, including UNESCO. UNESCO (2006) actively provides assistance to enhance teacher performance and Saudi educators regularly attend hosted workshops and conventions.

### **3.4 Education Policy and Practice**

The Saudi educational framework pertaining to secondary school is examined to explore the context of this study, which is a comparison of creative thinking and cognitive style (reflective–impulsive) in a select sample of grade 10 male students in rural and urban Saudi Arabia. The background section (s3.2) above, tended to concentrate on primary school, which was the focus of the government during the schools' establishment period until mid-20<sup>th</sup> century, and then as a matter of necessity during the dramatic expansion of schools to meet the high population growth. This section considers recent decades, when the bulk of the students moved into intermediate and secondary schools, and universities, and gender distinctions in school availability and educational expenditures faded. Further, the Ministry's policy and practices regarding creative thinking and cognitive style are explored.

#### **3.4.1 Principles and Outcomes**

Saudi education policy is decreed by the government's religious Ministers. From these tenets are derived a number of education principles. Of note, girls are educated to reinforce a woman's role in the community including maintaining gender segregation. Next, Islam seeks knowledge, and religious studies are essential; Arabic is the language of education and appropriate standards of education are required at all levels. Knowledge and skills are directed toward cultural and social development, and global research trends (Al-Aqeel, 2005; Al-Issa, 2005; Al-Yahya, 2004). Further, there are

three aspects to teaching and learning, defined as cognitive, skills, and emotional outcomes, noting that these aspects are interdependent (Al-Aqeel, 2005; Al-Ghamdi & Abdaljoad, 2002; Al-Sadan, 2000).

The policy for cognitive goals is based on a dichotomy of originality and modernity; originality of Arabic and Islamic heritage, and modernity for the vigilance to maintain the relevance of Saudi curricula to global standards (Ministry of Education, 2004; Sonbul et. al., 1998). Al-Hugail (1998) and Abdulwasa (2002) suggest that the most important objectives are to:

1. provide students with appropriate cultural information and experiences to allow them to contribute as active members of society;
2. develop mathematical skills; thinking and research capabilities; and strengthen observation and reflection capacities;
3. understand types of environments: scientific, geographic, and economic; and history for context and to define trends; and
4. learn other languages to assist the acquisition of knowledge, art, and innovation and to transfer those skills to the Saudi community to gain benefits.

Students should also achieve motor skill development based on sports and training in healthy living. In addition, students should achieve appropriate standards of communication, with adequate speaking and writing skills. Individual differences should also be identified and acknowledged to assist those who are underdeveloped or disabled, providing opportunities for growth (Al-Aqeel, 2005; Al-Ghamdi & Abdaljoad, 2002; Al-Sadan, 2000).

Emotional goals are defined as personal and social skills: first, teachers should inculcate in their students an appreciation of the community's cultural, economic, and social issues, and the desire to contribute to resolution of those issues. Second, it is the teacher's role to cultivate psychological health by assisting the individual to grow spiritually, emotionally, and socially. This can be enhanced through creating an appropriate learning environment, emphasising the advancement of knowledge; and imbuing a positive attitude towards employment (Al-Aqeel, 2005; Al-Ghamdi & Abdaljoad, 2002; Hamed et. al., 2007).

Together, the above aspects of education become a holistic framework which guides teaching and learning throughout a child's education. Educational purpose, as defined by these tenets, is crucial to the two research questions: to determine and analyse results from students using the creative thinking test TTCT figure B, and the reflective-impulsive test MFFT; and to determine the responses of education professionals (principals, supervisors, and teachers), regarding the standard of creative thinking of their students, and factors that they envisage as impinging on the level of creative thinking and the reflective-impulsive test results. The next section continues to focus on the Saudi school context, exploring the means by which these principles are explicated.

### **3.4.2 Secondary School Charter**

The structure of public education in Saudi Arabia comes to fruition at the secondary level, when the student acquires knowledge for further education or to move into the job market (Al-Ghamdi & Abdaljoad, 2002). This section explains the



regulations under which secondary school administrations perform, and the charter which directs the school.

Secondary schooling comprises three years, and students study more specialised subjects that provide them with a greater general knowledge and the opportunity to gain university admission (Al-Atas, 1983; Ben-Dhash, 1986). Al-Aqeel (2005) notes that, as students are adolescents during the years of secondary education, they require greater guidance skills from their teachers. There are several types of secondary schools in Saudi Arabia: high school, secondary scientific institutes (for example, Dar Attawheed School), and technical institutes (agricultural, industrial, commercial, sports, and arts institutes).

As secondary school is the culmination of the general education system, the principles and objectives noted above are expected to be achieved. These are that Islamic principles and standards are understood and appreciated, the individual is committed to being a loyal citizen contributing to society, and that the school leaver understands science and research. The schools' charters to achieve these outcomes for the five million children passing through their classrooms are important to this thesis, with its emphasis on creative thinking and cognitive style. School administrations are required to identify and nurture outstanding students, encouraging them to pursue further studies, and they are also charged with the responsibility to prepare all school leavers for the job market either immediately or after further study. As noted, other instructions include the prominence of Islamic virtues, and to recognise the need to attend to youth welfare and engender a positive attitude which can counter defeatism (Al-Khudayr, 1998; Al-Madhi, 2003; Sonbul et al., 1998).

The following section details the separate experiences of boys' and girls' education, and the effects on literacy and school certification.

### 3.4.3 Secondary School Gender Comparison

In this section, educational indicators are examined to explore gender differences. First, resources allocated to gender-segregated schools are noted, followed by literacy rates, and then curricula are considered.

In 1935, as noted at s3.2.2, the first secondary school established in Saudi Arabia was in Makkah for international scholarship preparation, 'Exchange Students' Preparation' (Al-Hugail, 1998). Al-Aqeel (2005) detailed that the school first provided five years of study, changing in 1958 to six years, with three years each of intermediate and secondary standards.

**Resources.** As the population expanded and oil revenues became available, considerable resources were allocated to boys' education. Table 3.5 illustrates this increase over the last half-century (Hamed et al., 2007). The extraordinary rise in the 13 years between 1993 and 2006 was three-fold across schools, teachers and boys.

Table 3.5

*Secondary education statistics for boys, 1953 to 2006*

School year	Schools	Students	Teachers
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360

Public secondary education for Saudi girls began in 1963 when the first school opened (Hamed et al., 2007). It remained the only girls' public secondary school until 1974, when nine public and four private schools were opened. During the intervening period many more girls' schools were established (see Table 3.6).

Table 3.6

*Secondary education statistics for girls, 1963 to 2006*

Year	Schools	Students	Teachers
63			N/A-
		,	
		,	,
		,	,
	,	,	,

Source Hamed et al., 2007 p.105

Table 3.6 shows that the number of schools, teachers and students also tripled between 1993 and 2006. Whilst girls' secondary schools are now similar in number to those for boys, there is a clear difference in the number of boys attending secondary schools in 2006, also, interestingly; there are many more teachers for girls than for boys. Faraj (2005) reports the Saudi government's rectification of girls' educational opportunities was on an equity basis; that females represent half of Saudi society; and that parents were now demanding more attention to their daughters' education. Further, Saudi women are joining the workforce in ever-increasing numbers and they require a full education so that they can become competitive.

***Literacy.*** The intense focus on education, including adult education, impacted on literacy rates in the country. By 2007, the United Nations (2009) estimated Saudi

Arabia's overall literacy rate was 85 per cent: 89 per cent for men over 15 years of age, and 79 per cent for women in that cohort. However, for young people between the age of 15 and 24 years, the rate was 97 per cent, 98 per cent for males and 96 for females.

***Curricula.*** As boys mature, their educational needs diverge and these aspects are taken into account (Al-Aqeel, 2005; Ministry of Education, 2004). Table 3.7 is a study plan for boys' secondary education.

Table 3.7

*Boys' secondary school study plan*

Subjects	Areas	Grade 10	Arabic & Islamic Studies		Admin. & Social Sciences		Natural Sciences		Technical Sciences	
			Gr 11	Gr 12	Gr 11	Gr 12	Gr 11	Gr 12	Gr 11	Gr 12
Islamic Laws	Quran Tafseer (Interpretation) Hadith Theology Fiqh (Jurisprudence)									
Sub-total										5
Arabic Language	Arabic Grammar Rhetoric and criticism Literature Reading Self- Expression		3							
		-	2		-	-	-	-	-	-
			2							
			1				-	-	-	-
			1		-	-	-	-	-	-
Sub-total										3
Administ Sciences	Administration skills Economics Accounting	-	-	-	3		-	-	-	-
		-	-	-			-	-	-	-
		-	-	-			-	-	-	-
Sub-total		-	-	-			-	-	-	
Social Sciences	History Geography Psychology Sociology		1				-	-	-	-
			1				-	-	-	-
		-	1	-		-	-	-	-	-
		-	-				-	-	-	-
Sub-total							-	-	-	
Sciences	Physics Chemistry Biology Geology		-	-	-	-				
			-	-	-	-				
			-	-	-	-				
		-	-	-	-	-				
Sub-total			-	-	-	-				
Maths			-	-						
English										
Computer										
Library and Research							-	-	-	-
Physical Education										
National Education										
Activities									-	-
Sub-total		14	9	9	13	13	14	14	13	13
Total		3	3	3	3	3	5	5	5	5

Source Al-Aqeel, 2005, p.95

Information pertinent to this study can be extracted from the above table. The first year of secondary school is a preparatory year, where students study religion, the Arabic language, social sciences, natural sciences, computer, library skills and elective

activities. Subjects such as Islam, Administrative and Social Sciences, Natural Sciences and Technical Sciences became more specialised from the second year (Al-Aqeel, 2005).

Girls' secondary school curricula are different from the boys' curricula in both courses and in the nature of the subject. Secondary schooling for girls is divided into two sections: Arts and Sciences. Table 3.8 shows the study plan for girls' secondary schools (Al-Issa, 2005; Al-Khatib, 2002).

Table 3.8

*Girls' secondary school study plan*

Subject	First year	Second year		Third year	
		Arts	Sciences	Arts	Sciences
Religion	4	4	4	3	3
Arabic	9	11	4	11	3
Social Education	4	8	-	9	-
Maths	5	-	7	-	7
Science	6	-	11	-	11
English	4	4	4	4	4
Home Economics	2	2	2	-	-
Library	1	1	-	1	-
Total	35	30	32	28	28

Source Al-Issa, 2005, p.38

The above table again illustrates a generalist introduction to secondary school for girls; however, there are only two selections for girls' education, arts and science, compared to the specialised streams offered to boys. There are similarities however

between secondary education for boys and girls within the organisation of some subjects such as science and the Arabic language (Al-Issa, 2005).

#### **3.4.4 Inputs and Outcomes**

There is wide acknowledgement of Saudi Arabia's accomplishments in secondary schooling over the half-century (Al-Aqeel, 2005; Al-Ghamdi, 2002; Al-Issa, 2005; Al-Zaid, 1990; Hamed et al., 2007). However, poor quality of education and training, common among the GCC is a major factor in unemployment, as there are deficiencies in coordination and planning between sections of the Ministry and employers, which leads to the use of expatriate labour (Al-Ali, 2008). Further, pedagogical practices promoted by Ministry of Education such as militating against diversity in thinking and risk-taking; Al-Yousif (2005) and Girgis (2002) suggest that many educators use memorising rather than the techniques which are designed to develop innovative thought.

Al-Salom (1990) and Al-Dawood (1995) asserted that the educational system required attention to quality standards to provide better outcomes for students and graduates. They recommended the following steps:

1. improving the quality of school management, including closer links with their communities, particularly students' families;
2. improving the performance of teachers and employing world standard pedagogical techniques; and
3. The modernisation of curricula and revisiting the examination and evaluation systems.

A decade later, these matters were again raised, with researchers stating that quality issues still remain as barriers to successful graduate outcomes for the country (Al-Aqeel, 2005; Al-Issa, 2005; Al-Zeiber, 2000). These issues became significant with an unexpectedly high adoption of education throughout the country when access to schools and tertiary education became available and the population rate continued to rise. This population increase far exceeded estimates for each five-year development plan, so that, a lack of appropriate resources allocated to infrastructure and educator training resulted in an ineffective educational system. High numbers of students in classes and inadequate teaching techniques led to poor educational results. These results are clearly visible in rural schools, where there are inadequate buildings, teachers, and equipment to meet the students' needs (Al-Issa, 2005).

**School Facilities.** Although school infrastructure, including buildings, currently receives high priority in resource allocations, the rapid growth of student numbers did result in the Ministry of Education hiring a large number of residential buildings as schools (Al-Ghamdi & Abdaljoad, 2002). Al-Aqeel (2005) noted that rooms in these premises were frequently too small for teaching and lacked basic equipment and the opportunity for the children to move freely. A further concern is that rented buildings have structural problems, as they are inadequately maintained (Al-Issa, 2005). Hamed et al. (2007) and Al-Zeiber (2000) concur with these observations, noting the government's inability to provide adequate budgets for school buildings, especially in rural and regional areas. This situation is expected to continue, especially as parents are now considering tertiary educations for their children.



Table 3.9

*School buildings and status, 1991 to 2005*

Ministry of Education schools	Year							
	1991		1996		2002		2005	
	No.	%	No.	%	No.	%	No.	%
Owned	3053	49	3214	45	3876	48	4613	54
Rented	3163	51	3963	55	4200	52	3909	46
Total	6216	100	7177	100	8076	100	8522	100

Source Al-Issa 2005 p. 68

Over the decade, rented buildings represent more than half of the Ministry's stock. Table 3.9 shows the growth and status of government schools from 1991 to 2005. The number of rented buildings from 1991-2001 was relatively stable, although there was a decline in 2005 due to further resources being placed into purpose-built buildings for schools. However, this situation has reversed. In 2010, there were 25,000 state schools in the kingdom of which 16,000 operate in buildings rented by the Ministry of Education, according to a news report (Mahdi, 2010). At that time, the program of building, which required two to three new schools opening each day, was affected by rising costs of commercial land in the main cities, especially Makkah, where an estimated 100,000 students attended rented school buildings. An under-secretary from the ministry announced in November 2009 that the replacement of rented buildings “has been one of the priorities of the ministry”, with a planned SR 20 billion project to build 3,200 new schools across the country for more than 1.7 million pupils.

Furthermore, government school buildings have inadequate fittings and equipment for appropriate teaching methodologies and some 40 per cent are below

standard. The inadequate schools are frequently in rural areas. Al-Aqeel (2005) and Al-Issa (2005) state that this inadequacy stems from the increasing numbers of students due to Saudi Arabia's high birth rate; lack of suitable sites for purpose-built schools, insufficient educational resources and inadequate space and hygiene in rented buildings.

**Teacher Competencies.** Teachers contend with many issues in their attempts to gain the best outcomes for their students (Al-Aqeel, 2005; Baghdadi, 1981; Hamed et al., 2007). Al-Aqeel (2005) posits these issues, often prevalent in rural regions, as:

- inadequate initial training, little access to continuing training exacerbated by lower standards in teachers' training institutions and a low standard of university outcomes
- lack of ambition and motivation for self-development, expansion of knowledge and professional development
- absenteeism and poor performance, lack of experience, low commitment to teaching
- teaching tasks that are outside teachers' specialisation; this problem is more prevalent in schools across villages (p. 201-202).

It is possible the attitudes of a significant number of Saudi teachers can reduce their students' educational achievements and reduce their potential for creative thinking and innovation (Sonbol AL-Katepe, and Moawali, 1998). The researcher further mentioned that students lacked creative opportunities in class and that written examination and therefore memorisation was the sole route to graduation. This observation is contrary to the modern notion of evaluation which is confirmed by the

researcher noting that there was a lack of communication and interaction between the teachers and their students.

**Family Environment.** Education professionals frequently note the connection between inadequate parental support and children's scholastic performance, with few Saudi rural parents attending parents' nights or teachers' meetings to discuss their children's progress (Al-Aqeel, 2005). This reflects on a student's performance, especially as the child progresses through the later classes. Al-Zaid (1990) states that school administrators also observe this lack of parental cooperation, even with end of year celebrations. This has an adverse impact on students' creativity and the child's motivation to succeed. The author considers that families are not fully aware of the importance of school visits.

This section has considered the characteristics and implementation of a general education in Saudi Arabia. Perhaps a general education can be summarised as being based on Islamic principles, yet constrained by inadequate resources, and administration. Of these, inadequate administration is of the greatest consequence, as education principles and policies are a reflection of their communities in all societies; and constraints are a perennial problem linked with the allocation of resources. The issue of inadequate administration is illustrated by the Ministry of Education's structure, separated both administratively and logistically. Management presides over nearly a half-million teachers, 5 million students, and a vast supporting array of teacher training establishments, supervisors, pedagogy, curricula design with teaching and learning materials, technology, and student support. This is the nature of all very large

bureaucracies and indeed, corporations. However, they have internal checks and controls, and external auditors and controls to recognise waste and possible duplicity.

The outcomes from the Ministry's management are mixed. Whilst it accommodates its teachers and students, even this process is not adequate, as the majority of school buildings are rented and government schools are not maintained. For teachers, promotion is through length of tenure with performance of secondary consequence and principals have little control over teacher recruitment or transfer. Curricula and pedagogy are also defined and supported, so that any initiative at the school level is difficult.

The next section explores the nature of Saudi Arabia's varied societies, especially in regard to the issues of maintaining services to nomadic children and remote villages.

### **3.5 Comparison of Rural and Urban Environments**

In this section, the research questions of this thesis concerning the postulated differences between students in urban areas and regional areas in Saudi Arabia are discussed. The primary question is the effect of the rural environment on the creative thinking of these students compared to the greater range of influences and stimuli of the urban environment of city students (see s1.4). To inform this argument, relevant characteristics of the diverse societies are explored. First, the dispositions of both societies are explained, with specific reference to the transition of the nomadic Bedouins into settlements, and the impact of this transition on the children. The key differences between a rural and urban education as an outcome of these developments are also discussed.

### 3.5.1 Social Profile

Saudi society is divided into two main groups; the first are the Bedouin, the indigenous people of the Arabian Peninsula (Profanter & Cate, 2009). The Bedouin were nomadic tribes, eking out sustenance from their livestock which were their only source of transport between settlements, frequently at war (Lauzière, 2000). After unification, the Saudi government enjoined the Bedouin people to relocate to settlements or *hijra*; effectively, to adopt Islam (Al-Issa, 2005). The government initially concentrated oil revenues on industrial infrastructure, then on social infrastructure, predominantly the port cities such as Jeddah and Dammam and the main regional cities, Makkah, Al-Madinah, and Riyadh (Al-Aqeel, 2005; Hamed et al., 2007). Later, it turned to the Bedouins, providing them with water, infrastructure, and encouraged them to settle and farm, whereupon they moved into the *hijra* and adopted Islam. Mosques were established for religious observations, to teach the basic principles of Islam, and public schools were introduced (Al-Aqeel, 2005).

Until the Bedouin adopted motor vehicles, they depended on camels; for example early in the 20<sup>th</sup> century, the pilgrimage to Makkah was impossible without the Bedouin and their large herds. The Saudi government respects the special needs of the Bedouins; however, their economic base is disappearing and the protection of their culture based on camels and travel is difficult. Jobs which utilise their unique skills are required so that their work is perpetuated, and this is slowly occurring through tourism and for “the Saudis’ fondness for escaping the cities to be with their falcons and pet camels, the desert is an indissoluble element of the national soul” (Venditti, 2001, p.1). There are many types of sports practised in the desert: camel racing consists of large

numbers of camels and riders over long distances; falconry is another sport that the Bedouins enjoy, capturing and training the falcon to catch small birds and animals; and horse racing (Amara, 2008). To escape the summer heat, regional dwellers often visit coastal regions, holy cities, or visit their families (Al-Aqeel, 2005). Bedouins nevertheless drift into the large cities searching for work; however, as noted, they are largely unskilled.

The second group comprises urban residents of mixed ethnicity. Abdulwasa (2002) and Faraj (2005) state that the population of Makkah city, for example, includes non-Arabs. Due to its status, Moslems on the hajj pilgrim over the centuries encamped or studied in Makkah, or moved to Jeddah or the holy city of Al-Madinah, where many settled. Saudi Arabia requires its citizens to become Moslems, so that people from southern Asia, south and east countries of the Mediterranean Sea, Europe, and Russia have adopted Saudi customs and lifestyle (Hamed et al., 2007). Consequently, people in Makkah, Jeddah, Al Madinah, and to some extent, Riyadh, are multicultural and differ from the smaller hijra towns and villages, where the mores and practices of Bedouin families differ.

Urban Saudi Arabia is a series of modern metropolises, based on old walled cities, which in the case of Jeddah, was still its confining perimeter up until the late 1940s (Al-Ali, 2008). Urban Saudis seek the modern lifestyle of embracing consumer goods and following global trends. They anticipate good careers and a continuation of the benefits that come with oil and gas revenues and which they can confidently expect to continue for generations. It is difficult for them to contemplate employment in the 'deprivations' of the desert, which is still the immediate environment.

A further barrier to integration of Saudi peoples is the emirate system. Saudi Arabia, as noted at s.3.1.3, comprises 13 emirates, each divided into a number of cities and villages. Each emirate has a provincial Council System (Al-Ghamdi & Abdaljoad, 2002). The outlying emirates resist integration and demand that the existing level of decentralisation remain protected, which is to some degree occurring through a large scale transport project. However, the government does not have the resources for a new hospital and school in every hijra village, and it may actively be pursuing a different form of regionalisation through its urbanisation policy of economic cities along the Red Sea (Porter, 2008). Other factors impacting on village life include the remaining nomadic tribes who move from hijra to hijra, seeking pasture and staying for education and commerce. This places strains on the local schools, especially for teachers, who are unable to obtain relief from their urban counterparts, who do not wish to travel or to share the villagers' customs (Hamed et al., 2007).

### **3.5.2 Rural education**

As tribal people, Bedouins were late adopting urbanisation and accepting the requirement for girls to be educated and remain away from the duties of the household or caravan. By 1970, they were gradually coming to recognise the benefits from education; however, whilst their children gained literacy skills, there are still remnants of Bedouins who use memorisation for their poetry and stories (see s3.1.3). In the past two decades the education of Bedouins has improved, especially after an increase in the number of teachers directed into rural areas (Faraj, 2005; Hamed et al., 2007). As education was adopted earlier in the cities, urban children were expected to undertake as

much education as they were capable of doing. Consequently, the number of educated students in urban areas is much more when compared with those in rural areas.

There are differences between rural and urban schools. Stanley, Comello, Edwards, and Marquart (2008) posit that in rural areas, young adults seek work in the city, thus leaving an ageing population and leading to school consolidation in more urban areas. Given the significant relationship of income and parental education to school-related variables, a key long-term strategy may lie in improving the economic climate of rural areas. In addition, there is a reason for the creeping decline of the rural school system in the system itself, which prepares students for a life in conflict with the rural environment (Wright, 2003). The rural school system fosters the exodus of students to urban areas. The school system is not meeting the immediate challenge which is confronting it, which is the revitalisation of home communities (Harmon, 2000). Theobald and Hachtigal (1995) offer a suggestion for the structuring of a curriculum; “it must gain its momentum and impetus on the basis of the lives of those who will obtain direct benefit from its processes, it must be structured to serve those it will immediately impact” (p.135). The learning from the curriculum must be structured to sustain the community.

Of interest to this thesis, McCracken and Barcinas (1991) and Preston (2006) find that a strong factor in different achievement levels is that the parents of rural students are less educated than parents in urban areas. On the other hand, Preston (2006) finds no difference between rural and urban settings in regard to academic potential, which may be of significance in the Saudi environment. However, this researcher



considers there are differences between rural and urban students, dependent upon the quality of education.

The primary educational advantage of rural schools is arguably, size. Morgan and Alwin (1980) conducted an investigation of rural schools which revealed a negative correlation between school size and student participation. The researchers note that students from rural schools are more likely to participate in school activities when they are from small schools. The close-knit nature of the small rural school inculcates a sense of responsibility toward the school, and rural schools have a range of environmental characteristics conducive to student continuation (Hardré & Sullivan, 2008; Kearney, 1994; Pittman & Haughwout, 1987). However, small rural schools may have inadequate development of critical modern learning areas such as laboratories, computer rooms, and libraries, which can impact on student development, and also teaching qualities may be not at the same level of urban systems (Hamed et al., 2007). Cross and Frankcombe (1994) note that lifestyle adjustments are necessary for new teachers in a rural environment. This is of consequence for young inexperienced teachers, who lack peers with whom they can interact. Further, teachers may be called upon for subjects where they have limited experience (Hill, Rowan, & Loewenberg, 2005). In the rural school environment, size is an insufficient determinant in assessing the level of education as regards that of urban schools. The summary of this assessment of quality in rural schools remains open in the literature: there are arguments that teachers may be young and inexperienced, or frequently, they are older and have taught in the community for years (Blasé & Blasé, 2001; Haar, 2007). Resources, including teacher training, are shared among a group of schools, and students move through campuses to experience different resources (Du & Hu, 2008; Glazer & Hannafin, 2006).

Researchers debate the notion that rural school systems are challenged in instituting scope and diversity into their curriculum (Craig, 2006; Jones, 2006; Mackinnon, 2000). This issue of rigid curriculum development predominates in the academic and fine arts areas (Drew, 2004). Achievement levels among the rural students are lower than their urban counterparts, as are their reading levels (Cartwright & Allen, 2002; DeYoung, 1994). “Long bus routes are another example of the disconnection between schools and rural communities. Instead of making the school more accessible, the results of consolidation create circumstances that reduce accessibility” (Gleason, Belcher, Britt, & Savich, 2008, p.25). Further, a school’s financial burden is compounded when the school must factor in extra-curricula activities and field trips, and this is further compounded for rural schools that have a higher instructional cost per student than urban schools (Alderman, Kim, & Orazem, 2003; DeYoung, 1994).

In a study of urban and rural cognitive differences between students, Hongli and Yulin (2006) find variances in creative thinking between the two groups. Shutiva (1991) compared the TTCT scores of eleventh grade rural and urban American Indian students from twenty-one tribes. The results indicated that creative originality, abstractness of title, resistance to closure and average creative index scores were highest in the urban students tested. Urban girls scored higher on the six variables than all other students, including urban males.

In all societies, there are differences between rural and urban communities, brought about by the physical and social environment. Florida (2003) notes the ideal city as “a font for creativity and innovation” (p.3). Whilst providing more social stimulation, urban environments demand from the individual greater interaction and

faster responses; arguably as the challenges are higher for more rewarding outcomes. Frequently, young provincial adults move to the cities for opportunities to study and work; they may return to the home province or they may not.

In the case of Saudi Arabia, there is the additional attraction of the ‘new environment’. Regional families visiting urban relatives or holidaying are captivated by the ever-changing cities and may return to their homes aware of a different and perhaps easier and less frustrating lifestyle. This can build a desire for improved opportunities for their children and, assisted by the government they may move to a new home in the city and thus perpetuate the urban drift by removing themselves and their resources from the rural environment.

Rural schools are more likely to be rented, less well-equipped, have less skilled teachers, and in some cases have ‘temporary’ students as the Bedouins move through the area. Given the centralisation of decisionmaking in the Ministry of Education, the time in providing further resources for the temporary numbers may be greater than the need for the extra resources exists. When resource funding is allocated over five-year plans, it may be the rural schools that are at the end of the queue.

### **3.6 Creative Thinking Policies**

Creative thinking is critical to Saudi Arabia. The country’s socio-economic development began only a few decades ago, and since the first oil boom, the government has effectively built cities from the sand. The country has a high population growth, the rate of which is levelling off as women become educated and seek employment outside their homes. Nevertheless, there are high youth unemployment

rates (60 per cent of the country's current unemployed). The current unemployment rate is seven per cent (Arab Human Development Report, 2009).

Pedagogy is slowly emerging from a traditionalist approach to adopt modern concepts, so that the aim is moving from teacher-centric lecturing to a focus on the students' learning capacities to prepare each individual to enter into adulthood and employment. This requires flexibility and creativity in Saudi Arabia's highly bureaucratic and inflexible environment.

This section reviews the route followed by the Saudi government to conceptually develop creative thinking in a traditionalist society. In education, there is an emphasis on exploring creative thinking in children, nurturing it and allowing free expression of talent and imagination. This forms new career opportunities and widens the number of professions, sub-professions and technical pathways available to the cohorts of school-leavers and graduates who pour on to the Saudi job market each year. Thus the elements of the Ministry of Education's creative thinking policy and the programs and practices that support it are examined in the following sections, namely, the methods and techniques used for developing creative thinking, the current status of these programs, and issues relating to these practices.

### **3.6.1 Creative Thinking Programs**

Education policy in Saudi Arabia is based on Islamic principles (Al-Enezi, 2003; Al-Kasi, 2000). Islamic education focuses on values and culture for all Muslims, particularly gifted students who are nurtured for the advancement of society (Al-Said, 2000).

The Ministry of Education states that Saudi educators should identify and nurture gifted and creative students (Maajni, 1996). Creative thinking can only grow and develop when a healthy environment exists within families and schools. The role of a gifted students' care centre begins when students are provided with scientific, psychological, and social care (Al-Issawi, 1994). There was initially great progress in identifying and nurturing gifted Saudi students, where it was intended that individuals gain the skills to achieve in their preferred profession (Al-Attas, 2005). Creative individuals assume an important position in a country's development, and the means to reach their potential is a matter of priority for the government. Al-Akder and Hussein (1993) previously noted that expenditure on those students was estimated to be millions of Saudi riyals in a bid to establish the institutions and activities necessary to nurture their talents.

**Creativity Centre.** The Ministry of Education introduced a program for human creativity in 1998 at the Prince Sultan educational school centre in Riyadh (Tuwaijri, Abdulmajed, and Mohmmad, 2000). The Creativity Centre encourages research in the field of creativity and develops programs to enhance creativity. This facility accommodates one or two per cent of all Saudi public students and provides educational programs that are not available in public schools, it also administers national examinations and provides awards across a range of creative dimensions. Further the families and schools of participating creative students are assisted in nurturing their talent with a range of mentoring and fostering programs.

The centre comprises a planning and training unit which provides curricula materials, and trains teachers and examiners. As noted, it also provides school

administrations and coordinators with information and advice regarding creativity through an information unit (Tantawi, 2001; Tuwaijri et al., 2000). The courses comprise literature, science, mathematics, computer, art, and physical education. Several courses are designed to develop creative thinking and problem solving. The inventions and innovations of gifted students are also encouraged through workshops, exhibitions and competitions. Finally, psychological and social care is extended to support the children and their families so that they can discuss matters that arise from the child's special situation and can work through solutions (Al-Attas, 2005; Al-Enezi, 2003; Hijazi & Naser 2001).

**Ministry of Education and gifted students.** The Gifted Students department was established in the Ministry of Education in 2000. Similar to the Creativity Centre, it identifies and fosters creativity in students; provides program training; and has a communications group (Al-Pakistani, 2007; Al-Zahrani, 2003).

The department also cooperates with those interested in gifted people, within the Ministry, and other public organisations, and professional associations. It has a central database of creative children and monitors their progress (Ministry of Education, 2002a) Other creativity centres were then established throughout the country to foster and assist children in their quest for excellence (Al-Nokali, 2004; Al-Thubayti, Y., 2003).

The department has several policies for nurturing gifted students, relevant to circumstances such as remote schools, or targeted professions such as engineering or the creative arts. Once identified, a child can be promoted to an appropriate class level; separate and additional tasks and projects can be offered to a gifted child; and

exceptional students may be placed in a separate class so that they receive a separate curriculum (Ministry of Education, 2002b). Separate programs are offered after school hours and during the summer holidays (Al-Nafie, Al-Qtami, & Al-Dobiban, 2000).

Departmental counsellors identify outstanding students and provide them with appropriate conditions and encouragement to reach their potential, reinforcing the notion that they can make a difference, and their successes will be rewarded. Counsellors also assist teachers to attend to the needs of gifted students to develop their talent in the right direction (Al-Attas, 2005; Al-Pakistani, 2007; Jaroan, 2002). The department offers social and cultural activities, including religious studies and sports to encourage children to excel in these areas (Al-Harby, 1996).

**King Abdul Aziz Foundation.** The King Abdul Aziz Foundation for Gifted Students supports creativity through the provision of resources for fostering talent. The foundation offers national and international scholarships, competitions, and awards to gifted individuals. Of interest is a science-based program which is supported through the private sector and specialist government organisations, such as the Faqih Centre for Scientific Research. The technical aspect includes a standing invitation to receive and test innovative ideas, and gain verification in terms of functionality and quality. Another program identifies and nurtures artistic talent in a range of media. This particular aspect includes evaluation of pieces by professionals and scholars, and thus achieving entry into exhibitions, and possible international scholarships (Tuwaijri et al., 2000; Fathalla, 2003).

The foundation also produces curriculum teaching and learning materials which are either stand-alone or coordinated into other coursework in schools. Exhibitions and

conferences are sponsored, the former showcasing inventions, and the latter a series of conferences for the exchange of ideas. Recently, students and graduates attended conferences in Jordan, Syria, Spain, and Korea in pursuit of excellence. Students are also offered Saudi and overseas scholarships to prestigious universities (Al-Thubayti, H., 2003; Fathalla, 2003; Tuwaijri et al., 2000). Gifted students receive scholarships for undergraduate and post-graduate studies, for example the grants provided by the universities and grants from the King Faisal Foundation and the Sultan Bin Abdul-Aziz charitable foundation (Al-Souli 2003). Finance is sourced from the Ministry budget; however, this is supported by funding from religious sources, the private sector, and wills (Al-Attas, 2005). The foundation also interacts with its counterparts in other countries, accepting exchange students, arranging exhibitions and conferences, and providing communication links for talented individuals around the world (Al-Nokali, 2004).

**Public support for gifted students.** Other areas fostering excellence were nominated by Al-Pakistani (2007). The King Abdul-Aziz City for Science and Technology was established in the late 20<sup>th</sup> century: this experimental organisation coordinates the activities of institutions and centres for scientific research for the benefit of the Kingdom (Al-Harby, 1996). The organisation comprises various disciplines: the Computer and Electronics Research Institute (which contains Saudi Arabia's internet connections and registry function), Petroleum and Petrochemical, Energy Research, Resource and Development, Astronomy and Geophysics and Space Research.

The organisation also supports programs for identifying gifted students, experimental science projects, and fostering community awareness in identifying creative



children (Al-Attas, 2005). The Saudi Scientific Club nurtures outstanding students, male and female, in order to develop their capabilities. In addition, the institute studies scientific innovations from students at all educational levels (Al-Attas, 2005). Its role is to encourage scientific endeavours, to improve curricula in schools, host scientific exhibitions, lectures and conferences, bestow awards, and showcase innovation in private industry through inspections and presentations (Maajni, 1996).

Universities such as King Saud University and colleges contribute to the education of gifted students through the King Abdul-Aziz Foundation. This has created a competitive atmosphere among the universities, attracting the students participating in gifted programs which can be either annual or over the summer (Al-Souli, 2003).

Aramco Saudi Arabia invites applicants from grade 11 at the end of the school year to attend the company's well-regarded educational and training centres for the summer. The centres also provide support and aim to expand the horizons for innovative thinking among participant students (Al-Pakistani, 2007).

The General Presidency for Youth Welfare is the sports and culture authority. This public organisation is responsible for the development of individuals in sports, cultural and social areas; again offering competitions and prizes (Al-Souli, 2003).

**Private support for gifted students.** Support from the Saudi private sector is available for gifted students (Al-Attas, 2005; Al-Souli, 2003). The following programs are indicative of those on offer:

1. The Almarai company has an annual award for scientific innovations. This award was set by the company in 2000 to support and encourage scientists, researchers, inventors, creators, and gifted students in Saudi Arabia.

2. Saudi Airlines offers flights to the value of SR 130,000 as a contribution to the King Abdul Aziz foundation for members and students to attend conferences and exhibitions on innovations (Al-Attas, 2005).

### **3.6.2 National Outcomes**

By 2003, the Ministry of Education had established gifted children's centres in Riyadh, Jeddah, Al-Taif, Dammam, Medina, and Al-Ihsa. There is a program in place for supervisors and counsellors to identify talented youth and curricula for gifted students, available in a range of subjects, including natural sciences, mathematics, and intellectual and artistic development. In Al-Taif, for example, Al-Pakistani (2007) highlighted that the achievements of the care centre in Al-Taif included: (1) the provision of curricula for teachers for topics such as innovative thinking, evidence of innovation, enrichment of understanding, management and principles of resolving problems; (2) the offering of training courses for teachers and supervisors for holistic enrichment, teaching strategies, thinking skills; and (3) development of technical education teachers.

Of interest to this thesis, Al-Attas (2005) detailed that the number of students benefiting from the innovative thinking skills program was increasing rapidly every year. Further, Al-Attas, (2005) and Al-Khalidi (2001) find that the advantages of the Saudi policy include community awareness of the benefits of gifted students to society. The Ministry's approach to gifted students received recognition from the Arab Bureau of Education for the Gulf States for its use of the Wechsler Intelligence test and the Torrance Test of Creative Thinking in testing and classifying children. It also has

enriching programs in science and mathematics as models for gifted care programs and a procedural definition for a multidimensional gifted student.

The King Abdul Aziz Foundation for Gifted Students also increased social interest in gifted students and provided a focus for creativity (Al-Misned, 2000; Al-Nafie et al., 2000; Al Soulami, 2004; Aziza, 1985). The establishment of creativity centres in the larger cities adequately assisted individuals to attain their potential in appropriate professions and positions through guidance and financial support. By giving students a voice on the world academic platform, the Saudi government has encouraged innovation, talent, and progress.

The Ministry's department responsible for gifted children has achieved good results (Al-Attas, 2005). Al-Souli (2003) and Obada (2001) note that the Ministry's policy and practices have a positive impact on the development of students' innovations. The department continually seeks improvements in its programs and curricula throughout Saudi Arabia and in all disciplines, encouraging research and performance criteria in inter-disciplinary forums and conferences for gifted students. Further, a database of exceptional educators was developed to benchmark curricula, pedagogy practices and student outcomes.

**Issues from Ministry Policies.** There are several issues regarding the identification and fostering of gifted children. Researchers are critical of the Ministry's approach, which they consider does not have a strategy or a vision for creative students, that is, one which defined outcomes and benchmarks for school leavers and certificated individuals (Al-Harby, 1996; Al-Khalidi, 2001; Al-Pakistani, 2007; Al-Souli, 2003). As with all matters, the Ministry retains control of all aspects of these programs, so that the

innovation centres may be stifled by long chains of command and inflexible procedures. The aims of the centres are generic but need to be focused on the outcomes for the graduates using contemporary trends in creativity support. Indeed, there is little contemporary research in the country regarding specific approaches for identifying and fostering creative children. The bureaucratic structure of the Ministry and its approval structures results in little coordination between the regional centres, professional organisations or universities, thus there are few opportunities for the centres to share resources and knowledge, and to leverage these to achieve better outcomes for the students. Once they leave school, individuals are not supported by the centres and thus there is no further contact with their educators, or communication by the centre staff with the tertiary institutions attended by the children.

The majority of gifted children's programs are based on academic achievement tests and teachers' assessments. The innovation centres are available only in the larger cities, forcing gifted rural children to forego special education, or to travel long distances. Once identified, there are limited resources for schools to nurture talent; inadequate resources relate to accommodation, space and equipment for playgrounds and laboratories, and there is insufficient printed advanced material in school libraries. These conditions occur especially in the leased buildings used for schools, which are frequently inappropriate residential buildings. Also, due to population pressures and large classes, there is insufficient time for teachers to focus on a few individuals and principals do not encourage special curricula after hours (Al-Khalidi, 2001). As well, families frequently do not appreciate their children's talents, so that gifted students do not necessarily succeed with their specialist programs and curricula.

Further, the curricula in the centres, as with Saudi education in general, is formulated and didactic; the teaching and learning processes are inflexible and do not meet the standards of nurturing excellence. The identification of exceptional children, as noted, is conducted through standardised tests which do not take into account the varying customs and traditions; thus some creative children can be unfairly excluded. Education professionals are seldom recognised or financially rewarded for their achievements. Unpaid overtime is a frequent expectation for educators, administrators and technicians (Al-Attas, 2005; Al-Kasi, 2000; Al-Khalidi, 2001; Al-Thubayti, 2002).

In this section, the Ministry of Education's policy, institutions, and practices for identifying and nurturing creativity through its gifted students' program are reviewed. The primary element of Ministry policy is conducted through the specialised Gifted Students department which identifies exceptional children and provides a range of interventions to foster their development. However, the identification of exceptional children is undertaken with standard curricula tests, which relates more to academic achievement than to creativity. These tests are also standardised so that individual differences and the child's environment are not taken into account.

Funding is primarily through the Ministry, leading to a bureaucratic situation wherein the supportive and flexible environment necessary to achieve a satisfactory outcome is frequently absent. Overcrowding and inadequate resources preclude educators at the innovative centres from performing their duties, and in schools, teachers find little time to encourage their exceptional students. Further, there is some evidence, with the creativity centres in the urban locations only, that rural children are deprived of the opportunities enjoyed by their urban counterparts. Whilst the Ministry is

supporting creativity through a traditionalist structure, the government arguably does not achieve the outcomes it expects from its considerable expenditure.

### **3.7 Summary**

Saudi Arabia is a rich country taking its position in international organisations. It is also adopting global concepts by which to measure its considerable economic progress. However, the pace of social change differs, reflecting the government's limited ability to change the social and religious environment.

Traditionally, memorising and reciting passages from the Qur'an, and learning basic literacy and numeracy was the extent of mass education on the Peninsula. There were minimal opportunities to gain a comprehensive education on the Arabian Peninsula before the Saudi regime. For example, in Makkah and Jeddah, there were private schools for boys and girls in the early 20<sup>th</sup> century, while other locations relied on the Qur'anic schools and Kutab where student groups learned basic writing and reading skills. King Abdul-Aziz Al-Saud's first order in 1924 was the establishment of the Directorate of Knowledge and Education which was replaced in 1953 by the Ministry of Knowledge and again in 2003 with the Ministry of Education for all Saudis (Abdulwasa, 2002).

The current government has afforded education a high priority with its vision 'Education for All', spending more than 25 per cent of the overall budget for general education (Hamed et al., 2007). Education is free in Saudi Arabia, and there are also financial incentives to continue education (Al-Zeiber, 2000). A massive continuous investment in education spanning five decades now places Saudi students within reach

of global norms; the country has achieved a high literacy rate, including the semi-nomadic adults who still use their livestock and trade to travel the region.

The Ministry of Education controls education in Saudi Arabia. It is increasingly focused on secular outcomes for Saudi children emerging from the school system such as acquiring jobs, or preferably attending the growing number of trade institutes and universities. Arguably, a general Saudi education can be summarised as one which is based on Islamic principles but which is limited by resource constraints and inadequate administration. For this study, inadequate administration is of the greatest consequence, which is illustrated by the Ministry's structure, separated both administratively and logistically. It may be affected by a lack of internal checks and controls, and external auditors and controls which can recognise where efficiencies can be made. There are mixed outcomes from the Ministry's accommodation of its students, teachers and provision of curricula resources; and its many goals, directions and programs, are sometimes ill-defined and conflicting. Performance measures are introduced slowly however, there is little devolution of responsibility. This impacts on teacher motivation, especially in the rural areas, where there are inadequacies in infrastructure, schools, pedagogy, and quality standards. Teachers in rural areas are unmotivated and have to teach large classes in rented classrooms have inadequate teaching materials, and work in unsanitary conditions. Further, Saudi teachers do not seek career opportunities through further study, and their classroom performances do not equal best practice seen elsewhere (Al-Zeiber, 2000).

In the final section, the Ministry's policy, institutions, and practices for nurturing creativity were examined. The Ministry has an impressive array of programs

to foster creative thinking, conducted through the Gifted Students' department which identifies exceptional children and provides a range of interventions to foster their development. There is some concern over standardised curricula tests, so that individual differences and the child's environment are not taken into account. Further, the bureaucratic nature of the administration may not be sufficiently flexible to achieve a satisfactory outcome. Resource constraints hinder the effectiveness of staff at the innovative centres, and in schools, teachers find little time to encourage their exceptional students.

This is the conundrum of nurturing talent and creative thinking through bureaucratic lines of control. Whilst exceptional students are identified and educated to draw out their talents, the creative thinking of the other 90 per cent or more of children may be unrecognised and untapped. Obviously, parental guidance and indeed input into their children's education and welfare is necessary to nurture creative thinking in the classroom. This may well be the next step for Saudi education: the devolution of responsibility.



## **CHAPTER 4: QUANTITATIVE STUDY**

### **4.1 Introduction**

The previous chapters comprise the preparation for the original research of this study. They describe the nature of creativity, and the place of creativity and education in the Kingdom of Saudi Arabia. Introduced in Chapter 2, the measure of creative capacity, the Torrance Test of Creative Thinking (TTCT), and the impulsivity-reflectivity dimension, measured by the Matching Familiar Figures test (MFFT) are employed in this research to compare the results with other data (Kagan et al., 1964; Torrance, 1965).

This thesis uses both quantitative and qualitative analyses. Quantitative data gathering reveals points of comparison, while analysing qualitative data may determine the meaning of the events. Quantitative research explains phenomena by collecting quantitative data which is then analysed using mathematics. Kim (2006), Rich and Weisberg (2004), and Weisberg, 2004) prefer using a quantitative method, particularly in their research on creative thinking. Rich and Weisberg (2004) observed that “the present study has provided further evidence for the feasibility and usefulness of applying quantitative methods to the analysis of the development of creative products” (p.258). Qualitative data, on the other hand, depends on the collection of non-numerical data such as interviews, video, and photos (Gelo, Braakmann, & Benetke, 2008; Muijs, 2004). Muijs (2004) continued that “the quantitative view is described as being 'realist' or sometimes 'positivist', while the worldview underlying qualitative research is viewed as being 'subjectivist’” (p.4). Combining quantitative and qualitative analyses enables

the researcher to obtain rich data for analysis, and supports the methodological integrity of the study (Muijs, 2004; Onwuegbuzie & Teddlie, 2003). Further, quantitative analysis can determine differences between students' creative thinking abilities which support creativity and decision making (Căncer & Mulej, 2005; Yu & Jing, 2006). The researchers (e.g., Al Zyoudi, 2009; Kim, 2006; Rich & Weisberg, 2004; Weisberg 2004; Yu & Jing, 2006) use quantitative measures to determine the level of creativity and to analyse the development of creative thinking in the individual. Kim (2006) asserts that

“(the) TTCT is a helpful addition to the assessment repertoire, because most measures for gifted identification are heavily driven by verbal and quantitative content.... Even teacher recommendation focuses more on the student's classroom performance than other kinds of potential. For these reasons the TTCT-Figural is valuable in that it allows another perspective on the student's ability that is vastly different from other aptitude and achievement tests” (pp. 8-9).

In this study, quantitative data and analysis is drawn from the results of TTCT and MFFT tests of Makkah district school boys.

In this chapter, the methodology of the research is described, that is, the theoretical framework used for data gathering and analysis. A quantitative form of data gathering was chosen, in the form of the TTCT and MFFT tests which are also described in detail. This is followed by the procedures used for the data collection, obtaining school and parent consent, samples, and testing arrangements. The data retrieval and analytical steps are explained, and the chapter then concludes with a discussion of the outcomes from these procedures.

## **4.2 Research Method**

In this section, the research methods are discussed. The section comprises information and discussion on sampling, the instruments used, reliability and validation of the data and the means of collection, and the data analysis procedures.

### **4.2.1 Sampling**

In the broad social and behavioural sciences literature sampling is usually divided by type into probability and purposive sampling. Probability sampling pertains to quantitative research and involves “(s)electing a relatively large number of units from a population, or from specific subgroups (strata) of a population, in a random manner where the probability of inclusion for every member of the population is determinable” (Tashakkori & Teddlie, 2003, p.713). Probability sampling is therefore deemed the most appropriate type for this research. In this research the use of random sampling as described was compromised as legal and cultural regulations in Saudi Arabia do not permit the mixing of genders in public places. Further, women psychologists experienced in the MFFT and TTCT were not able to be released from other duties, and therefore results from girls’ schools in the district were not available in the time frame allowing for the social constraints for this study. My research therefore comprises of samples representing males in public schools.

#### **4.2.1.1 Participants**

The study involved 120 rural and 120 urban grade 10 Saudi male students, age 15 to 17 years, from six secondary schools; three schools from the city of Makkah and three from neighbouring towns and forty students were selected from each school. The age level of grade 10 was selected firstly, on the basis of Piaget’s developmental theory

(1985) which states that the formal operational, that is the abstract thinking stage, starts around 12 years of age, which is the early high school or intermediate school level, and an important area of enquiry.

Secondly, Piaget's theory continues that children's thinking at a formal operational level becomes more systematic and the abilities for hypothetical and abstract thinking should emerge at this level (s.2.1.2; Moses & Baldwin, 2005). Results from a study by Smith and Carlsson (1983) find that creative thinking is at its strongest in high school students, peaking at 16 years. Reflective-impulsive style is also influenced by age. Drake (1970) and Frare (1986) reported that high school students' scores were higher on the MFFT than the primary school students. These insights support the contention that grade 10 is the most appropriate stage for this study.

Taking into account external variables, such as diversity in social, economic, and cultural backgrounds, the sample schools were randomly selected from different parts of Makkah. Each school consisted of many classes for each grade, and each class included approximately 25-37 students. Twenty male students were chosen randomly from each of the two grade 10 classes from each school to participate in the tests. As most rural towns have only one secondary school, three towns within 160km of Makkah were selected; they are Aljamoum, Alabyar, 160 km south-east and Asfan, 90 km northwest.

The population and the location characteristics of each secondary school in the sample are as follows:

1. Large rural school comprising 600 male students at Aljamoum 45 km north east of Makkah;
2. Small rural school of 450 students at Alabyar 160 km to the south east;

3. Large rural school of 535 students at Asfan, 90 km to the north-west;
4. Large school of 650 students in Otabia suburb of Makkah city;
5. Large school of 635 students in the suburb of Al Siteen; and
6. Large school of 725 students in Alizazia suburb.

The test-retest for the TTCT was conducted in two sessions (two to four weeks apart) in April 2008 (see appendix P). The tests were scored by the researcher and two volunteers from the Makkah Creativity Centre, all of whom are qualified and experienced in these tests. Whilst there were logistics problems in conducting the tests, the greatest issue was that the number of participants for the retest varied slightly from those of the first test (with an overall final retest total of 51). The students were from the same sources of class and school, so that the results were not compromised in the retest. The next section considers the nature of the testing instruments, which were selected as representative of the study's approach to quantitative data collection.

#### **4.2.2 Measures**

The measures of creative thinking and cognitive style are discussed in detail at s.2.1 and s.2.2. The following is a brief summary which illustrates the value of the instruments in this study.

##### **4.2.2.1 Instruments**

*Torrance Tests of Creative Thinking-Figural, Form B.* The TTCT-Figural was first published by E. Paul Torrance in 1966 and has since undergone several format changes (s.2.1.4) (Kim, 2006). The present Torrance test has two verbal forms (A and B) and two figural forms (A and B) (Al Zyoudi, 2009; Kim, 2006). This thesis used the

TTCT figural form (B) as it is comprehensive, and because verbal forms of the test require participants' knowledge of a particular language.

The TTCT test consists of three drawing activities:

- Activity 1 is the construction of a picture with a curved shape;
- Activity 2 is the completion of a picture by adding lines to the incomplete figures; and
- Activity 3 requires participants to add lines to the circles to complete the picture (see Appendixes A and B).

This test is suitable for all ages from kindergarten to adults, and can be administered either individually or in groups. In my study I chose the individual option to complement the integrity of the data. All students who participated in this study completed the creative thinking test in 30 minutes. To measure the figural TTCT test for participants, the standardised scores of five ability areas were used: fluency “the number of relevant ideas”, originality “the number of statistically infrequent ideas”, elaboration “the number of added ideas”, abstractness of titles “the degree beyond labeling”, and resistance to closure “the degree of psychological openness” (Cheng, Kim, and Hull, 2010, p. 106). In addition, the scores of thirteen items as indicators of creative strengths were included: (1) emotional expressiveness “in drawings, title”; (2) storytelling articulateness “context, environment”, (3) movement or action “running, dancing, flying, falling, etc.”; (4) expressiveness of titles; (5) synthesis of incomplete figures “combination of 2 or more”; (6) synthesis of lines “combination of 2 or more”; (7) unusual visualization “above, below, at angle, etc.”; (8) internal visualization “inside, cross section, etc.”; (9) extending or breaking boundaries; (10) humor “in titles, drawings, etc.”; (11) richness of imagery “variety, vividness, strength, etc.”; (12)

colorfulness of imagery “exactingness, earthiness, etc.”; and (13) fantasy “figures in myths, fables, fairy tales, science fiction, etc.” (Al Zyoudi, 2009, p. 75)

***The Matching Familiar Figures Test (MFFT-20).*** The MFFT consists of 20 matches to standard items, plus practice items (see Appendixes C and D). Each participant was examined individually and each test item comprised one standard picture with eight similar variants. In MFFT, a participant must select the drawing which corresponds exactly to a standard among similar variants. The total number of errors and the latency of the first response for each test item is recorded. Therefore, two areas are measured: latency (response) and accuracy (errors) in order to classify the participants into four groups. 1) Participants who take a long time to respond and make fewer errors (those that score above the median on response time and below the median on errors) are classified as reflective; 2) participants who are quick to respond and make many errors (those that score below the median on response time and above the median on errors) are classified as impulsive; 3) participants who take a long time to respond and make many errors (those that score above the median on response time as well as number of errors) are classified as slow and inaccurate, and 4) participants who are quick to respond and make fewer errors (those that score below the median on response time and number of errors) are classified as fast-accurate (Agarwal, Tripathi, & Srivastava, 1983; Buela-Casal, Carretero-Dios, de los Santos-Roig, & Bermudez, 2003; Kenny, 2009). However, the percentages for the reflective and impulsive (R-I) participants in the majority of tests are found to be greater than for the remaining groups (slow-inaccurate and fast-accurate); and this phenomenon has been the subject of research. The majority of studies focus on the RI group “because they contain the

largest number of individuals (about 70%) . . and because they support the initial Kagan et al. (1964) hypothesis that individuals who answer too quickly (impulsivity) make more mistakes” (Rozencwajg & Corroyer, 2005. p.453).

#### **4.2.2.2 Reliability and Validation**

The results associated with the psychometric analyses of the reliability and validity of the TTCT and MFFT scores and subsequent data are presented in this section.

***TTCT Reliability.*** In an early test of TTCT reliability, Rosenthal, Demers, Stilwell, Graybeal, and Zins (1983) performed separate tests on gifted and nongifted children to establish scorer (rater) differences. Their findings are that most interrater reliability coefficients exceeded  $r = .90$  for both groups; however, there significant mean differences between the scorers resulted in the recommendation of a single rater for a test, particularly if cutoff scores were involved. However, as noted at s.2.1.5, the 1984 TTCT–Figural manual both simplified the scoring process and provided greater detail for standardising scores (Ball & Torrance, 1984). Silvia et al. (2008) again raised the issue of interrater bias, using a Top 2 scoring method where participants complete a divergent thinking task and then circle the two responses they consider most creative. However, Kim (2006), Hébert et al. (2002) and Torrance (2002) have evidence for TTCT reliability as well as validity.

The test and retest of the TTCT scores were conducted to examine the stability of the TTCT figural form B. The results of the test-retest of the TTCT for raw scores showed that they were significant and stable within the range  $r = .76$  (fluency) to  $.93$  (elaboration), similar to Al Soulami’s (2004) findings with ranges between  $r = .75$  to  $r =$



.91. and to Al Zyouidi (2009) findings that the test-retest for the raw score (actual score) was between  $r = .77$  to  $r = .87$ , see Table 4.1 and Table 4.2. The result for the raw scores was similar when compared with the standard scores of the TTCT with range .76 (fluency) to .92 (elaboration). These results mean there are no significant differences between the raw and standard scores. The result of this study is similar to several studies documented by Kim (2006); Lee, Sherry, & Mccallum (2007); and Al Zyouidi (2009). Al Zyouidi (2009) which found that the correlation for all raw scores was significant within the range from .76 to .91, and that all standard scores were significant within the range from .64 to .92.

In addition, the differences between the test and retest scores were analysed by using t-test of means for paired samples. The reason for using t-test is to evaluate the differences between the test-retest scores which are significantly different from zero. The results of the test and retest for raw and standard scores were significant (Tables 4.1 and 4.2), thus the test and retest data provided evidence that the TTCT figural form B is reliable. This finding of reliability in the current study is similar to the findings of many studies including those of Al Zyouidi (2009); Kim (2006); and Whitelaw (2006).

Table 4.1

*Test-retest Reliability Coefficients of the TTCT Figural Form B for raw scores*

Raw Score Analysis				
	r	p	t	p
Fluency	0.76	.00	.97	.04
Originality	0.84	.00	-.62	.03
Elaboration	0.93	.00	-.05	.01
Title	0.87	.00	.19	.01
Closure	0.85	.00	-.25	.02

Table 4.2

*Test-retest reliability coefficient of the TTCT figural form B for standard scores*

Standard Score Analysis				
	r	p	t	p
Fluency	0.76	.00	.91	.03
Originality	0.81	.00	-.54	.02
Elaboration	0.92	.00	-.03	.01
Title	0.86	.00	.16	.02
Closure	0.84	.00	-.19	.03

**TTCT Validity.** Content and construct validity of the scoring measures are also the subject of evolution. Johnson and Fishkin (1999) stated that the TTCT's revised scoring system addresses essential constructs of creative behaviours; therefore after revisions in 1984, Torrance showed that the TTCT is a creativity test as well as a divergent thinking test. However, Almeida, Prieto, Ferrando, Oliveira, and Ferrandiz (2008) find insufficient evidence to explain variances in scores of cognitive functions. Although elaboration factors are involved, the authors hypothesise the importance of format, content and demand on TTCT specific tasks. This is in contrast to the long period of development and evaluation of the TTCT which produced large norming samples and longitudinal validations (Davis, 1997); and predictive validity for a broad age range (Cropley, 2000). The TTCT figural form B was analysed by Kim (2006) and Kim, Cramond, and Bandalos (2004) to determine the latent structure to confirm the validity of this test by conducting a confirmatory factor analysis to test the fit of the two-factor models by using Adaptor-Innovator's theory. A two-factor model is more significant than a single-factor model. The first factor (innovative) consists of fluency, originality, and closure, whereas, the second factor (adaptive) consists of elaboration,

abstractness of title and creative strengths. All of the correlation coefficients between the variables were significant at  $p < .01$ , thus the construct is valid for this study. In addition all five subscale variables of the TTCT were highly correlated. Therefore there is internal consistency between the measured items of the TTCT, this confirms validity (Table 4.3). As further evidence of validity, the convergent validity was examined for the TTCT in the current study, where the correlation between creativity index and mathematics results for the participants was measured and found significant = .61 at  $p < .01$ . This infers that the TTCT figural form B is valid.

Table 4.3

*Correlation Between TTCT Abilities*

		Fluency	Originality	Elaboration	Title	Closure
Fluency	Pearson Correlation	1.000	.76*	.82*	.48*	.53*
	Sig. (2-tailed)		.00	.00	.00	.00
	N	240	240	240	240	240
Originality	Pearson Correlation	.76*	1.00	.82*	.59*	.58*
	Sig. (2-tailed)	.00		.00	.00	.00
	N	240	240	240	240	240
Elaboration	Pearson Correlation	.82*	.82*	1.00	.53*	.56*
	Sig. (2-tailed)	.00	.00		.00	.00
	N	240	240	240	240	240
Title	Pearson Correlation	.48*	.59*	.53*	1.00	.84*
	Sig. (2-tailed)	.00	.00	.00		.00
	N	240	240	240	240	240
Closure	Pearson Correlation	.53*	.58*	.56*	.84*	1.00
	Sig. (2-tailed)	.00	.00	.00	.00	

N	240	240	240	240	240
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\*Correlation is significant at the .01 level (2-tailed).

Al Soulami (2004) used TTCT figural B to measure the validity and reliability for TTCT figural A and B for male students at Saudi high schools. Al Soulami found that the subskills of creative thinking (fluency, originality, abstractness of titles, elaboration and resistances to premature closure) and the overall test score ranged between  $r = .75$  (fluency) to  $r = .91$  (overall test). This indicated they were significantly related. Al Soulami also measured the test-retest of TTCT figural B; finding the correlations between the subscale scores were as follows: fluency  $r = (.77)$ , elaboration  $r = (.97)$ , resistances to premature closure  $r = (.84)$ , abstractness of title  $r = (.82)$ , originality  $r = (.65)$  and for the overall test scores  $r = (.81)$ . Furthermore, the researcher found a correlation between figural A and B of TTCT. The scores were as follows: fluency  $r = (.58)$ , elaboration  $r = (.62)$ , resistances to premature closure  $r = (.63)$ , abstractness of title  $r = (.71)$ , originality  $r = (.58)$  and overall test score  $r = (.62)$ . These findings support using the TTCT in contemporary Saudi culture.

**MFFT Reliability.** To examine the stability of the MFFT, the test-retest reliability was conducted with the results of .88 latency and .78 for errors. The results of this study are similar to previous research conducted by Buela-Casal et al. (2003); El-Faramawy (1986); Kenny (2009). Buela-Casal et al. found a high level of reliability for test-retest of the MFFT, with significant results for latency  $r = .85$  and for errors  $r = .77$ . In addition, El-Faramawy measured the reliability of the MFFT in Arab culture, and found a test-retest correlation with the results of  $r = .85$  for latency and  $r = .68$  for errors

(accuracy). Overall, this study supports the results of previous studies referenced above and thus the MFFT is relevant for use in Saudi Arabia.

***MFFT Validity.*** Other tests, such as intelligence or achievement, can be assessed by using predictive validity in terms of subsequent school performance. However, for the MFFT, predictive validity is not available (Buela-Casal et al., 2003; El-Faramawy, 1986). Construct validity in this case was ascertained by determining a coefficient of correlation between response time and errors. The result showed were = -.51 at  $p = .01$ . A significant negative relationship was expected because subjects who need a long time to respond (latency) actively reflect on the extent of options within the MFFT. In this respect, the findings of the current study are similar to that of several studies (e.g., Buela-Casal et al., 2003; Davidson, 1988; El-Faramawy, 1986). Buela-Casal et al (2003) suggested that the negative correlation between latency and errors is not a problem with regard to the construct validity of the reflective- impulsive style. In addition, the convergent validity of the MFFT was examined using the correlation between latency and the results from the participants' responses. The result proved significant = .32 at  $p < .01$ . This finding is consistent with several studies referenced by El-Faramawy (1986) and Frare (1986). Overall, the finding of this study provides evidence that the MFFT is valid in Saudi society.

### **4.2.3 Procedures**

#### **4.2.3.1 Data collection**

After receiving Victoria University Human Ethics Committee's approval (HREC 08/45) (Appendix I) to undertake this research, permission was also requested from the Director, Makkah Educational Department to approach the selected school

administrations to request their assistance in the study. This was granted and the study was facilitated by the Department (see Appendixes G, H, J, and K).

Each school was then approached and informed of the nature of the research. All agreed to participate, and the prospective student participants were advised about the study and what was requested of them; this was followed by the information and consent forms for parents of students who were to participate in this study (see Appendix N). After distribution, all consent forms were collected before commencement of the study. The data for this study was collected at the beginning of semester 2 of the 2008 school year. Both tests were scheduled for students for week days (see Appendix P). The TTCT and MFFT tests were conducted with grade 10 participants from six regional and urban schools in the Makkah district. The participants were examined in their school library with the assistance of two volunteers from each school. Both tests were individually conducted to allow each student an opportunity to express his personal views. When the tests were completed, the participant was thanked for his contribution and asked if there were any questions regarding the tests or the research. All students' questions were meaningful. After the participants from each school had completed both tests, an initial analysis was conducted.

#### **4.2.3.2 Data analysis**

This part of the study involves the use of quantitative methods. The Statistical Package for Social Science (SPSS version 16) was used for the initial screening of data and the subsequent analysis. The statistical technique used was the Multiple Analyses of Variance (MANOVA) documented by Hair, Black, Babin, Anderson, & Tatham (2006). This study had two dependent variables (MFFT and TTCT) and more than two

independent variables, school region, school, and class. Further, the researchers recommend that MANOVA analyses require data from at least 20 participants in each cell, and this requirement was achieved for this study (Hair et al., 2006; Tabachnick & Fidell, 1996). One-way ANOVA was used to test hypotheses ( $H_0$ ,  $H_1$ ), and post-hoc tests used Hochberg's method, because the sample size of the current study was unequal. Pouyat, Yesilonis, Russell-Anelli, and Neerchal (2007) assert that Hochberg's method is the most appropriate to use to determine significant differences between means in groups of unequal sizes, in the case of varying the number of variables sampled. For multiple variable analysis, Bonferroni's method is suitable for evaluating the post-hoc comparisons of the univariate analysis. Milliken and Johnson (2009) note that

it (*Bonferroni's method*) is particularly good when the experimenter wants to make a small number of comparisons. Bonferroni's method or the multivariate *t*-method, when appropriate, will often be better (narrower confidence interval or more powerful test) than Scheffe's procedure for a finite number of comparisons (p. 48-49).

To summarise, the TTCT figural form B results were reliable, supporting previous research documented by Al Zyoudi (2009), Kim (2006), and Whitelaw (2006). Further, the use of the TTCT figural form B was appropriate based on convergent validity and findings are comparable with Al Soulamy's research (2004). Similarly, the MFFT test results were reliable and convergent validity results acceptable (cf. Buela-Casal et al., 2003; El-Faramawy, 1986; Kenny, 2009). As discussed earlier (p.136), upon receiving Victoria University Human Ethics Committee's approval, permission from the Makkah Educational Department to approach the selected school administrations was

successfully obtained. The volunteer students and staff agreed to cooperate in the research and participants were individually tested and interviewed. The next section documents the results of my quantitative research data.

### **4.3 Result**

This section presents the quantitative results of the study. The MFFT and TTCT figural B were the measures used to generate the data to address the main research questions of this study. In this section of the quantitative analysis, hypotheses from the research questions were tested. The goal of hypothesis one was to examine differences in the TTCT scores. The means of students were grouped according to the independent variables of school, region, and class. The second hypothesis was to examine the differences in students' TTCT scores from each of the individual schools. Before detailing the inferential analyses of the data the descriptive statistics are presented.

#### **4.3.1 Descriptive statistics: Participant Students and Schools**

Descriptive statistics present the results of quantitative data analysis, and are frequently illustrated by tables or a figural form as described by Wojan, Lambert, & McGranahan (2007). The previous section showed the use of these instruments in data analysis for creative thinking with regard to the research questions. This section reports the results of the means and standard deviations of the creative thinking subscales assessed by the TTCT in each of the four categories of the MFFT for both the rural and urban categories. The means and standard deviations for the creative thinking abilities for each of the six schools are also discussed.

The response time (latency) and number of errors (accuracy) for the MFFT are used to classify respondents into the following four categories:



1. The reflective student. This student scored more than the mean on the initial response and less than the mean amount of errors;
2. The impulsive student. This student scored less than the mean in the initial response and scored above the mean with the amount of errors;
3. The slow-inaccurate student. This student spent more than the mean time for the initial response and scored more than the mean with the amount of errors; and
4. The fast-accurate student. This student scored less than the mean in the initial response and made fewer errors than the mean score. See Table 4.4

Table: 4. 4

*Mean Latency and Accuracy in the four Groups*

Group	N	Latency	Accuracy
Reflective	103	1799.17	4.38
Impulsive	88	878.11	21.75
Slow-inaccurate	1	1893.4	18
Fast-accurate	48	978.16	4.54

The overall median of the first response time for the MFFT was 1297.64 seconds (22.27 min) and the median number of errors was 10.35 cf. Kenny, 2009). The minimum time for the first response was 219.7 seconds (4.06 min), whereas the maximum response time was 3140.7 seconds (52.34 min). The minimum – maximum number of errors for the total sample was 0 to 51.

Following the review of the distribution of participants into the four MFFT categories, only one student was classified as slow-inaccurate. For this reason it was decided to only report descriptives for the other three categories of the MFFT scores.

Further, there were reflective and impulsive students only, and no fast-accurate students at school number three.

The TTCT subscale scores, based on fluency, originality, elaboration, abstractness of title, and resistances to premature closure and the creativity index, were used to determine students assessed levels of creativity. The MANOVA and ANOVA statistical techniques were used to compare the rural and urban categories and the six schools in relation to all TTCT subscale and index scores.

Independent sample t-tests were used to examine the differences of TTCT scores between the classes in each of the rural and urban schools. The results showed no significant differences in the creativity scores for classes within each school except for a significant difference between classes for school two in fluency ( $t(38) = 2.24, p = .031$ ).

#### **4.3.1.1 TTCT abilities, MFFT Status and School Region**

The means and standard deviations of the creative thinking subscales assessed by the TTCT in each of the four categories of the MFFT for both the rural and urban categories are discussed in this section. Table 4.5 (see p.156) presents the MFFT categories' means for urban, rural, and total means and standard deviations, under TTCT subscales. These are discussed under the following subscale headings.

***Fluency*** The means and standard deviations for TTCT fluency for each of the MFFT categories are presented for the rural and urban groups in Table 4.5. The results show the differences in fluency between rural and urban students with regard to the MFFT status. The total mean of the reflective, impulsive and fast-accurate categories shows that the urban group had higher scores in fluency when compared with the rural group. The students in the reflective category scored higher in fluency than the students

in either the impulsive or fast accurate categories. Also, the students in the impulsive and fast-accurate categories in urban schools were higher in fluency when compared with those in rural schools. In addition, the students in the impulsive category in rural schools were higher in fluency than the students in fast-accurate category in rural schools. In contrast, fluency scores of the students in the fast- accurate category in urban schools were higher than the students in the impulsive category in both urban and rural schools. In general, the students in urban schools demonstrated higher levels of fluency than those in rural students.

***Originality*** The means and standard deviations for TTCT originality for each of the MFFT categories are presented for the rural and urban groups in Table 4.5 (see p.162). The results show the differences in originality between the rural and urban students with regard to the MFFT status. The total mean of the reflective, impulsive and fast-accurate categories shows that the urban group had higher scores in originality when compared with the rural group. The students in the reflective category scored higher in originality than the students in either the impulsive or fast accurate categories. Also, the students in the impulsive and fast-accurate categories in urban schools scored higher in originality when compared with those in rural schools. In addition, the students in the impulsive category in rural schools were higher in originality than the students in fast-accurate category in rural schools. In contrast, originality scores of the students in the fast-accurate category in urban schools were higher than the students in the impulsive category in both urban and rural schools. In general, the students in urban schools demonstrated higher levels of originality than those in rural students.

***Elaboration*** The means and standard deviations for TTCT elaboration for each of the MFFT categories are presented for the rural and urban groups in Table 4.5 (see p.162). The results show the differences in elaboration scores between the rural and urban students with regard to the MFFT status. The total mean of the reflective, impulsive and fast-accurate students from the urban group shows that these students had higher scores in elaboration when compared with the rural group. The students in the reflective category scored higher in elaboration than the students in either the impulsive or fast accurate categories. Also, the students in the impulsive and fast-accurate categories in urban schools gained higher elaboration scores when compared with those students in rural schools. In addition, the students in the impulsive category in rural schools gained higher elaboration scores than the students in the fast-accurate category in rural schools. In contrast, the elaboration scores of the students in the fast- accurate category in urban schools were higher than the students in the impulsive category in both urban and rural schools. In general, the students in urban schools demonstrated higher levels of elaboration than those in rural students.

***Abstractness of Title*** The means and standard deviations for TTCT abstractness of title for each of the MFFT categories are presented for the rural and urban groups in Table 4.5 (see p.162). The results showed there were differences in abstractness of title between rural and urban students with regard to the MFFT status. The total mean of the reflective, impulsive and fast-accurate students from the urban group shows that these students had higher scores in abstractness of title when compared with the rural group. The students in the reflective category were higher in abstractness of title than the students in either the impulsive or fast- accurate categories. Also, the students in the impulsive and fast-accurate categories in urban schools were higher in abstractness of

title when compared with those in rural schools. In addition, the students in the impulsive category in rural schools were higher in abstractness of title than the students in fast-accurate category in rural schools. In contrast, abstractness of title scores of the students in the fast-accurate category in urban schools were higher than the students' scores in the impulsive category in both urban and rural schools. In general, the students in urban schools demonstrated higher levels of abstractness of title than those in rural students.

***Resistance to Premature Closure*** The means and standard deviations for TTCT resistances to premature closure for each of the MFFT categories are presented for the rural and urban groups in Table 4.5 (see p.162). The results showed there were differences in resistances to premature closure between the rural and urban students with regard to the MFFT status. The total mean of the reflective, impulsive and fast-accurate students in urban schools shows that the urban group had higher scores regarding their resistances to premature closure when compared with the rural group. The urban students' scores in the reflective category were higher in relation to resistance to premature closure than the students in either the impulsive or fast-accurate categories. Also, the students' scores in the impulsive and fast-accurate categories in urban schools were higher regarding their resistance to premature closure when compared with those in rural schools. In addition, the students in the fast-accurate category in both rural and urban schools were higher in resistance to premature closure than the students in the impulsive category in both rural and urban schools. In general, the students in the urban schools demonstrated higher levels of resistance to premature closure than those in rural schools.

***Creativity Index*** The means and standard deviations for the TTCT creativity index for each of the MFFT categories are presented for the rural and urban groups in Table 5.5 (see p.162). The results show the differences in the creativity index between rural and urban students with regard to the MFFT status. The total mean of the reflective, impulsive and fast-accurate students in urban schools shows that the urban group had higher scores in the creativity index when compared with the rural group. The urban students' scores in the reflective category were higher in the creativity index than the students in either the impulsive or fast- accurate categories. Also, the students' levels in the impulsive and fast-accurate categories in the urban schools were higher in the creativity index when compared with those in the rural schools. In addition, the students' scores in the impulsive category of the rural schools were higher in the creativity index than the students in the fast-accurate category of the rural schools. In contrast, the creativity index scores of the students in the fast- accurate category in urban schools were higher than the students in the impulsive category in both urban and rural schools. In general, the students in urban schools demonstrated higher levels of performance in the creativity index than the rural students.

#### **4.3.1.2 TTCT and individual schools**

This section reports on the means and standard deviation for all schools with regard to the students' creative thinking abilities (TTCT subscales). Schools one, two, and three represent the rural schools, and schools four, five, and six indicate the urban schools.

***Fluency*** The means and standard deviations for the fluency of the students between schools are presented in Table 4.6 (see p.165). The students in school four

demonstrated higher scores in fluency when compared with all of the other schools. The results of the other urban schools show the students in school six were higher in fluency than the students in school five. The mean fluency scores for each of the rural schools show that the students in school three demonstrated a higher level of fluency than the students in schools one and two. In general, the students in schools four, five, and six demonstrated higher levels of fluency when compared to those students in schools one, two, and three.

***Originality*** The mean and standard deviations for measuring the students' original thinking abilities is presented for all of the schools in Table 4.6 (see p.165), *Descriptive analysis: TTCT subscale and individual school*. The students in school five had higher scores in originality when compared with all other schools. With regard to the other urban schools, levels of the students in school six were higher than the students in school four. The mean originality scores for each of the rural schools show the students in school three demonstrate a higher level of originality in their thinking than the students in schools one and two. Also, the scores of the students in school two were higher than the students in school one. In general, the results of the students in schools four, five, and six demonstrated higher levels of originality in their tests when compared with those students in schools one, two, and three.

***Elaboration*** The means and standards deviations for elaboration for all schools are presented in Table 4.6 (see p.165). The results showed there were differences in elaboration between schools. The students in school six had higher scores in elaboration when compared with all other schools. In regards to the other urban schools, the students in school five were higher in elaboration than the students in school four. The

mean elaboration scores for each of the rural schools showed the students in school three demonstrated a higher level of elaboration than the students in school one and two. Also, the students in school two scored higher in elaboration than the students in school one. In general, the students in school four, school five, and school six demonstrated



Table 4.5 *Descriptive analysis: TTCT subscale means, by MFFT category and location*

MFFT Category	Fluency									Originality								
	Rural			Urban			Total			Rural			Urban			Total		
	M	SD	n	M	SD	n	M	SD	n	M	SD	n	M	SD	n	M	SD	n
Reflective	94.76	14.82	37	103.7	18.05	66	100.5	17.43	103	97.27	12.42	37	114.9	20.18	66	108.6	19.66	103
Impulsive	84.81	18.07	69	86.53	18.26	19	85.18	18.02	88	84.17	16.85	69	97.53	16.89	19	87.06	17.65	88
Fast-Accurate	80.46	18.46	13	98.54	16.41	35	93.65	18.65	48	75.08	13.23	13	107.7	18.09	35	98.83	22.26	48
Total	87.43	17.78	119	99.47	18.5	120	93.47	19.08	239	87.25	16.79	119	110.1	19.97	120	98.7	21.67	239

MFFT Category	Elaboration									Abstractness of Title								
	Rural			Urban			Total			Rural			Urban			Total		
	M	SD	n	M	SD	n	M	SD	n	M	SD	n	M	SD	n	M	SD	n
Reflective	114.1	19.4	37	124.9	19.82	66	121	20.26	103	98.97	14.31	37	126.2	24.22	66	116.4	24.88	103
Impulsive	98.2	25.67	69	107.9	19.66	19	100.3	24.72	88	75.78	17.63	69	82.89	19.09	19	77.32	18.09	88
Fast-Accurate	89.23	22.73	13	120.8	24.13	35	112.3	27.46	48	74.23	18.1	13	101.5	24.98	35	94.15	26.18	48
Total	102.2	24.89	119	121	21.8	120	111.6	25.18	239	82.82	19.85	119	112.2	28.88	120	97.56	28.78	239

MFFT Category	Resistance to Premature Closure									Creativity Index								
	Rural			Urban			Total			Rural			Urban			Total		
	M	SD	n	M	SD	n	M	SD	n	M	SD	n	M	SD	n	M	SD	n
Reflective	98.51	16.97	37	114.3	28.62	66	108.6	26.1	103	112.6	14.08	37	133.7	23.88	66	126.1	23.16	103
Impulsive	68.97	16.01	69	71.53	18.07	19	69.52	16.4	88	88.3	17.3	69	95.76	15.26	19	89.91	17.08	88
Fast-Accurate	74.92	7.123	13	94.4	23.59	35	89.13	22.18	48	86.63	14.21	13	116.1	21.77	35	108.1	23.86	48
Total	78.81	20.51	119	101.7	30.08	120	90.31	28.16	239	95.68	19.6	119	122.5	26.03	120	109.2	26.65	239

higher levels of elaboration when compared with those students in school one, school two, and school three.

***Abstractness of Title*** The means and standards deviations for the abstractness of title for all schools are presented in Table 4.6 (see p.165). The results show the differences in abstractness of title between schools. The students in school four had higher scores in abstractness of title when compared with all other schools. In regards to the other urban schools, the students in school five were higher in abstractness of title than the students in school six. The mean abstractness of title scores for each of the rural schools show the students in school three demonstrated a higher level of abstractness of title than the students in schools one and two. Also, the students in school two scored higher in abstractness of title than the students in school one. In general, the students in school four, school five, and school six demonstrated higher levels of abstractness of title when compared with those students in school one, school two, and school three.

***Resistance to Premature Closure*** The means and standards deviations for the resistances to premature closure for all of the schools in this study are presented in Table 4.6 (see p.165). The results show the differences regarding the resistances to premature closure between the schools. The students in school four gained higher scores indicating their resistance to premature closure when compared with all of the other schools. With regard to the other urban schools, the students' results in school five show a higher in resistances to premature closure than the students in school six. The mean resistances to premature closure scores for each of the rural schools show the students in school two demonstrated a higher level of resistances to premature closure than the students in schools one and three. Also, the students in school three scored higher in

their resistance to premature closure than the students in school one. In general, the students in schools four, five, and six demonstrated higher levels indicating their resistance to premature closure when compared with those students in schools one, two, and three.

***Creativity Index*** The means and standards deviations for the creativity index for all of the schools are presented in Table 5.6 (see p.165). The results show the differences in the creativity index between the schools. The students in school four gained higher scores in the creativity index when compared with all of the other schools. Regarding the other urban schools, the students in school five were achieved scores higher in the creativity index than the students in school six. The mean creativity index scores for each of the rural schools show that the students in school three demonstrated a higher level of achievement in the creativity index than the students in schools one and two. Also, the scores of the students in school two were higher in the creativity index than the students in school one. In general, the students in schools four, five, and six demonstrated higher levels of achievement in the creativity index when compared with those students in schools one, two, and three.

In summary, the descriptive statistics of means and standard deviations of the creative thinking subscales were assessed by the TTCT in each of the four categories of the MFFT for both the rural and urban categories. Differences were found in all of the subscales; fluency, originality, elaboration, abstractness of title, resistance to premature closure, and the creativity index. Also, in the descriptive analysis of the means and standard deviation for the individual schools with regard to their creative thinking abilities (TTCT subscales) there were differences between the individual schools.

School four had the highest means for fluency, abstractness of title, resistance to closure, and the creativity index, followed by schools five, and six. School six was first for elaborateness of title, followed by schools five and four; whilst school five had the highest mean for originality, followed by schools four and six. This shows that the urban schools, individually and collectively, displayed higher means on all scales than the rural schools. Of the rural schools, school three had the highest mean for the majority of subscales, with school two higher on closure.

Table 4.6

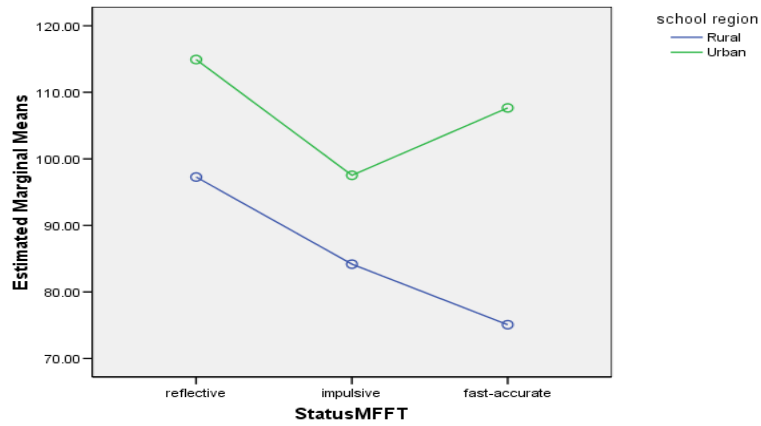
*Descriptive analysis: TTCT subscale and individual school*

School	creative thinking abilities																	
	Fluency			Originality			Elaboration			Title			Closure			Creativity Index		
	M	SD	n	M	SD	n	M	SD	n	M	SD	n	M	SD	n	M	SD	n
1	85.95	18.33	40	80.48	15.31	40	96.85	24.18	40	75.6	18.7	40	78.4	20.25	40	90.96	17.37	40
2	82.97	16.67	39	87.13	16.83	39	98.1	24.35	39	84.7	20.7	39	79.3	21.91	39	95.103	21.19	39
3	93.25	17.11	40	94.15	15.7	40	111.45	24.04	40	88.2	18.4	40	78.8	19.87	40	100.96	19.28	40
4	102.1	20.56	40	108.7	17.81	40	119.6	18.94	40	122	25.2	40	114	25.26	40	130.13	22.56	40
5	96.5	16.57	40	111.7	17.52	40	120.35	20.33	40	108	30.2	40	101	31.1	40	122.08	25.77	40
6	99.85	18.19	40	109.7	24.26	40	123.1	25.9	40	107	29.4	40	89.4	28.94	40	115.38	27.97	40
Total	93.47	19.08	239	98.7	21.67	239	111.63	25.18	239	97.6	28.8	239	90.3	28.16	239	109.16	26.65	239

#### 4.3.2 MANOVA results for TTCT, cognitive style, and the school region

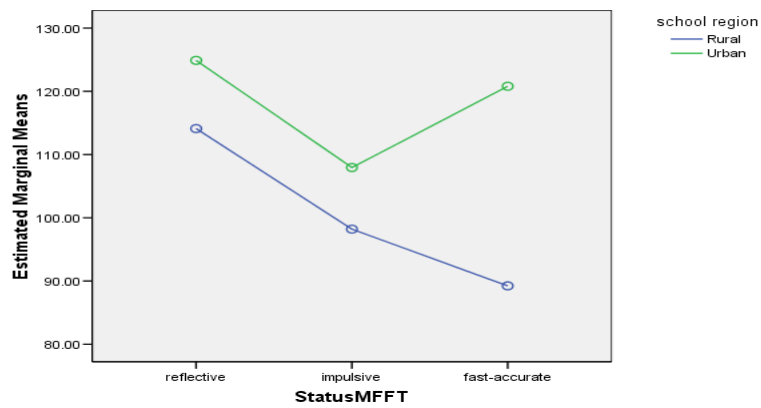
A multivariate analysis of variance (MANOVA) was used to compare the TTCT respondents from the rural and urban schools in relation to their categorisation according to MFFT status. There are no significant differences in creative thinking abilities between the students categorised according to MFFT status attending the rural and urban schools. The data for this variable was collated from the responses of the rural and urban students with regard to the Torrance Test of creative thinking (TTCT) and the Matching Familiar Figure Test (MFFT). To study the differences in the five areas of the TTCT abilities (fluency, originality, elaboration, abstractness of title and the resistance to premature closure) between the school regions along with the MFFT status, a 2 (school region) x (3 MFFT status) MANOVA was conducted on the five measures of the TTCT abilities. The results show that all of the TTCT abilities of the students in the urban schools were significantly higher when compared with those in the rural schools (Wilks'  $\Lambda$  (.71),  $F_{(5, 229)} = 18.49, p < .05, \eta^2 = .29$ ). The multivariate interaction between the school region and the MFFT status was also significant (Wilks'  $\Lambda$  (.91),  $F_{(10, 458)} = 2.22, p < .05, \eta^2 = .05$ ). The univariate analysis was used to observe the interaction between the variables. The univariate analysis revealed that the interaction is significant for originality ( $F_{(2,233)} = 3.8, p < .05$ ), elaboration ( $F_{(2,233)} = 3.4, p < .05$ ), and abstractness of title ( $F_{(2,233)} = 4.9, p < .05$ ). Figure 4.1 shows the relationship for originality between the school region and the MFFT category, Figure 4.2 the relationship for elaboration, and Figure 5.3, for abstractness of title.

*Estimated Marginal Means of Originality*



*Figure 4.1. School Region and MFFT Category: Originality*

*Estimated Marginal Means of Elaboration*



*Figure 4.2. School Region and MFFT Category: Elaboration*

*Estimated Marginal Means of Abstractness of Title*

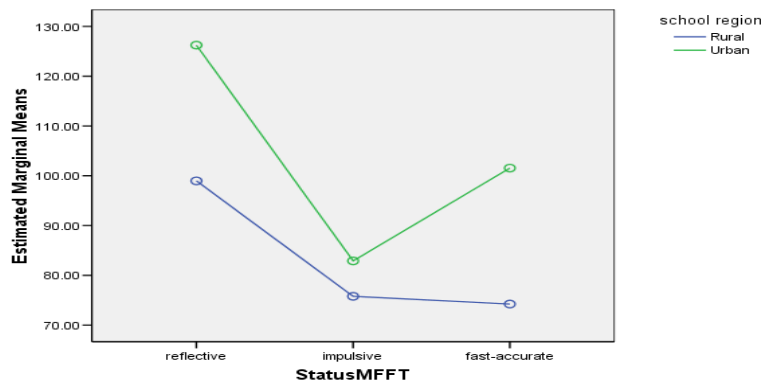


Figure 4.3. School Region and MFFT Category: Abstractness of Title

However, the interaction for the fluency (Figure 4.4) and resistances to premature closure measures (Figure 4.5) were not significant, see Table 4.7.

*Estimated Marginal Means of Fluency*

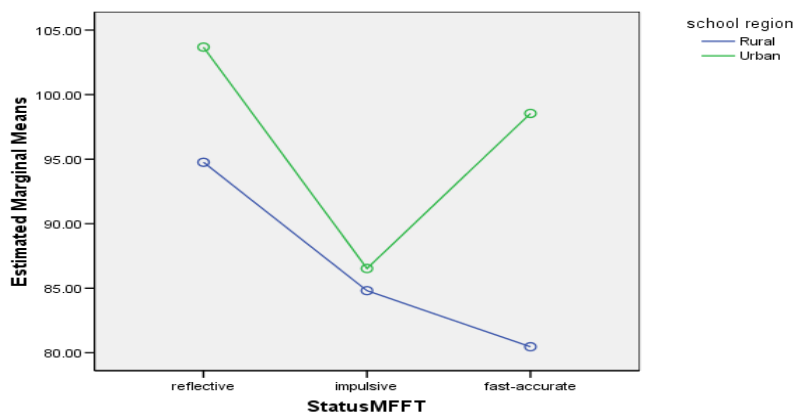


Figure 4.4. School Region and MFFT Category: Fluency

*Estimated Marginal Means of Resistances to Premature Closure*

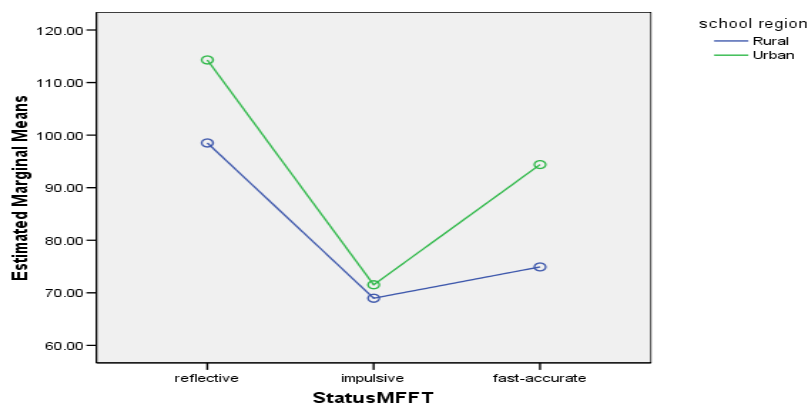


Figure 4.5. School Region and MFFT Category: Resistances to Premature Closure

Figure 4.1 shows that the mean originality scores are substantially higher for fast-accurate students than that of the impulsive students in urban schools, whilst in the rural schools the mean originality scores were substantially lower for the fast-accurate



students than the impulsive students in the urban schools. Also, the reflective students in the urban schools scored substantially higher in originality than those in the rural schools. The same characteristics can be seen for elaboration (Figure 4.2) and abstractness of title (Figure 4.3).

However, there was no interaction for the other TTCT variables fluency, (Figure 4.4) and resistances to premature closure (Figure 4.5), see Table 4.7. Figure 4.4 shows that the mean scores for fluency are substantially higher for the fast-accurate students than the impulsive students in the urban schools, while in the rural schools the mean scores for fluency were lower for fast-accurate students than the impulsive students in the urban schools. Also, the reflective students in the urban schools scored higher in fluency than those in the rural schools. Table 4.7 shows a relationship between the school region and the MFFT status with regard to fluency, but statistically, the differences were not significant. Figure 4.5 shows the mean scores for resistances to premature closure were of the same pattern for the students in both the rural and urban schools. Therefore there is no significant relationship with regard to resistance to premature closure (see Table 4.7).

Table 4.6 indicates the interaction in creative thinking variables between the MFFT status and the school region (encompassing the rural and urban schools).

Table 4.7

*ANOVA: Status MFFT and School Region*

Variable	Dependent Variable	F	P
Status MFFT * School region	Fluency	2.57	.07
	Originality	3.78	.02
	Elaboration	3.41	.03
	Titles	4.95	.00
	Resistance	2.39	.09

A series of Post hoc tests was performed to demonstrate the differences in creative thinking abilities and MFFT status for all of the participating students. The probability values for each of these comparisons are outlined in Table 4.8. The post hoc test for fluency revealed that most of the MFFT status results in the rural and urban schools were not significant. The exception was the results of those students of impulsive status. The post hoc test revealed there were significant differences in originality between the students category according to the MFFT status (see Table 4.8). The post hoc test for elaboration revealed there were no significant differences between the MFFT status and the school region except for the students demonstrating an impulsive style. However, for the creative thinking abilities of abstractness of title and resistances to premature closure, the post hoc results showed there were significant differences in these abilities between the students category according to the MFFT status.

Table 4.8

*Post Hoc Test for Contrast MFFT Category and TTCT Subscale*

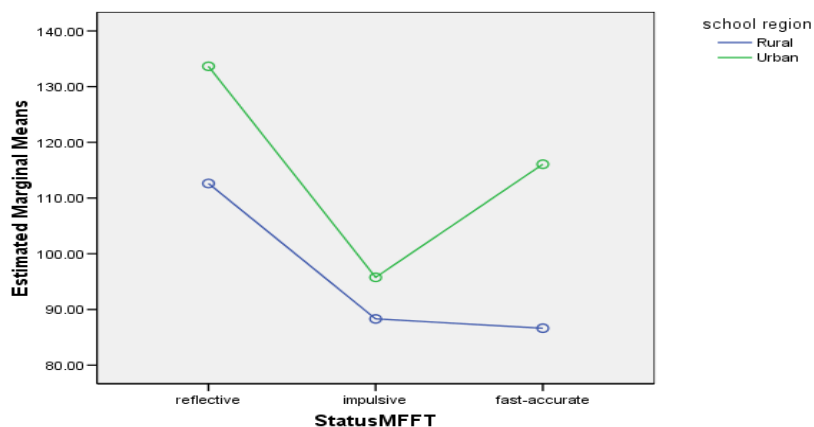
Contrasts MFFT category	TTCT Subscale				
	Fluency	Originality	Elaboration	Title	Closure
Reflective v Impulsive	.001	.001	.001	.001	.001
Impulsive v Fast-Accurate	.021	.004	.001	.001	.001
Reflective v Fast-Accurate	.075	.001	.076	.001	.001

A univariate analysis was conducted to study the creativity index, and the overall differences in creative thinking variables, between the school region and the MFFT status. The results show that the mean score for the creativity index for students

in the urban schools (122.5) was significantly higher than the mean score for the students in the rural schools (95.65) ( $F_{(1,233)} = 41.7, p < .05, \eta^2 = .15$ ). Also, the results show that the reflective students along with the students in the other MFFT categories in the urban schools, scored substantially higher when compared to those in the rural schools (see Figure 4.6). The creativity index interaction between the school region and the MFFT status was found to be significant ( $F_{(2,233)} = 4.1, p < .05, \eta^2 = .34$ ). A post hoc test was performed to identify differences in the mean creativity index among the MFFT categories.

The results demonstrate significant differences in the creativity index between the school region and the MFFT status. Therefore, the null hypothesis derived from the first research question, that there are no significant differences between the school region encompassing rural and urban areas and the status of the MFFT with regard to the creative thinking (TTCT) variables, is rejected.

*Estimated Marginal Means of Creativity Index*



*Figure 4.6. School Region and MFFT Category: Creativity Index*

### 4.3.3 MANOVA results for creative abilities for each individual school

A multivariate analysis of variance (MANOVA) was used to compare the TTCT scores for the participating students in each of the individual schools. There are no significant differences in the students' creative abilities that can be related to the individual school they attend. The creative abilities data was collected from the students' TTCT responses from all six schools in the sample. The MANOVA described the TTCT differences in the five ability areas (fluency, originality, elaboration, abstractness of title and resistances to premature closure) between the six schools. The results show that there were significant differences in the mean creative thinking abilities between the individual schools (Wilk's  $\Lambda$  (.44),  $F_{(25,852)} = 8.43$ ,  $p < .05$ ,  $\eta^2 = .15$ ). Further, the subject analysis revealed that the mean scores for all five abilities were significantly different between the individual schools (see Table 4.9).

Table 4.9

*ANOVA: Creative Abilities and Individual Schools*

Variable	Dependent Variable	F	P
Individual schools	Fluency	7.13	.00
	Originality	21.22	.00
	Elaboration	10.03	.00
	Titles	20.45	.00
	Resistance	14.08	.00

A post hoc test was performed to demonstrate the differences for each creative thinking ability score between each of the schools in the study (see Table 4.10). The Post hoc test for fluency revealed there were a number of differences in fluency between the schools. The scores of schools one and two were significantly different from the mean scores of schools four, five and six. No significant differences in fluency were found between school three and any other school; this also applied to schools five and

one. For originality, the results show the significant difference between the scores of schools one, two, and three on one side and schools four, five, and six on the other side, much greater than the differences between school one and school three (see Table 4.10). The results for elaboration reveal the significant differences between the scores of schools one and two on one side and schools four, five, and six on the other side. No significant differences in elaboration were found between school three and any other school. For abstractness of title the results show the significant differences between the scores of schools one, two, and three on one side and schools four, five and six on the other side. For resistances to premature closure the results reveal the significant differences between the scores of schools one, two, and three on one side and schools four and five on the other side. No significant differences were found between school six and any other school (see Table 4.10).

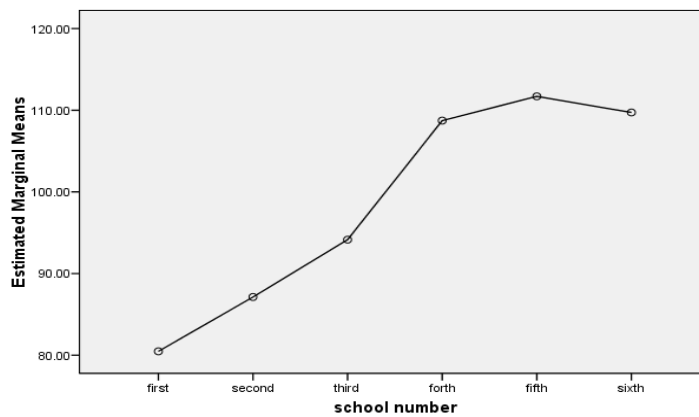
Table 4.10

*Post Hoc Test: Contrast Individual School and TTCT Subscale*

TTCT abilities					
School contrasts	Fluency	Originality	Elaboration	Title	Closure
1 v 2	1.00	1.00	1.00	1.00	1.00
1 v 3	1.00	.013	.076	.323	1.00
1 v 4	.001	.000	.000	.000	.000
1 v 5	.138	.000	.000	.000	.001
1 v 6	.010	.000	.000	.000	.738
2 v 3	.175	1.00	.162	1.00	1.00
2 v 4	.000	.000	.001	.000	.000
2 v 5	.014	.000	.000	.000	.002
2 v 6	.001	.000	.000	.000	1.00
3 v 4	.442	.006	1.00	.000	.000
3 v 5	1.00	.000	1.00	.004	.001
3 v 6	1.00	.002	.374	.011	.861
4 v 5	1.00	1.00	1.00	.216	.324
4 v 6	1.00	1.00	1.00	.105	.000
5 v 6	1.00	1.00	1.00	1.00	.486

Figure 4.7 shows that the means scores for originality in the urban schools were substantially higher than for each of the rural schools (see Figure 4.7 below).

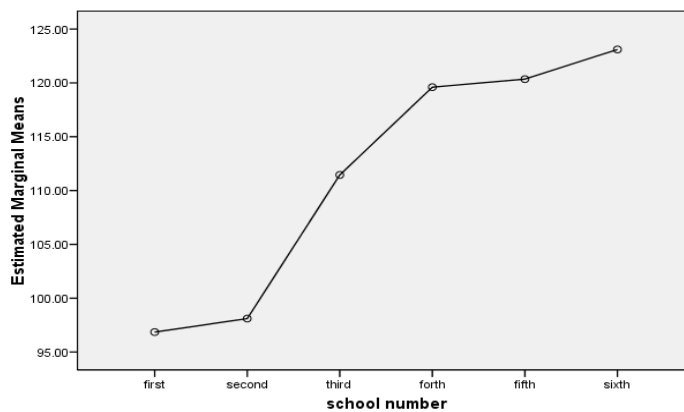
*Estimated Marginal Means of Originality*



*Figure 4.7. Individual Schools: Means scores for Originality*

Figure (4.8) shows that the mean score for elaboration in each of the urban schools is substantially higher when compared with the rural schools (see Figure 4.8).

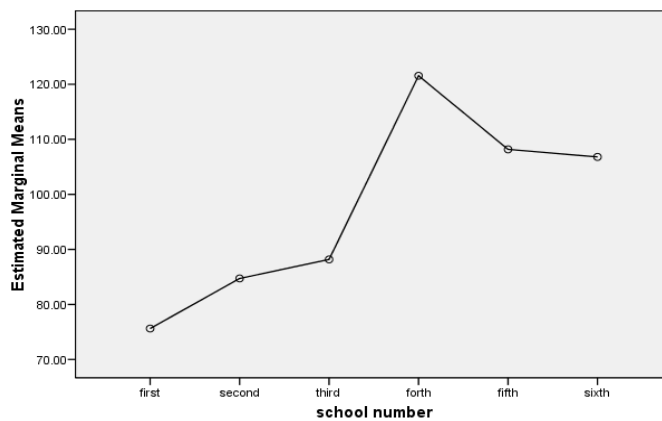
*Estimated Marginal Means of Elaboration*



*Figure 4.8. Individual Schools: Means scores for Elaboration*

Figure 4.9 reveals that the mean score for the abstractness of title for school four is substantially higher than other schools, also the mean scores of the rest of the urban schools is substantially higher than rural schools (see Figure 4.9).

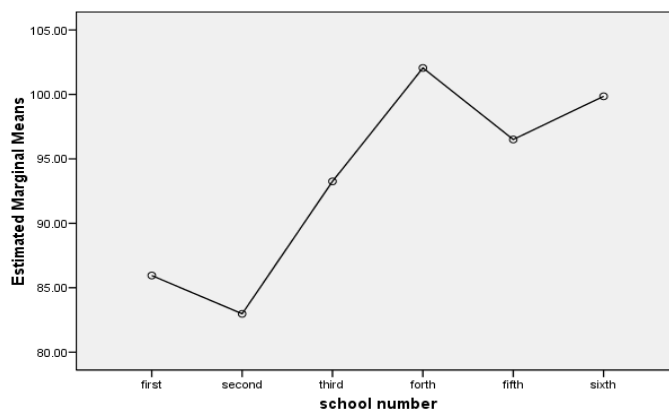
*Estimated Marginal Means of Abstractness of Title*



*Figure 4.9. Individual Schools: Means score for Abstractness of Title*

Figure 4.10 shows the mean score for fluency in school four is substantially higher than for each of the rural schools (see Figure 4.10).

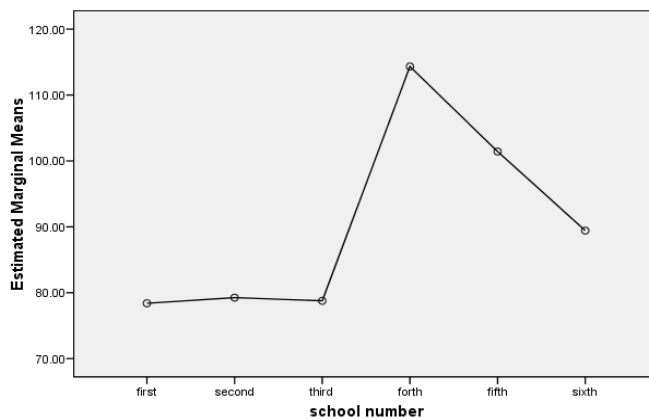
*Estimated Marginal Means of Fluency*



*Figure 4.10. Individual Schools: Means scores for Fluency*

Regarding resistance to premature closure, Figure 4.11 reveals that the mean scores for school four is substantially higher than any of the other schools (see Figure 4.11).

*Estimated Marginal Means of Resistances to Premature Closure*



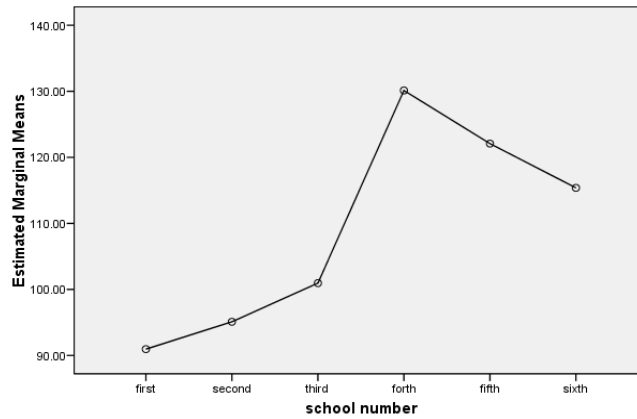
*Figure 4.11. Individual Schools: Means scores for Resistances to Premature Closure*

In general, the mean scores for each of the creative thinking abilities for the urban schools were higher than the rural schools numbered one, two, and three. School four demonstrated higher mean scores in several creative thinking abilities, except for originality and elaboration, in comparison with the other schools.

To study the overall differences in creative thinking abilities (creativity index) between the schools, a univariate analysis of variance was conducted. The result showed there were significant differences in the mean score on the creativity index between the schools ( $F_{(5, 233)} = 19.26, p < .05, \eta^2 = .29$ ). Further, analysis within the subject revealed that the mean scores on the creativity index between the schools were significantly different. The mean score in school four was the highest when compared with the other schools (see Figure 4.12).



*Estimated Marginal Means of Creativity Index*



*Figure 4.12. Individual Schools: Means scores for the Creativity Index*

Post hoc tests were performed to demonstrate the differences in mean scores for the creativity index between the individual schools (see Table 4.11). The results show that the mean scores for the creativity index between the rural schools (S1, S2, and S3) and the urban schools (S4, S5, and S6) were significantly different. An exception was the difference in scores between school 3 and school 6 with regard to the creativity index, which was not that significant. In general, the mean scores regarding the creativity index for the urban schools were demonstrably higher when compared with the mean scores of the rural schools (see Figure 4.12). Therefore, the null hypothesis related to the second research question; there are no significant differences between individual schools in regard to the students' responses in the TTCT, is rejected.

Table 4.11

*Post Hoc Test: Contrast Individual Schools and the Creativity Index*

Individual School	Creativity Index
1 v 2	1.00
1 v 3	.744
1 v 4	.000
1 v 5	.000
1 v 6	.000
2 v 3	1.00
2 v 4	.000
2 v 5	.000
2 v 6	.000
3 v 4	.000
3 v 5	.001
3 v 6	.072
4 v 5	1.00
4 v 6	.059
5 v 6	1.00

Overall the findings of the quantitative analysis in this chapter show significant differences in the creative thinking abilities between the school region and the MFFT status. The findings relating to the fluency and the resistance to premature closure variables are an exception, as they were not significant. However, the overall difference in the creativity index between the school region and the MFFT status was significant. In addition, there were statistically significant differences in creative thinking abilities between the individual schools. However, the pattern of difference was typically matched to the rural and urban location of the schools. The results show there are higher levels of creative ability abilities in urban schools than in rural schools. Of special significance is the urban school four, which scored higher in the majority of the variables, within the creativity index.

#### **4.4 Discussion**

In this study, the TTCT responses for the rural and urban students were collected and analysed to determine whether these students could be categorised as reflective, impulsive, fast-accurate, or slow-inaccurate. The data was subjected to quantitative analysis to explore differences between the rural and urban students with regard to their creative thinking abilities and the MFFT status.

In this study quantitative analyses supported the research questions. Quantitative outcomes indicate significant differences between the rural and urban students with regard to their creative thinking and reflective-impulsive styles. The result shows that the students in the urban schools scored higher than those in the rural schools. The key findings are discussed under the following two themes:

1. Creative thinking and the MFFT status;
2. The individual schools and the creativity variables.

##### **4.4.1 Creative Thinking and the MFFT Status**

The priority for this study was to determine the differences in the creative thinking variables between students, categorised according to the MFFT status, attending rural and urban schools. For this purpose, a multivariate analysis of variance (MANOVA) and an analysis of variance (ANOVA) were both applied to compare the responses of students from rural and urban schools with regard to the TTCT and MFFT tests introduced in chapter 2 and discussed in my introduction (see 4.1).

#### **4.4.1.1 Creative Thinking and the School Region**

The results indicate that all of the TTCT categories of Figural Form B of the students tested in the urban schools were significantly higher than those students in the rural schools. The result of the current study is consistent with the following literature references, noting that students in Saudi Arabian urban schools score higher in creative thinking ability than those in rural schools (e.g., Dharmangadan, 1981; Hongli & Yulin, 2006; Sharma, 2005; Shutiva, 1991).

There are several influences which impact on this outcome. Specifically, urban students' parents are proactive in encouraging creativity, urban areas have more facilities and greater stimulation, and the teachers in urban areas are more knowledgeable with regard to initiating creative thinking practice (Lee, 2008).

Contemporary research describes how students in urban schools have scored higher in their creative thinking tests than those in rural schools. Shutiva (1991) utilised the TTCT figural form B to compare the scores between rural and urban American Indian students, finding that the urban students scored higher in originality, abstractness of title, resistances to premature closure, and creativity index. This was supported by Hongli and Yulin (2006) who also found evidence that supported higher levels of creativity in urban students. Further, Lee (2008) studied the relationship between children's computer game usage and creativity in Korea, finding that children in urban schools scored higher regarding their levels of originality and elaboration than those in the rural schools. Also, the results show that there was a strong relationship between parent involvement and the TTCT scores. This same trend was recorded earlier, when Shukla and Lucknow (1982) found that urban male students scored higher in their

creative thinking abilities when compared with those in the rural schools, with science students scoring higher in creativity than arts students.

The results of this study and collected data support the previous research and clearly demonstrate that students in urban schools scored higher in relation to the creative thinking abilities than those in rural schools. The consistency between the results of these previous studies and the findings of my present study can be attributed to common factors such as the school region, the family environment, the school environment and the teacher's role with regard to enhancing the level of student creativity (Fleith et al., 2002; Kharkhurin and Motalleebi, 2008; Lee, 2008; Peña, 2000; Sternberg, 2003; and Whitelaw, 2006). Peña (2000) and Snowden and Chiristian (1999) add that parents play an important role in encouraging the creative thinking abilities of their children; this role is more effective if parents are better educated and understand the value of creative thinking. Teachers also play an important role in improving the creative thinking abilities of their students. When teaching actively encourages creative thinking, student academic achievement is improved (Fleith, 2000 and Sternberg, 2003). In addition, Hongli and Yulin (2006) report differences between rural and urban students in their creative thinking and their cognitive style (dependent and independent fields). Their results found that students in urban schools scored higher in creative thinking than students in rural schools.

In contrast, the results of this current study are inconsistent with the findings of Williams, Teubner, and Harlow (1973), who see no significant difference between the children in the rural and urban schools of India with regard to their creative thinking abilities as variables in figural subtests. This inconsistency may be related to the

teaching and learning environment of the time, or a possibility that the study's sample came from children in primary schools, whose intellectual level, therefore level of creativity can be argued to be lower than that of students in secondary schools. Cropley (2001) finds that primary school students had lower intellectual growth than secondary school students (s. 2.2.3, Figure 2.4).

#### **4.4.1.2 MFFT Status and School Region**

This study finds significant differences between students grouped according to their school region (either rural or urban) and categorised on their MFFT status (the impulsive, reflective, and fast-accurate dimensions as discussed at s.2.3 and 4.1). The results show that the students in urban schools are more reflective than those in the rural schools, who exhibit an impulsive style. This result is similar to previous studies where rural children tend to make more errors with less latency, that is, they are more impulsive in style; whilst urban children make less errors with higher latency, thus are more reflective in style (e.g., Buéla-Casal et al., 2003; Lesiak, 1978). The findings in this research support the findings of the current study; thus students in urban schools demonstrate a more reflective style than those in rural schools, which again can be attributed to common factors such as the social environment, the teachers' role, and parental encouragement.

#### **4.4.1.3 Creative Thinking and the Reflective-Impulsive Style**

With regard to the creative thinking variables and the MFFT status of rural and urban students, the current findings indicated that there were significant group differences in originality, elaboration, abstractness of title, creativity index, and the MFFT status. The results show that the mean scores of originality, elaboration,

abstractness of title, and the creativity index for reflective students in urban schools were higher than for the impulsive and fast-accurate students in the rural schools. In addition, the impulsive and fast-accurate students in the urban schools scored higher in creative thinking abilities than the impulsive and fast-accurate students in the rural schools. The findings of this study are that the reflective, impulsive, and fast-accurate students in urban schools scored higher levels in their creative thinking abilities than those in the rural schools. However, no significant differences were found in the remaining creative elements of fluency and resistance to premature closure between the school region and the MFFT status.

Taking the overall results into consideration, some general comments can be made. The result is inconsistent with the findings of Sigg and Gargiulo (1980), who find that there was no significant difference between the reflective-impulsive style and creative ability. However, as Sigg and Gargiulo sampled primary age children, the inconsistency may be for that reason (Cropley, 2001). Alternatively, the findings of this study are consistent with other researchers (Al Soulami, 2004; Frare, 1986; Fuqua et al., 1975) who find that reflective students scored higher in their creative thinking abilities than those students who demonstrated an impulsive style. Frare (1986) reported that reflective students scored higher in most of the creative thinking abilities fluency, originality, and elaboration than impulsive students. Also, the relationship between errors and creative thinking abilities was negative. Al Soulami (2004) adds that reflective students scored higher in all creative thinking abilities, whilst the impulsive students scored lower in creative thinking abilities.

These results clearly demonstrate that reflective students achieve higher scores in their creative thinking than impulsive students. These outcomes can be attributed to common factors such as school facilities, the teachers' role, parents' education, and the social environment. It should be noted that there are no records in the literature (see chapter 2) comparing rural and urban students with regard to creative thinking abilities and the reflective-impulsive style.

#### **4.4.2 Individual Schools and Creativity**

A further objective of this study was to explore differences in creative thinking between students attending individual schools. Differences in the five areas of the TTCT variables (fluency, originality, elaboration, abstractness of title and resistances to premature closure) between the six schools were examined. Results of a MANOVA demonstrated that the mean scores of the students in school 4 were higher in fluency, abstractness of title, resistance to premature closure, and creativity index; whilst the students in school 6 scored higher in originality and elaboration (see s.4.3.1, Table 4.5). The results of question two revealed that there were significant differences in the mean creative thinking abilities between the individual schools. Further analysis revealed that the mean ability scores for all five abilities were significantly different between individual schools (see s.4.3.1, Table 4.5). This finding is consistent with the results of other studies (Maker, Jo, & Muammar, 2008; Lee et al., 2007; Plucker, 1998) where creative thinking abilities are found to be different from school to school. Rudowicz, Lok, and Kitto, (1995) find that Hong Kong students scored higher in TTCT A and B (figural and verbal) than students of the same age from different cultures such as Taiwan, Singapore, and USA, especially in originality and fluency. These higher scores



may be due to different cultural effects on student creativity. Glover (1976) finds no difference between white and African American students in flexibility, whereas the rest of the subscales of TTCT were higher in the white group than the African American group.

The findings of this study support the differences between the individual schools with regard to students' creative abilities. This is arguably due to the individual schools' educational challenges and influences the outcomes for their students.

#### **4.5 Summary**

As a group, urban students are found to be more creative than those in rural areas. Hongli and Hulin (2006) find that urban students have a greater ability to think creativity than those students in rural areas. In a study on differences between China's rural and urban areas, Ayoroa, Bailey, and Crossen (2010) find that a poorer quality of education in China's rural areas was characterised by high drop-out rates, low enrolments, poor teacher quality, lack of resources, and an inappropriate school curriculum. They advocate for increasing human capital resources to address the unbalanced growth.

With regard to the reflective-impulsive style, researchers suggest that reflective students have more creative abilities than those who are impulsive in their style (e.g., Al Soulami, 2004, Frare, 1986, and Olaseinde, 1994). Al Soulami (2004) asserts that

the period of time that is needed by reflective students is more than impulsive students and may help reflective students to focus deeply before making any

decision. Therefore, the outcome of the reflective students demonstrates more creativity than impulsive students (p.68).

In addition, the current findings show that creative thinking abilities and reflective-impulsive style differ between individual schools. The results indicating that school four was consistently higher in the TTCT abilities could reflect the influence of factors such as environment (home and school), culture, and motivation. This is also the suggestion of aligned research in relation to impact of environment (home and school), motivation, and the teacher's role in regard to enhancing creative thinking of students (e.g., Kharkhurin & Samadpour Motallaei, 2008, Prabhu et al., 2008, and Sternberg, 2003).

In conclusion, the findings of this study show that urban students as a group are reflective and creative in their abilities; whereas rural students as a group are impulsive and less creative. Overall, the findings indicate that there are differences between individual schools with regard to creative thinking and reflective-impulsive style. These findings suggest that changes to practices in rural schools may develop the creative thinking abilities of students.

## **CHAPTER 5: QUALITATIVE STUDY**

### **5.1 Introduction**

This study employs a mixed methodology approach, using both quantitative and qualitative methodology, and the qualitative analysis is examined in this chapter. This chapter primarily evaluates the interviews of the supervisors, principals, and teachers regarding their views on creative thinking and reflective-impulsive styles.

In this chapter, the relevance of qualitative research to this study is first considered, and the relevant method of semi-structured interviews selected. Preparation for the research is discussed, the means of obtaining the sample population, and the characteristics of the respondents noted. The interviewing techniques are described, together with the data collection and preparation. Results are divided by the nature of the responses of supervisors, principals, and teachers.

Educational research benefits from qualitative data collection, although substantial variables in quantitative data can render them difficult to collect (Erickson & Gutierrez, 2002). “Qualitative research is especially effective in obtaining culturally specific information about the values, opinions, behaviors, and social contexts of particular populations” (Mack, Woodsong, Macqueen, Guest, & Namey, 2005, p.1). The researchers state that the methodology provides valuable data regarding the perspectives of study populations. Brantlinger, Jimenez, Klingner, Pugach, and Richardson (2005) propose that the use of qualitative methodologies is expansive and growing. They offer a definition for qualitative research as a systematic approach within a particular context to explore the nature of a phenomenon. These researchers (Brantlinger et al., 2005; Mack et al., 2005) show that the advantages of using qualitative methods allow participants to express their views freely, while quantitative methods may not, and

qualitative data collection is more flexible than quantitative methods. Muijs (2004) adds that qualitative analysis may allow a matter to be explored in depth.

Researchers have previously used qualitative research techniques to examine creativity characteristics (Clark, 2008; Corcoran, 2006). Qualitative methods employ a wide range of strategies such as interviews, investigation, and case study which can be used to evaluate the phenomenon. Using interviews as a form of qualitative data provides an alternative form of information that can elaborate on the questionnaire responses drawn from quantitative analyses. A qualitative approach was selected that involved the use of in-depth, semi-structured interviews with teachers, principals, and supervisors who work in the educational field. Cohen, Manion, and Morrison (2007) suggest that there are four types of interviews: semi-structured, structured, non directed, and focused. The semi-structured interview is a flexible way of gathering data that is detailed and personal (McLeod, 1994). The interviews conducted in this study consisted of questions designed to investigate the individual's thoughts, opinions, and recommendations relating to the characteristics of student creativity. The interviewees were asked if they consider there is a relationship between reflective-impulsive style and creative thinking in students and to what extent this relationship can be observed. A further area of enquiry was the participants' perceptions on the differences between rural and urban students when considering the characteristics of creative thinking.

To analyse the qualitative data obtained from the semi-structured questions during the interviews, the researcher in this study followed the interview analysis technique developed by Cohen et al. (2007). After reviewing the audiotapes and translating Arabic transcripts into English language, the resulting data was analysed

using a text analysis procedure. This study involved the different participants: teachers, principals, and supervisors, with different sub-questions for each group. This chapter is divided into three sections that detail the recorded responses for each of the three groups.

## **5.2 Research Method**

In this section, the interview data collection process and analysis to inform the quantitative results is explained. The section comprises a discussion on sample selection, the interview protocols and the process adopted.

### **5.2.1 Sampling**

It should be noted that female teachers and girls' schools were not available to the researcher due to legal restraints in Saudi Arabia. Whilst a female researcher could interview women respondents, male researchers cannot. Overall, the sampling procedure in this study targeted teachers, principals, and supervisors involved in the school system of the Makkah Department of Education.

After receiving Victoria University Human Ethics Committee and Makkah Education Department approval for the research, the principals from six secondary schools, three from the city of Makkah and three from neighbouring towns were contacted by letter (appendixes I, J, & L). The nature of the research was explained along with the conditions of approach, and an invitation for them to participate in the research. All of the principals approached agreed to participate in the study, together with their assistant principals, and were further asked to distribute a letter to the year 10 teachers inviting them to also be involved in the study. A list of questions developed for

the research was attached. The open-ended questions used during the interviews were constructed by the researcher. The principal of each school was also given all copies of the letters from both Victoria University and the Makkah Education Department, and consent forms for teachers and assistant principals (appendix O). The principal then distributed the information and consent forms to their assistant principals, and five teachers who had been randomly selected. All of the consent forms were then collected from the schools before conducting the interviews and communication began with the volunteers to arrange dates and times for the person-to-person one hour interviews. None of the participants were personally known to the researcher before this study began. All the teachers were employed at the schools where the student sample for the quantitative study took place.

Next, a sample of teacher supervisors was recruited for the study. The Makkah Education Department was contacted to obtain supervisors' names and details for contact. All of the supervisors are employed at schools either in rural or urban areas. The supervisor's job is to assess teachers and students in each school. Therefore, supervisors have more experience about students, teachers, school facilities, and the surrounding environment. Therefore, they were involved as a part of this study. Five supervisors were randomly selected to be invited to be participants in this study. The Department was then sent the information and consent forms to distribute to the supervisors who agreed to be participants (see appendix O). All consent forms were collected from the Department before conducting the interviews. The distribution of the principal-teacher samples are as follows in Table 5.1

Table 5.1

*Distribution of Teachers and Principals participating*

Schools	Location	No. Of Teachers	No. Of Principals
1	Aljamoum (rural areas)	5	2
2	Asfan (rural areas)	5	2
3	Alabyar (rural areas)	5	2
4	Al Falah (urban areas)	5	2
5	Al-Hussein bin Ali (urban areas)	5	2
6	Makkah (urban areas)	5	2
Total		30	12

All of the teachers were employed at the same schools where the student sample for the quantitative study took place. The following tables present the personal characteristics of the interview respondents. The first variable is age (see Table 5.2).

Table 5.2

*Respondent teachers' age groups*

Age Group	No. Of teachers	Location		%	
		Rural	Urban	Rural	Urban
23-27	6	5	1	16.66	3.34
28-32	7	6	1	20	3.33
33-37	10	4	6	13.33	20.00
38-42	4	-	4	-	13.33
43-47	1	-	1	-	3.33
48-52	2	-	2	-	6.67
Total	30	15	15	50%	50%

The age distribution shows that the mean age of teachers in the rural areas was less than the mean age of those in the urban areas, with none over the middle thirties. Thus teachers in the rural areas may have less experience than the average Saudi teacher in the Makkah region. It should be noted that the teaching experience also differed according to the location of the school. This is confirmed in table 5.3.

Table 5.3

*Teaching experience of teacher respondents*

Years of teaching experience	No. Of Teachers	Location		%	
		Rural	Urban	Rural	Urban
1-5	4	3	1	10	3.33
6-10	13	11	2	36.66	6.66
11-15	8	1	7	3.33	23.33
16-20	3	-	3	-	10
21-25	1	-	1	-	3.33
26-30	1	-	1	-	3.33
Total	30	15	15	50%	50%

In addition, the reason for selecting principals from different schools was to identify characteristics that may have an influence on students' creativity. The characteristics include: age, location, specialisation, and teaching experience, as outlined in Table 5.4

Table 5.4

*Characteristics of respondent principals*



Principal	Age	Location	Teaching specialisation	Years of teaching experience
1	36	Rural	Arabic language	11
2	44	Rural	Arabic language	22
3	40	Rural	History	18
4	35	Rural	History	10
5	38	Rural	Arabic language	14
6	38	Rural	Geography	12
7	59	Urban	Religion	37
8	58	Urban	Religion	36
9	39	Urban	Religion	17
10	49	Urban	Biology	25
11	36	Urban	Arabic language	15
12	45	Urban	History	23

Before collecting the data for this study, all interviewing techniques were rehearsed. The data was collected at the beginning of Semester 2 of the 2008 school year. All interviews were scheduled for week days (see appendix P). None of the participants were personally known to the researcher before this study began.

Secondly, a sample of supervisors working for the Makkah Education Department was recruited for the study. The Makkah Education Department was contacted to obtain supervisors' names and details for contact (see Table 5.5). All of the supervisors are employed at the schools in rural and urban areas. The supervisor's job is to assess teachers and students in each school. Therefore, supervisors have more experience about students, teachers, school facilities, and the surrounding environment. Therefore, I involved them as a part of this study. Five supervisors were randomly selected to be invited to be participants in this study. The Department was then sent the information and consent forms to distribute to the supervisors who agreed to be participants (see appendix O). All consent forms were collected from the Department before conducting the interviews. All interviews for the supervisors were scheduled for

week days (see appendix P), and were conducted in the staff room in Makkah

Department of Education.

Table 5.5

*Characteristics of respondent supervisors*

Supervisor	Age	The Specialisation	Number of years of teaching	Number of years of supervision in rural schools	Number of years of supervision in urban
1	53	Mathematics	29	10	15
2	48	Religion	25	6	10
3	38	Religion	14	2	7
4	38	Arabic	15	4	8
5	43	Geography	23	9	10

## 5.2.2 Measures

### 5.2.2.1 Interviews

Before collecting the data for this study, interviewing techniques were selected and rehearsed. All interviews for the supervisors were scheduled for week days, and were conducted in the staff room in Makkah Department of Education (see appendix P). The data from principals and teachers were collected at the beginning of Semester 2 of the 2008 school year. All interviews were scheduled for week days (see appendix P). The interviews, in Arabic, were conducted with study participants in the staff room at each school.

The interviews were conducted individually to allow each participant the maximum opportunity to express his views. To minimise influence on participants' opinions during the interviews, the interviewer remained neutral and did not offer any

opinion or response evaluation. Each individual was asked the number of years they had been in the teaching service. They were also asked about the characteristics of creative thinking representative of differences between rural and urban students. The individuals who work in the educational field were also asked if they understood the relationship between RI and creative thinking for students, and to what extent this relationship can be observed (see appendix E). When completed, each interviewee was thanked and an opportunity extended to ask any questions in regard to interviews and the research. Participants' questions at this stage were meaningful, especially those of the urban teachers and supervisors, which demonstrated their depth of knowledge. The interview consisted of questions designed to investigate the individual's thoughts, feelings and recommendations relating to student creativity.

All interviews were audio-recorded and then transcribed. Each participant read the transcript of his interview to confirm that it was a true and accurate record of the interview, and then the transcripts were translated into English at the Certified Translation Office (J.C.C. No.92120). To ensure the accuracy of interpretation, three Saudi English specialists at Umm Alqura University satisfactorily compared the translation with the original. Content validity was employed to ensure that the data was valid. Firstly, all interview items that supported the main goal of the study were identified. Secondly, to examine the content validity all interview items were examined by three Saudi English reviewers. The aim of this assessment was to determine the extent to which the interview items measured the main goal of this study. All reviewers asserted that the interviews were valid. Also, the interview transcripts and translations were reliable.

### **5.2.3 Procedures**

#### **5.2.3.1 Data collection**

When I received permission from Victoria University Human Ethics Committee and Makkah Education Department as mentioned in section 5.2, I commenced interviews with participants who worked in the educational field. As the participant groups were different, I undertook a variety of procedures to facilitate the interviews. I contacted each school administration whether in rural or urban areas, and informed all participants about the study and what was requested of the participants. I sent each school administration the information and consent forms for teachers and principals who were to participate in this study (see appendix O). After that every school distributed information and consent forms to two of their principals, and also five teachers who had been randomly selected. After that I collected all consent forms from schools before conducting the interviews. The data for this study was collected at the beginning of Semester 2 of the 2008 school year. All interviews were scheduled for week days (see appendix P).

I interviewed all participants in the staff room in each school. All of the interviews were audio-recorded and then transcribed. I decided to conduct the interviews individually in order to give each interviewee the same possibilities and room to express his personal views. In addition, during the interviews, I consciously avoided expressing my personal views that might influence participants' opinions. After a period of five weeks the participants were given the opportunity to read the transcripts of their interviews, to ensure they were an accurate representation of their responses.

All interviews were conducted in the Arabic language. Later on, all interviews were translated in to the English language as determined in section 5.2.2.1.

When I finished all interviews, I thanked all participants. After that, I offered an additional opportunity for every participant to ask any questions in regard to interviews and the research. All participants' responses were very good, especially urban teachers and supervisors and this demonstrated their depth of knowledge.

### **5.2.3.2 Data analysis**

In this study the data transcribed from the interviews of people who work in the educational field (teachers, principals, and supervisors) was analysed using the technique recommended by Cohen and Menion (1994). The process is to transcribe the data whilst listening to the interview for a sense of the whole; identifying units of general meaning; delineating units of meaning relative to the research question; clustering units of relevant meaning; writing a summary of each individual interview; and contextualising themes.

### **5.2.3.3 Research questions**

The research questions of this thesis concern the postulated differences between students in urban areas and regional areas in Saudi Arabia. The primary question is the effect of rural isolation and the fewer opportunities to express creativity for these students, compared to the greater range of influences and stimuli of the urban environment of city students. This theme was separated into three parts as follows and then subdivided (Appendix E).

1. The supervisors' evaluation of students' creativity in rural and urban schools;

2. The principals' opinions on student creativity in their schools and the factors that impact on their creativity; and
3. The teachers' opinions on student creativity in their schools and the factors that impact creativity.

### 5.3 Results

Responses from the interviews in relation to the demographic characteristics of the sample are presented in the following section. Study participants differ regarding their interaction with students; therefore the following elucidating questions were aligned to reflect the interests and views of each group. The transcripts and ensuing data are presented for supervisors, principals, and teachers, as follows.

#### 5.3.1 Supervisor Respondents

**SQ1** *How did the supervisors evaluate the rural and urban schools in regard to the level of students' level of creativity?*

This question was divided into the following sub-questions:

**SQ1.1** *Do you think there are differences between rural and urban students in their ability to think creatively?*

**SQL.1 Response** All five supervisors said there were differences between urban and rural students in regard to creative thinking, with urban students exhibiting greater creativity. Those who gave reasons suggested the differences were due to parents' education, home environment, and teachers' levels of activity and the greater level of concern for creativity in urban areas. One supervisor further explained the main differences between rural and urban students in regard to the creative thinking:

I think there are differences between rural and urban for many reasons: Firstly, the environment in rural areas (family and peers) does not help students to be creative. Secondly, the families in the city are educated more than those in rural settings. Therefore, most of the families in the city know the value of creativity and try to encourage their children to be creative. Thirdly, teachers in rural areas are not settled, they stay a short time and are often transferred closer to their homes. The (transitory nature of their employment) may negatively affect teachers' performance in relation to (identifying) creative students (S1, par.102).

Another supervisor said

(students) in the city participate more in the creativity competitions than rural students. This gives the impression that they are more creative than rural students. Also, there are other differences between rural and urban students. Most parents of students from urban areas are educated, so the environment surrounding the students in the city is encouraging creativity in students. In addition, most urban families do world tours during the school holidays, which may increase the knowledge of students and it will certainly have a positive impact on the level of creativity in students (S2, para.104).

**SQL1.2** *Do you think rural teachers are more helpful in improving a student's creative thinking than urban teachers?*

**SQL1.2 Response** All supervisors indicated that teachers in rural areas are not as helpful in developing a students' creativity. This may be due to inexperience on the part of rural teachers and that they have less awareness of creativity. A supervisor explained:

(it) may be due to (the following) reasons: firstly, rural teachers have less career experience when compared with urban teachers. Secondly, rural teachers do not attend courses that are organised every year by Education Administration. These courses clarify the importance of creativity and how to deal with the creative students. Thirdly, rural teachers are not settled in the rural schools (S5, para.111).

A further response was

(the) teachers in rural areas are less interested in creativity of students, for several reasons. Firstly, most of the village students as well as their parents believe that concern for academic achievement and the development of creative talent is a waste of time. Therefore the interest of students in rural areas is low when compared with those students in urban areas. In addition, teachers' professional experiences in rural schools are lower, which may negatively affect rural students (Supervisor 3, para.98).

**SQ1.3** *Do you agree that the school environment plays an important role in enhancing the student's creative thinking?*

**SQ1.3 Response** All supervisors agreed that the school environment plays an important role in enhancing students' creativity.

(the) school environment plays an important role in developing the students' creativity. If the school is aware of the importance of creativity, attending the educational meetings and participation in creativity competitions will have a positive impact on the development of the students' creativity (S3, para.107).



Another supervisor commented

(if) the school understands the importance of creativity it will work to develop the students' creativity and encourage the rest of students to be creative.

However, this requires teachers who know the value of creativity, have educational experience, and who attend educational sessions in the field of creativity. This is commensurate with teachers in urban areas (S5, para.11).

**SQL.4** *Do you agree that the home environment plays an important role in encouraging the student to be creative?*

**SQL.4 Response** All supervisors agreed that the home environment plays an important role in encouraging students to be creative. Also, they think that this influence is stronger if parents are educated. For example, one supervisor suggested that

(home) environment has an important role to play in developing the students' creativity. Of course, this role will be positive if the educational level of the family is high. Also, parents play an important role in regard to innovation in encouraging their children to go to the library and watch educational films (S4, para.107).

Another supervisor made the statement:

(parents) should fulfil their role effectively in the development of their children by providing all facilities at home (e.g., the internet, books, and educational material). Also, the parents should organise visits to museums for their children during school holidays (S 2, para.102).

**SQL1.5** *Do you agree that the level of experience of teachers in rural areas is less than teachers in urban areas?*

**SQL1.5 Response** Again all five supervisors in interview said they believed that the level of experience of teachers in rural areas is less than teachers in urban areas. Some of them gave reasons for their answer. For example, one supervisor made this comment: “I can say that rural teachers are less experienced than urban teachers in using suitable teaching methods, dealing with creative students and dealing with class problems that they may face in their academic life” (S1, para.105).

Another supervisor suggested that

(the) main reason for differences between rural and urban teachers is that most teachers in rural areas recently graduated from institutes, therefore they have less experience in comparison with urban teachers. Consequently those in rural schools are less able to improve the students' abilities (S5, para.111).

**SQL1.6** *Do you agree that motivation is important for a student's creative thinking?*

**SQL1.6 Response** All five supervisors in the interview said that motivation is important for students' creativity whether in rural or urban settings. Few supervisors gave reasons why motivation is important. For example, supervisor 4 said “(motivation) is important to develop the students' creativity. Without it, the students could not solve problems in creative ways” (S4, para.109).

Further:

(there) are two types of motivation, intrinsic motivation, which represented the individual willingness and inheritance, and extrinsic motivation which represents the external influence on individuals, such as reward. To improve students' abilities of creativity, we need both types of motivation (S3, para.107).

**SQL1.7** *Do you think that impulsive students are creative?*

**SQL1.7 Response** Responses were divided, with one group of the opinion that impulsive students can occasionally be creative; however, creativity sometimes needs impulsivity to appear (S1, para.103; S5 para.111). One supervisor asserted that “impulsive and shame are both considered as undesirable attributes in the individual, but in some cases impulsiveness is part of the response considered as the causes of creativity” (S1, para.104).

The second group believed that impulsive students cannot be creative, because creativity needs reflection before making decisions (S2, para.105; S3, para.107; S4 para.109). For example, one supervisor said “(creative) solutions for problems need time and that (does) not exist in the impulsive student” (S4, p.109).

**SQL1.8** *Do you think that the age plays an important role in improving creative thinking for students? If so, at what age is a student's creativity most apparent?*

**SQL1.8 Response** All five supervisors believed that the age of students plays an important role in improving creative thinking for students. Also, they think the best age at which creativity can be observed and developed is from 13 to 19 years as the optimum time for creativity to be nurtured in boys. For example, one supervisor said “(age) is important for student creativity and there is an age in which creativity (is) obvious. That is in the secondary school stage” (S3, p.108).

**SQL.9** *Do you think that the teacher's encouragement may increase students' creative thinking?*

**SQL.9 Response** All five supervisors stated that teachers' encouragement may increase students' creative thinking. For example, one supervisor suggested that “(encouragement) is important in order to develop the students' creativity. If the student is not encouraged, he becomes frustrated and (cannot) achieve” (S2, p.106).

Another supervisor commented

(a) good teacher helps students by giving them freedom to think and to solve problems in innovative ways; and at same time respects the ideas of students and encourages them, even if the ideas of students are wrong. Teachers' encouragement has a strong influence on the development of creativity among students (S4, para.113).

**SQL.10** *Do you agree that the school must provide good facilities for students to improve their creative thinking?*

**SQL.10 Response** All supervisors considered that the school must provide suitable facilities for students' creativity. Two supervisors (S1, para.104; S2, para.106) said that school facilities are important but that school administration and teachers must be persuaded regarding the importance of creative thinking. Another supervisor believed that

(it) is necessary that the school provide students with (everything they need). That helps in developing the students' creativity. (It is) obvious . . . that facilities employed (for this purpose) in rural schools are less than those in urban schools (S4, p.110).

**SQ1.11** *Do you think there is a relationship between cognitive style and creative thinking?*

***SQ1.11 Response*** All supervisors stated there is a relationship between reflective-impulsive style and creative thinking, particularly for students who are reflective in their decisions and creative thinking because creativity needs contemplation before making decisions (S1, para.105; S2, para. 107; S4, para.110). A fourth participant nominated a factor of 80 per cent to describe the fit (S5, para.112).

**Summary of Supervisors' Responses to Q1** The following table 5.6 draws key themes from the supervisor participants' replies.

Table 5.6  
*Supervisor participants: Key themes*

Question 1 Do you think there are differences between rural and urban students in their ability to think creatively?		Question 2 Do you think rural teachers are more helpful in improving a student's creative thinking than urban teachers are?		Question 3 Do you agree that the school environment plays an important role in enhancing the student's creative thinking?	
Key theme	No. of supervisors	Key theme	No. of supervisors	Key theme	No. of supervisors
Creativity is lower in rural schools.	5	Urban teachers greater focus on creativity.	5	Increase creativity.	5
Different parents education level.	2	Rural students are less creative.	2	Understand the meaning of creativity.	5
Teachers experience.	1	Rural teachers have less experience.	3		
Question 4 Do you agree that the home environment plays an important role in encouraging the student to be creative?		Question 5 Do you agree that the level of experience of academic teachers in rural areas is less than teachers in urban areas?		Question 6 Do you agree that motivation is important for student's creative thinking?	
Key theme	No. of supervisors	Key theme	No. of supervisors	Key theme	No. of supervisors
Educated parents foster creativity.	5	Rural teachers are less experience.	5	Motivation is important for creativity.	4
		Less understand the meaning of creativity.	1	Motivation is important for problem solving.	1
		Schools are different.	1		

Table 5.6 continued

Question 7 Do you think that impulsive students are creative? Why?		Question 8 Do you think that the age plays an important role in improving creative thinking for students? And at what age is a students creativity most apparent?		Question 9 Do you think that the teacher's encouragement may increase students' creative thinking? And to what extent?	
Key theme	No. of supervisors	Key theme	No. of supervisors	Key theme	
They could be creative.	2	Yes. At secondary school stage.	4	Teachers impact creativity.	
Creativity needs time.	3	Creativity appears from 13-19 years.	4	Teachers' encouragement affects students' achievement.	
Creativity needs reflective style.	2	TO a great extent.	1	To great extent.	
Creativity doesn't exist with impulsive style.	1				

Question 10 Do you agree that the school must provide many facilities for students in order to improve their creative thinking?		Question 11 Do you think there is a relationship between cognitive style and creative thinking?	
Key theme	No. of supervisors	Key theme	No. of supervisors
Good facilities improve creativity.	5	Reflective students normally creative.	4
Urban schools have more facilities than rural schools.	2		
Schools administration must understand the meaning of creativity.	1		
Teachers has main role to improve creativity.	1		

### 5.3.2 Principal Respondents

**PQ2** *How did the rural and urban principals express their opinions with in regard to the level of student creativity in their schools and what affects the level of student creativity in their schools?*

Question two was deconstructed into the following sub-questions:

**PQ2.1** *What does the word 'creative thinking' mean in your opinion?*

**PQ2.1 Response** All principals defined creative thinking; P2, P7, and P10 said that the term means to present a new idea that is useful and accepted by society. For example, one principal suggested that creative thinking is “(to) present new and useful ideas that benefit society” (P1, para.65). Others defined creative thinking as creating or produce something new (P3, P4, P6).

**PQ2.2** *How many years have you been at this school?*

**PQ2.2 Response** Principals had varying levels of experience, between 3 to 25 years. Principals in rural schools were generally less experienced, and attended less training courses than principals in urban schools.

**PQ2.3** *How would you describe the school?*

**PQ2.3 Response** The respondents can be divided into two groups, three in rural areas who defined rural schools’ overall performance from sub-standard to acceptable.

For example, one principal said

(relating) to students, performance level is low. The standard of teachers in this school is not good. Teachers here are interested more in salary rather than



improving the level of creativity of students. The services in the school are not too bad (P2, para.16).

Another principal suggested that

(student standards) in year 10 are low for many reasons: the uncooperative home environment, bad peers, and rural society. Regarding teachers, the standard is generally low (and) they live (further away) about an hour's drive. This matter may affect their performance. In relation to general services, they are not too bad (P4, para.34).

The second response was that the standard of urban schools was good to excellent. For example, one principal said

(student standards) are between very good to excellent. Many students in this school are participating in creativity competitions. In addition, this year some students participated in a Chinese creativity competition for robotics. Teacher (standards) in this school are excellent. In relation to services in this school, we have a library containing more than ten thousand books and free internet access for students. So in general, the services here are excellent (P7, para.66).

Another participant offered the following

(all) the services that the students need (e.g., internet, library, laboratories, and teaching aids) are available in this school. Also, the majority of teachers in this school have adequate teaching experience; therefore, the academic level of students in this school is excellent (P10, para.75).

Thus principals, on average, reported better performances from both teachers and students in urban schools.

**PQ2.4** *Do you think teachers play an important role in enhancing the creative thinking in students? If yes, to what extent?*

**PQ2.4 Response** The majority of respondents agreed that the teacher is crucial in enhancing creativity: “I think the teacher helps to develop the students' creativity (by about) 70 per cent” (P3, para.32). Other comments were that not all teachers play an important role in students' creativity unless the teacher is interested in creativity. For example, one principal suggested that “if the teacher is interested in creativity he can encourage and support student's creativity” (P7, para.66). Another commented: “(teachers) who attend training on innovation and how to develop the capacity of individuals will be encouraging and supportive of creative students” (P10, para.76).

**PQ2.5** *Do you think the school environment helps students to be creative?*

**PQ2.5 Response** All principals believed that the school environment assists students to be creative. One respondent added that “(the) school environment improves students' creativity to a great extent. Students in this school can participate in many competitions of creativity (both here and internationally)” (P10, para. 83). Further, “(the) school environment has a great role in regard to the students' abilities. This role either is positive when the school succeeds in improving the capacity of students to be creative or negative when the school does not care about students abilities” (P 7 p. 71). Others said that the school environment does help students to be creative but there is ‘room for improvement’ in many cases. However, the respondents were generally enthusiastic: “(the) school environment here helps to improve the students' creativity to

a great extent. The best evidence is that many students in this school participate in international creativity competitions” (P7, para.66).

**PQ2.6** *Do you think that rural parents are more active in encouraging creative thinking in their children than those in urban settings?*

**PQ2.6 Response** All principals considered that there were differences between rural and urban parents in regard to children's creativity. Responses on the reasons for this were rural illiteracy, lower education, and low parent interest in creativity: “(there) are differences between parents in rural and urban areas. Most parents in rural areas are illiterate, so their children are less creative than (those in) urban areas” (P1, para.15). Another principal responded “(most) parents in rural areas are less educated compared with those in urban areas. Therefore, they have less knowledge and concern about the value of the abilities of their children. As a result of that, their children are less creative” (P3, para.37).

This is due to those in urban areas having, on average, more education: “(parents) in urban areas are better at dealing with their children’s creativity than parents in rural areas” (P9, para.82). Another principal agreed: “(parents) in urban areas are more interested in developing the creativity of their children than parents in rural areas” (P7, para.66).

**PQ2.7** *Does the school provide sufficient support to enhance creativity in students?*

**PQ2.7 Response** Again, the responses were divided, predominantly into rural and urban respondents. Principals in rural schools said that most of the school services to enhance creativity were substandard: “(this) school has provided students' study

requirements, but those are still limited compared with urban areas” (P4, para.34).

Another principal said that

(in) this school we have only one lab sharing all scientific materials. This lab lacks the main materials compared with labs in urban schools. Also, we have no library in this school, maybe next year we will (drop one class in favour of) a library (P5, para.49).

The second group or respondents were urban-based and reported that they had excellent resources to promote creativity in children, that they had all study requirements such as: books, laboratories, access to the internet, and libraries: “(this) school provides students with all their learning requirements such as books, access to the Internet and (other resources)” (P12, para.100). Another response was “(all) the services that are needed by the students (such as library, laboratories, and the Internet) are located in this school. Therefore, the level of academic achievement among students in this school is high compared with other schools” (P7, para.68).

**PQ2.8** *What is the academic standard for students in your school?*

**PQ2.8 Response** There was a mixed response to this question, broadly divided into rural and urban principal respondents. P1 and P2, rural principals, stated that educational standards were lower in their school than the Saudi average, two others said that the academic level of students in their schools was average, whilst the remainder responded that the academic standards in their schools were good. Two urban principals (P7 & P8) replied that educational standards at their schools were excellent; another urban respondent said that the academic standard in the school was very good. The remaining principals (P9, P11, & P12) said that the academic level of their students was

good. The respondents therefore reported that the academic level of students in urban schools is higher than at rural schools.

**PQ2.9:** *Do you think that students' creative thinking is reflected in their decisions?*

**PQ2.9 Response** The majority of respondents reported that students' creativity is normally reflected in their decisions. P4, P3, and P7 said that in most cases creative thinking needs a reflective style because a student who is reflective normally takes time to make decisions and creativity needs a personality like this. Further: “(creative) students need time to solve problems. Creativity is therefore consistent with reflection, while not consistent with impulsive behaviour” (P12, para.112). Only one principal suggested that not all reflective students are creative, because impulsive students are sometimes creative (P1).

**PQ2.10** *What are the problems students may face thinking creatively at school?*

**PQ2.10 Response** Urban respondents did not see any barriers to creativity for their students: “(there) is no problem facing students in this school with regard to their creativity. The teachers in this school work on the development of creative abilities in their students and nurture creativity” (P7, para.99). On the other hand, P1, P3, and P4 from rural schools indicated issues with school administration, teachers who do not reward their students' creativity, and inexperienced teachers who are not interested in creativity and do not seek to encourage it in their students. There is also the rural social environment and the attitude of the student's family toward creative children. These issues can impact on creativity for students. One principal added that

(the) lack of experience of teachers (new teachers) in this school has a negative impact on the academic level of students. Also, nowadays there are many problems that face students such as absenteeism among teachers and their attempts to transfer to urban areas. As a result, many teachers in rural areas do not care about development of creative abilities of students (P4, para.44).

**PQ2.11** *Is the age of the student important for creative thinking?*

**PQ2.11 Response** All principals in rural and urban schools believed that the age of the student plays an important role in creative thinking. The main difference between principals is: what is the main age at which creativity appears in student? The responses can be divided into two groups. In the first group, many principals (P6 and P7) suggested that the best age range for the appearance of creativity for students is from 7 to 18 years. Other principals from the second group suggested that the best age range for the appearance of creativity is from 8 to 30 years.

**PQ2.12** *Do you agree that reinforcement, reward and motivation are important to improve creative thinking?*

**PQ2.12 Response** All principals in rural and urban schools mentioned that the reward and motivation for students is important in regard to improving the level of creativity of students. For example, P5 and P7 said that rewarding students is a strong factor in encouraging the development of creativity; also, it may increase creativity. Other principals (P3 and P4) suggested that positive rewards can affect the students' creativity.

**PQ2.13** *Do you think classroom overcrowding affects a student's chances of improving their creative thinking?*

**PQ2.13 Response** Overcrowded classrooms were considered to impact on creativity, as a teacher has not sufficient time to identify and foster students' creativity (P6, P7). P11 and P12 said that overcrowding could reduce the opportunity for students to exercise creativity.

**Summary of Principals' Responses to Q2** The following table draws key themes from the principal participants' replies

Table 5.7

*Principal participants: key themes*

Question 1 What does the word 'creative thinking' mean in your opinion?		Question 2 How many years have you worked at this school?		Question 3 How would you describe the school?	
Key theme	No. of principals	Key theme	No. of principals	Key theme	No. of principals
New ideas.	10	Less than ten years.	6	Students, teachers and services are good.	10
Work skills innovation.	2	More than ten years.	6	Students, teachers and services are weak.	2
				Services in urban schools better than rural schools.	1
				Students level in rural schools between weak-average.	3
				Students and teachers in urban schools are good.	6
Question 6 do you think the rural parents are more active in encouraging creative thinking in their children compared to in urban settings?		Question 7 Does the school provide all the services and facilities for students?			
Key theme	No. of principals	Key theme	No. of principals		
Rural parents are less educated.	10	Rural schools have low resources.	6		
Urban parents encourage their children.	2	Urban schools have better resources.	6		
Rural parents have negative role in fostering their children's creativity.	1				
Urban parents are more educated.	4				
Urban parents develop children's creativity more than rural.	3				
Rural parents are less encouraging of their children than urban.	3				



Table 5.7 continued

Question 8 How is the general academic level of school students in your school?		Question 9 Do you think that the students' creative thinking is reflected in their decisions?		Question 10 What are the problems students may face thinking creatively at school?	
Key theme	No. of principals	Key theme	No. of principals	Key theme	No. of principals
Academic level is low.	3	No creativity in decisions.	1	Creativity isn't rewarded.	1
Academic level is good-excellent.	9	Creativity in decisions.	11	No creativity presents problems	9
Academic level is average.	1	Reflective students are creative.	3	Family and society.	1
		To a great extent.	6	Teacher's level of experience.	1
				Problems are solved quickly.	1

Question 11 Do you agree that the age of the student plays an important role in creative thinking?		Question 12 Do you agree that reinforcement, reward and motivation are very important to improve creative thinking?		Question 13 Do you think classroom overcrowding affects a student's chances of improving their creative thinking?	
Key theme	No. of principals	Key theme	No. of principals	Key theme	No. of principals
Yes age is important.	3	Motivation is important.	12	Overcrowding has an affect.	12
Creativity starts from primary stage.	3	Rewarding is important for students.	7	Negatively impacts on creative students.	1
Creativity starts from secondary stage.	6			Decreases the level of creativity.	3
				Decreases the student's chance of creativity.	4

### 5.3.3 Teacher Respondents

**TQ3** *Rural and urban teachers' evaluation of students' creativity; factors that affect creativity.*

This question was divided into the following sub-questions:

**TQ3.1** *What does 'creative thinking' mean?*

**TQ3.1 Response** The teacher participants responded with several definitions for creative thinking; one teacher suggested that creative thinking is a product of high ability and fast understanding. Responses, however, may be divided into five categories the first of which represented 40 per cent of participants. In this group, the respondents defined the term as the presentation of new ideas: “presenting new ideas to solve problems” (T3, para.6). It was also suggested that creative thinking is “the hardworking student who presents a something new that has a cognitive basis, discussion, (and a) good answer for subjects he did not study” (T6, para.19). Another teacher stated: “(creativity) as a concept means achievement in the best possible way and presenting the new idea as useful to society” (T16, para.52). Of note, the subjects taught by the majority of this group were mathematics and science. Group two, represents 6.6 per cent of participants, T5, T18, and T24 defined creative thinking as “the production of a something new” (e.g., T5, para.11). The next generalisation from group three, perhaps 26 per cent of participants, defined the term as creating a new idea: “distinguishing (themselves) in a field and creating new ideas” (e.g., T20, para.63). Another participant in this group offered that creative thinking means to “go out with the familiar and create new ideas, new procedures and use modern technology, leading to good and different educational results. Creativity outcomes should be (welcomed)” (T22 para.72). Some 10

per cent of the participants who comprised group four said that creativity was innovative ways of solving day-to-day problems. For example, one teacher suggested that creative thinking is “to reach a goal or solve a problem by the (optimum method)” (T29, para.92). Another said that, with creativity is “an idea to solve a problem in a new way” (T25, para.79). Group five, 6.6 per cent of participants, defined creativity as the person who has innovative ideas that interest society. For example, one teacher suggested that creative thinking is to “start with the familiar and use superior talent to produce new ideas” (T11, para.36). Another participant said it referred to “the person's outstanding talent in matters that interest society” (T13, para.41).

**TQ3.2** *To what extent does the school improve a student's creative thinking?*

**TQ3.2 Response** This question was structured to encourage teachers to discuss the manner by which the school environment encourages creativity through its policies, practices, and resources, and to what extent it fosters creative students. Responses from the participants may again be divided into rural and urban schools; the majority who stated that rural schools are not involved with creativity in their pedagogy or curriculum. For example, one teacher from a rural school stated that “this school does not obviously work to develop creative thinking; also it does not have a program to encourage the students to be creative. The best evidence is the scarcity of participating schools in creativity competitions” (T4, para.6).

Further, “there are no schools in this region that try to develop creative activities and creative students. There are many reasons; the physical and social conditions here hinder the development of creativity” (T6. para.19).

The majority of respondents to this question view the resources and practices in rural areas in the encouragement of creativity as very low, with just a few schools in rural areas fostering creativity. The majority of rural teachers, however, consider that most urban school administrations have a policy to encourage creative activities and support creative students, and this view is supported by a majority of urban teachers:

(in) fact, this school does its best to deal with students and encourage creative students because the administration of this school and staff understand the importance of creativity for developing society. Therefore, this school concentrates on creativity and considers it as a part of the school's education aims. By the way, some students in this school participated in creativity competitions in and outside of Saudi Arabia. The most recent was a creativity competition held in China in 2008 (T16, para.52).

Another participant said that “the school works (hard to assist) creative students, but we should not ignore the family's role, because it is important for encouraging the student to be creative. In this school there are some students who are creative and who have participated in an (overseas competition)” (T18, para.58).

**TQ3.3** *Is there a relationship between creative thinking and the reflective-impulsive dimension of cognitive style?*

**TQ3.3 Response** The majority of teacher participants, 83 per cent, reported a strong relationship between creative thinking and reflective style. For example, one teacher said “from my experience, I think that there is a strong relationship between reflection and creative thinking. In contrast, the relationship between impulsivity and creative thinking is low” (T4, para.9). Another opinion expressed was that

the relationship between impulsivity and creative thinking is weak, with impulsivity responsible for only one quarter of creative thinking; whereas the relationship between reflective and creative thinking is strong, and is responsible for three quarters of creative thinking (T30, para.95).

Another respondent viewed creativity “as a (cognitive) process that has special characteristics . . . in general, the relationship between reflection and creativity is good (close to three quarters). The relationship between impulsivity and creativity is low” (T16, para.52).

A participant said that

the school works (hard to assist) creative students, but we should not ignore the family's role, because the family is important for encouraging the student to be creative. In this school there are some students who are creative and who have participated in an (overseas competition) (T18, para.58).

On the other hand, a few teachers (16.6%) found a strong relationship between creative thinking and impulsive style. They considered that a student with an impulsive style tries many times to get the correct result, while the person who has a reflective style does not try as hard. For example, one teacher suggested that

the creative student normally has an impulsive style, while a reflective person has more knowledge, but he isn't creative. In general, the relationship between creative thinking and cognitive style is as follows: strong relationship between creative thinking and impulsive style, while low relationship between creative thinking and reflective style (T6, para.19).

Another participant said that “there is a strong relationship between creative thinking and impulsive style ... however, the relation between creative thinking and reflective style is low” (T7, para.22). Similarly, a respondent’s opinion was “the relationship between creative thinking and impulsive style is strong . . . while it has a low relationship with reflective style (T10, para.29). Another respondent viewed creativity

as a (cognitive) process that has special characteristics in any one... in general, the relationship between reflection and creativity is good (close to three quarters). Whereas, the relationship between impulsivity and creativity is low to the extent of perhaps 30 per cent (T16, para.52).

**TQ3.4** *Does the impulsive student have creative ability?*

**TQ3.4 Response** The majority, over three-quarters of participants and all the urban respondents, viewed reflective style as more creative. In response to the question, *is the impulsive student creative*, one respondent said “I do not think so, because the student who has an impulsive style usually makes quick decisions, and as we know rarely quick decisions are true” (T16, para.52). Another agreed: “I do not think so, because in most cases creative thinking needs thinking before making decisions” (T18, para.59). Also, one teacher said “no, because the impulsive student has a desire to get the solution without thinking, so he makes many mistakes. Therefore, he isn't creative” (T19, para.61). The minority of the responses, 20 per cent of participants and all rural teachers, considered that impulsive students have more creative ability than reflective students: “(yes) to a great extent. I think that impulsiveness encourages individuals to be creative” (T6, para.20). Another participant opined that “the impulsive student makes

several attempts without any fear in order to solve any problem that (occurs). From my experience the impulsive person is more creative than the reflective person” (T13, para.41).

**TQ3.5** *Do you think that the teacher’s methods may enhance a student’s creative thinking?*

**TQ3.5 Response** All respondents agreed that teaching methods may enhance a student's creative thinking. Most of the teachers, whether in rural or urban areas consider that superior teaching style has a positive impact on increasing the student's creativity level. For example, one teacher suggested that “if the teaching method is good, it will positively affect the level of the student's creativity. In addition, diversity (in approach) plays a positive role in improving the creativity of students” (T3, para.7). A further opinion was that “it is useful and has a (significant) effect . . . in improving students' creativity; also diversity in teaching methods is very important in regard to improving the level of creativity” (T15, para.46). A slightly different argument was that

teaching methods have an obvious role in developing . . . creative students. The diversity of teaching methods may positively affect students in many areas such as making the lessons clearer and may improve the student's creativity.

However, the teacher’s experience and knowledge are critical for the use of appropriate teaching methods, considering individual differences (T16, para. 53).

**TQ3.6** *Do you agree that a particular cognitive style is important for individuals?*

**TQ3.6 Response** A cognitive style was considered critical to creativity by all teachers. Identification of the cognitive style of a student assisted teachers to use the most suitable teaching methods for the student. This also applied to the student; upon realising the nature of individual cognitive style, a student could use this knowledge to study and succeed. One teacher further explained why understanding cognitive style is important: “knowing the cognitive style of the student may help the teacher to choose the best teaching method to improve the level of student's creativity” (T15, para.46). Another responded that “if the student knows his cognitive style, he can improve his level of creativity” (T30, para.96).

**TQ3.7** *Does the home environment have an impact on a student's creative thinking?*

**TQ3.7 Response** This question was answered in the affirmative by all teachers, who considered it an important factor, to a crucial factor in the engendering of creativity in a child. This role will be positive if the parents have an education, but otherwise it could be weak or even negative: “the family has an effective role in encouraging the creative student . . . especially if the family is educated; whereas, if the family is not educated their role will be less” (T16, para.53). Another teacher stated “the family is the base, if the student is creative, the family may encourage or discourage him, depending on the level of education. Anyway, (the home environment) has more influence than the school environment” (T1, para.3).

**TQ3.8** *Do you think that reflective students are normally creative thinkers?*

**TQ3.8 Response** This question encouraged teachers to reflect on their experience in the education field, especially in regard to the relationship between



creative thinking and the reflective/impulsive styles. All responses for this question can be divided into two main groups. The first group is represented by 93.3% of participants, including all the urban teachers. This group suggested that the student who has an reflective style is closer to being a creative person than another who has impulsive style. Most of the teachers in this group are from urban areas. One teacher from this group mentioned that “reflective students are creative in most cases, more than impulsive students, because students who are reflective are reflective when making decisions” (T 16, para.53). Another teacher suggested that “I think they may be (very) creative to the extent of perhaps 70 per cent” (T12 p.39). Group two is represented by 6.67% of participants. The teachers in this group suggested that reflective students are not creative in most cases. All teachers in this group represent rural areas. For example, one teacher from this group suggested that “the impulsive students are creative in most cases” (T 6, para.20). Another teacher says “I do not think the reflective students are creative” (T 10, para.29).

**TQ3.9** *Do creative students make errors in the test that require multiple attempts?*

**TQ3.9 Response** This question relates to TQ3.8. As previously noted, 28 respondents (93%) said that an error-prone student can be considered impulsive, “because creativity needs reflection when making decisions” (T11, para.37). Another teacher stated “the student who makes several errors in matching familiar figures test is impulsive in making decisions and the impulsive student is rarely creative” (T16, para.53). Similarly, the two other respondents viewed students who make successive errors “creative in most cases” (T7, para.22).

**TQ3.10** *Is there a relationship between students' creativity and an ability to make quick decisions?*

**TQ3.10 Response** This question probed the relationship between creative thinking and impulsive style. All responses for this question can be divided into two main groups. The first group is represented by 28 respondents (93%). The respondents in this group suggested that the creative student does not make quick decisions. Normally, he takes time before making a decision. Normally, the student takes time before making a decision, thus is closer to being reflective rather than impulsive in style. For example, one teacher suggested that “creative students need time to think before making decisions” (T 29 p. 94). Group two is represented by 2 respondents (6.67%). The people in this group suggested that there is a relationship between the creative student and the making of quick decisions. For example, one participant decided that “there is a high relationship between each other to the extent perhaps of 70%” (T10, para.29).

**TQ3.11** *Does the curriculum improve a student's creativity?*

**TQ3.11 Response** Just over half the participants (56%) including 13 urban and 7 rural teachers, considered the Ministry of Education's current curricula satisfactory in supporting creativity and that the curricular aims met the needs of the students:

they (educators) seek to improve students' creativity. The best evidence is the competitions that the students participate in, whether inside or outside Saudi Arabia. In addition, the school provides all requirements such as laboratories, materials and books in all fields (T27, para. 89).

Other respondents (37%) considered the current curricula needed to be updated; as structured, the curricula do not improve the level of students' creativity: "in this school we need (improved) resources for students" (T2, para.3). Another teacher stated: "the curricula in Saudi Arabia generally do not encourage creativity in students, but (actively) discourage the students' creativity. Therefore, the curricula need development" (T19, para.62). The majority of rural teachers (8) and two urban teachers were included in this group; thus the curricula are not adequate for rural students' needs. Arguably, this also indicates that the rural teachers are less experienced.

**TQ3.12** *Is motivation an important factor in creativity?*

**TQ3.12 Response** All respondents agreed that motivation plays an important role in enhancing students' creativity: For example, one teacher suggested that "motivation is (critical) . . . Without it, there is no creativity" (T4, para.10). Another teacher said that "yes, motivation is very important in improving creativity" (T24, para.78).

**TQ 3.13** *Do you believe creative thinking is important?*

**TQ3.13 Response** This question explores the extent to which teachers value creativity. Theoretical knowledge must be applied in the field to be useful; therefore if teachers are cognisant of creativity theory, they should be employing it in the classroom. All respondents to this question agree that creative thinking is important: "(it) is important, and we need innovation in education, where the creative teacher has a positive impact on students. Also, we need to innovate in medicine, where the creative doctor can develop creative solutions to an intractable disease" (T27, para.89). Another teacher said

(yes), creativity is important and we need it in certain areas such as education, medicine, and science. However, we do not need to innovate in the area of religion because it might conflict with the customs and values in this country (T28, para. 92).

**TQ3.14** *Which teaching methods may assist creativity?*

**TQ3.14 Response** The intention for this question was to explore the optimum teaching style with which to promote creativity. There were mixed responses for this question that can be divided into several groups. The first group of 10 teachers, 30 per cent, preferred cooperative learning (working in groups) to enhance creativity. For example, one participant suggested that “(cooperative) learning is the best teaching method. Cooperative learning encourages students to cultivate a spirit of cooperation. Also, it aids the creativity of students in solving educational problems which may arise while they are in school” (T 8, para.26). The second group represented 20 per cent of respondents (6 teachers). They considered that discussion was the most suitable method to improve creative thinking. For example, one teacher believed that

(the) discussion method is the best one to improve a student's creativity. Because when a teacher uses this method, it helps students get their ideas freely.

Therefore, students can solve any problems that face them. Also, this method reduces the phenomenon of fear and shame that may haunt some of the students, which is considered an obstacle to obtaining creative ideas from students (T 2, para.6).

In group three, 13 per cent of teachers (4) suggested that the experimental method was most advantageous, especially in scientific subjects (such as physics and

chemistry): “I think experimental methods are the best to use with students” (T9, para.28). The remainder, 30 per cent (10) of the teachers preferred different approaches, that is, diversity of styles, rather than relying on a single method for teaching: “every lesson should have a different teaching method” (T19, para.62).

**TQ3.15** *Is the age of a student important for creative thinking?*

**TQ3.15 Response** Three-quarters of the participants responded that age and creative thinking are linked: “creativity (appears at) a certain time. In this period either it has appeared (which is useful for the person) or it has not appeared” (T30, para.97). The view of the remainder was that there is no link between age and creative thinking: “there is no specific age at which the creativity appears” (T6, para.21). Another participant stated that

(creativity) starts with the individual from an early age, maturing in secondary school from the age of 14-18 years. Therefore, the secondary school stage is crucial to students. Their creative abilities will benefit from the encouragement of parents and schools (T17, para.32).

**TQ3.16** *What is the age at which creativity appears in students?*

**TQ3.16 Response** This question was unexpected and elicited different answers. The majority, 53 per cent (16 participants), expressed the opinion that creativity appeared usually during secondary school. For example, one teacher said “I think from 12 to 16 years. If creativity does not appear in this period, it will not appear. Therefore, parents should encourage and meet all their children’s needs at this stage to develop their creative capacities” (T17, para.57). Another teacher stated “I think the best age for

the appearance of creativity is from 12 to 18 years” (T16, para.54). The next group, 40 per cent of participants (12), considered creativity appeared at the primary school stage:

(if) there is a specific age, it may be from 6 to 15 years. Creativity appears in the student from the first grade. In this grade the student can identify his ability and the field that is interesting for him. Therefore, parents and teachers must encourage students to develop their abilities (T6, para.21).

The opinion of the other 7 per cent of respondents (2) was that creativity starts at the early childhood stage. For example, one participant asserted that

I think creativity starts from 2 years and continues to the end of life. Therefore, parents should be fostering their children at this stage by choosing appropriate games for their abilities, also, by providing educational programs that serve the interests of their children (T11, para.38).

**Summary of Teachers’ Responses to Q3** The following table (5.8) draws key themes from the teacher participants’ replies

Table 5.8

*Teacher participants: key themes*

Question 1 What does the 'creative thinking' mean in your opinions?		Question 2 To what extent does the school improve a student's creative thinking?		Question 3 Do you think that there is a relationship between creative thinking and reflective-impulsive dimension of the cognitive style? How?	
Key theme	No. of teachers	Key theme	No. of teachers	Key theme	No. of teachers
To have ability	2	Not fostering creativity.	11	Strongly related to reflective.	25
New ideas	25	Fostering creativity.	19	Strongly related to impulsive.	5
Problem solving	3	The school improves students' creativity theoretically.	1		
Student's intelligence to create.	1	Rural schools don't encourage creative students.	9		
		Urban schools work to develop the creative students.	14		

Question 4 Do you think that the impulsive student has a creative ability? Why?		Question 5 Do you think that the teacher's methods may enhance a student's creative thinking? If yes, to what extent?		Question 6 Do you agree that the cognitive style is essential for individuals? Why?	
Key theme	No. of teachers	Key theme	No. of teachers	Key theme	No. of teachers
Not related	21	When appropriate.	11	It's important	28
Related	9	Diversity is required.	19	Not important.	2
Creativity needs reflective style.	2	Teaching methods improve creative students.	15	Using ability in the right way.	1
				To use the appropriate method.	5
				To improve the level of creativity.	7

Table 5.8 continued

"Question 7 Do you think that the home environment may help to increase or decrease the level of students' creative thinking?"		Question 8 Do you think that the reflective students are normally creative thinkers?		Question 9 Do you think that students who make several errors and attempts are creative students?	
Key theme	No. of teachers	Key theme	No. of teachers	Key theme	No. of teachers
It has the main role.	29	In most cases.	27	Not creative.	25
School and family together.	1	No	3	Can be creative.	5
Family has stronger role than school	1	Impulsive students are creative.	1	Creativity needs reflective style.	5
Educated family has positive role in improving creativity.	17				
Family has positive or negative role in improving creativity.	1				
Question 10 Do you think that there is a relationship between a student's creativity and their ability to make quick decisions?		Question 11 Do you think that the curriculum improves a student's creativity?		Question 12 Do you think that motivation is important to improve a student's creative thinking?	
Key theme	No. of teachers	Key theme	No. of teachers	Key theme	No. of teachers
No related.	21	It does.	18	It's important.	29
Can be related.	9	It doesn't.	12	It Improves creativity.	1
Creativity needs reflective style.	11	Ministry of Education tries to improve creativity.	1	No creativity without motivation.	1
Impulsive students can't be creative.	2	Ministry of Education doesn't support creative students.	1		



Table 5.8 continued

Question 13 Do you believe creative thinking is important?		Question 14 Which teaching methods do you think may help to improve a student's creative thinking?		Question 15 Do you think the age of a student is important for creative thinking? Explain?		Question 16 In your opinion, what is the age at which creativity appears in students?	
Key theme	No. of teachers	Key theme	No. of teachers	Key theme	No. of teachers	Key theme	No. of teachers
It's important.	30	Debate method	20	It's important.	23	Primary stage.	14
We need it in all fields.	12	Practical method.	5	Age is not important.	7	Secondary stage.	16
		Various methods	5				
		Student preparation for lesson.	1				
		Searching for information.	1				

## **5.4 General Findings**

The qualitative analysis methodology as described in pp. 170-171 and recommended by Cohen et al. (2007), was used for this study. The preliminary analysis above drew key points from the data; these are now contextualised as areas of agreement and creativity factors where the groups differed. The supervisors were not asked to define creativity as their role differed from the other participants. These are discussed in turn.

### **5.4.1 Factors of Group Accord**

There are several themes derived from the data analysis from the three groups of education professionals where all or a majority of participants agree. These are definition, home environment, school environment, teachers, motivation, age, the link between creative thinking and reflective-impulsive style, the differences between rural and urban students in their academic standards, and the ability to think creatively.

#### **5.4.1.1 Definition of Creativity**

The principal and teacher groups only were asked to define creativity, as this question was inappropriate for supervisors. The two groups were in broad agreement in defining creativity. Ten principals (83%) and 25 teachers (83%) defined creativity as the production of new ideas that are useful and accepted by society. Other minority views were that the term referred to work skills innovation, to something new, and to find novel ways of solving day-to-day problems. In this case, they demonstrated a practical problem-solving response, rather than taking an artistic or leisure approach to creative thinking. There was no clear differentiation between rural or urban participants.

#### **5.4.1.2 The Home Environment**

Home environment plays an important role in encouraging students to be creative. A majority of participants from all three groups reported that the home environment with supportive parents is an important factor in encouraging children to be creative. Also, they confirmed that a parents' role is increasingly effective if the parents are more educated. In contrast, the parents' role will decrease if the parents are less educated, as many parents are in rural areas. For example, a teacher respondent said “(yes), family has a highly effective role in improving the student’s level of creativity. This role could be (crucial) if the family is educated. However, (it) will be lower if the family is not educated” (T14, para.43).

#### **5.4.1.3 The Teachers’ role**

The finding from the majority of all study participant groups was that a teacher’s role in eliciting creativity from children was crucial: “(the) teacher plays an important role in improving and encouraging the student's creativity to a great extent” (P8, para.67). However, the role of the teacher may vary depending on the teacher's experience and the school’s location. In rural schools the teachers' role may be less effective because they have insufficient experience to identify and nurture creativity in students:

(it) may be due to these reasons: Firstly, rural teachers have less career experience when compared with urban teachers. Secondly, rural teachers do not attend courses that are organised every year by Education Administration. These courses clarify the importance of creativity and how to deal with the creative

students. Thirdly, rural teachers are usually not settled permanently in the area (S5, para.111).

#### **5.4.1.4 The School Environment**

A majority of all three participant groups agreed that the school environment is an important factor in creativity. However, this factor varies according to location, as there are differences between rural and urban schools in their aim of fostering creativity in students. In rural schools where there are fewer resources, the school environment may be less effective; a teacher commented that this school is more interested in official working hours and routine than developing the student level of creativity. Therefore, the number of creative students in this school is low (T15, para.46). On the other hand, urban schools have more facilities; also the school encourages students to participate in Saudi and international creativity competitions. One supervisor suggested that “(the) school environment is important for enhancing the level of creativity for students. If the school is aware of the importance of creativity, then creativity will be (reflected in) the students’ (performance)” (S5, para.111).

Principals and teachers agreed that the school environment helps students to be creative:

(certainly), the school environment helps to improve (creativity in) students to a great extent. Also, the school has many activities that may improve the creative students. The best evidence is the numbers of students in the school who have participated in many international competitions based on creativity (P7, para.66).

A teacher (T16, para.52) pointed out that the school actively encouraged creativity in its students through the introduction of competition, which was used

between Saudi schools and internationally. The chance to enter a large competition engenders a sense of exploration in the students and assists them to become innovative

#### **5.4.1.5 Motivation**

Participants agreed motivation is an important factor in assisting a student's creative thinking. The majority of respondents from all groups agreed that student motivation is necessary and may affect the student's demonstrative creativity: "motivation is important because without it, a student does not (reach potential)" (T20, para.65). Respondents from principal and supervisor groups also commented on motivation as a criterion in creative performance.

#### **5.4.1.6 Age**

Although all respondents agreed that age is a factor in creativity, the learning stage at which creativity first appears differed among the respondents. However, a majority in all groups stated that creativity was first apparent in a child at the secondary school stage (between 13 to 20 years): "(the) student's age plays an important role in the development of the level of student creativity. The best age to foster creativity is from 15 to 21 years" (P5, para.49).

#### **5.4.1.7 Creativity Linked to Impulsive or Reflective Style**

This question was directed to supervisors and teachers, although a minority of principals offered their views on the factor. A strong majority of teachers (83%) viewed reflective style as a criterion of creative thinking as did 4 (80%) supervisors. A similar proportion of supervisors considered time as an element in creative outcomes, and time is a factor in the reflective style. Three (25%) principals also volunteered the opinion

that reflective style is an aspect of creativity. Thus supervisors and teachers were in accord, and three principals agreed.

### **5.4.2 Factors of Group Discord**

The results from the qualitative analysis show several key points on which the majorities from all three groups disagree: school performance and resources.

#### **5.4.2.1 School Performance**

In comparing urban and rural schools' relative performances in creativity, a minority of principals and all supervisors said that the rural schools lagged the performance of their urban counterparts. A supervisor explained that the rural society, family culture, and teacher attitude and experience impact a student's opportunity to display creativity (see S1, para102). Teachers were not asked directly for an opinion, as they did not have this overview. Nevertheless, a minority of teachers viewed rural schools as less supportive of creativity, and a larger minority said that urban schools were better at encouraging students to be creative (TQ3.2).

#### **5.4.2.2 Resources**

There was only one direct question regarding school facilities which was directed at principals. Half of this group considered that the school facilities that could encourage creative thinking for rural students were inadequate. Again, half considered urban schools' resources superior. Although not directly questioned, two (40%) supervisors said that urban schools had superior resources to aid students' creativity. Although the responses are not conclusive, a finding from this study is that rural resources to promote student creativity are inadequate.

## **5.5 Discussion**

This section addresses the findings obtained from the supervisor, principal, and teacher interviews. There are several themes derived from the data analysis which are, home environment, school environment, motivation, age, and impulsive-reflective-style. These are discussed in turn.

### **5.5.1 The Home Environment**

The descriptive findings of this study can be found in sub question four in the supervisors' section, question six in the principals' section, and question seven in the teachers' section with regard to their attitudes toward the parents' role and the creativity level of their children. The result showed that all participants agreed parents have the main role in developing their children's creativity. This role is different depending on their level of education and their location. Therefore, the responses of the participants for this sub question are divided into two groups.

The first group suggested that the relationship between parents and creativity level of their children is negative. Many participants in this group agreed that parent's role is negative in regard to developing the creativity level of their children because they are less educated. One participant believed that there are differences between parents in regard to fostering creative thinking in their children. Therefore, the family influence may wane, or may become negative in encouraging creativity in a child if the parents are less educated, as many parents are in rural areas. The finding of the first group is supported by previous studies (Al-Aqeel, 2005; Parker, Boak, Griffin, Ripple, & Peay, 1999). The researchers suggested that parents who are less educated may be less capable of providing a broad framework of opportunities for their children in regard to the

development of their level of creativity. Also, increased parental control can negatively affect children's abilities in the classroom, and decrease their independence and creativity (Al-Aqeel, 2005; Parker et al., 1999). Al-Enezi (2003) indicated that many rural parents are illiterate, so their children present with less creative abilities, and lower academic achievement. Also, McCracken and Barcinas (1991) and Preston (2006) believed that because parents in rural areas are less educated their children show lower levels of academic achievement when compared with those in urban areas.

In contrast, the participants in the second group suggested that the relationship between parents and the creativity level of their children is positive, because they are educated, especially those who live in urban settings. This is because the surrounding environment and the facilities in urban areas encourage parents to be educated. For example, one participant believes that the role of parents will be positive in regard to increasing their children's level creativity if parents are educated (S4 6.4). Also, one teacher adds that the family had a highly influential role in encouraging the creative student, especially if all members of the family were educated. Furthermore, one principal noted differences between parents in rural and urban areas with regard to their level of education, favouring the urban parents. These findings are in alignment with previous studies (e.g., Feurestein, 2000; John-Steiner, 1997; Pena, 2000; Snowden & Christian, 1999; Whitelaw, 2006), that parents influence the creativity level of their children.

Al-Aqeel (2005) demonstrates that parents in rural areas are less educated, so that may negatively affect the academic level of their children. Also, the school administrators observed that the rural parents show less parental cooperation with school in regard to children's progress (Al-Zaid, 1990). In contrast, most parents in



urban areas of Saudi Arabia are educated, so their children typically evidence greater creative abilities and academic achievement, because the surrounding environment and facilities may have positively affected their children (Hamed et al., 2007). Thus, a higher standard of parent education has a positive influence in fostering student creativity.

### **5.5.2 The School Environment**

The result of responses for sub question three in the supervisor section, sub question five in the principal section, and sub question two in the teacher section showed that the school environment is important to a student's creative maturity. However, there are differences between rural and urban schools in regard to fostering creative students. With inadequate resources and less teacher experience with creativity, rural schools are less effective in enhancing the student experience. One participant detailed a critical element of the important role that the school plays in increasing the level of student's creativity. The school's role will only be effective if the teachers and administrators in the school understand the meaning of creativity (S3. s.5.3.1). Also, another participant suggested that schools, especially in urban areas, are playing an important role in regard to improving the creativity level of students. The best evidence for that is that many students participate in many competitions for creativity both within and outside Saudi Arabia (P 7 6.3). This finding supports research into differences between rural and urban schools in regard to enhancing the creativity level of students. Previous studies (Crompton 2001; Reisman et al., 2002; Runco & Johnson, 2002; and Scott 1999) support the contention that the school environment plays an important role in enhancing the student's creative thinking. In researching the development of

creativity, Fleith (2000) demonstrates that there were several previous studies which suggested that the school environment (e.g., socioeconomic level and classroom differences in similar socioeconomic level schools) significantly affected a student's performance in regard to creativity. Also, Fleith mentioned that the school environment either enhanced or inhibited creativity. If the school understands the value of creativity, accepts all the different ideas of students, and focuses on the student's strengths, this environment would enhance students' creativity, whereas if the school focuses solely on the curriculum, ignores all students' ideas, and provides little or no school activities, then this environment is not suitable for enhancing students' creativity.

Furthermore, the finding is that the teacher can influence creative thinking; however, the role of the teacher varies depending on the teacher's experience and the school's location. In rural schools the teachers' role may be less effective through insufficient experience in identifying and fostering creativity. One participant mentioned that if the teacher understands the value of creativity and has an interest in it, he will play an important role in regard to improving the students' level of creativity (P 5 6.3). These findings concur with the research concerning the teacher's effectiveness in enhancing creativity (Fleith, 2000; Runco & Johnson, 2002; Sternberg 2003). Teachers who have experience and knowledge of creative thinking may contribute to increasing students' academic achievement and encouraging creativity (Sternberg, 2003).

The number of students in Saudi Arabia has increased rapidly in the past two decades and that may be the cause of overcrowded schools. The increases in student numbers may have exceeded the expectations of the Ministry of Education plan and this may negatively affect learning outcomes (Al-Aqeel, 2005; Al-Issa, 2005). Therefore,

teachers in these schools have not had sufficient time to improve and foster the creativity of their students. However, to solve this problem the Ministry of Education, represented by the Department of Education in all regions in Saudi Arabia, rented many buildings and turned all of them into schools.

In addition, the rented schools, especially in rural areas, have less infrastructure, have inadequate teaching material, unsanitary conditions, poor attention standards and below standard teacher experience. Attention standards were measured through attendances. Therefore, the opportunities to encourage and improve the creativity level of students in these schools, especially in rural areas, are very limited. Also, the academic achievements of the students in these schools are lower in most cases (Al-Zeiber, 2000).

Previous studies, conducted in urban schools, show consistency with this study's urban school findings. However, this study concerns rural schools as well, and the findings are that rural schools in Saudi Arabia have fewer resources than their urban counterparts and their teachers are less experienced. This situation may be exacerbated by the practice of the Makkah Education Department that generally transfers to rural schools teachers who have less than optimal results in their performance criteria. Therefore, fostering creative thinking in students in rural schools is more difficult than in urban schools. This result is confirmed by other studies, for example, Hongli and Yulin (2006), and Shutiva (1991) whose findings are that urban students are more creative than those in rural schools. Hongli and Yulin (2006) studied the differences between rural and urban students at the high school stage in regard to cognitive style (dependence and independence fields) and creativity. The results showed that the field

independence students were scores higher than the field dependence students with regard to creativity. Also, there were differences between the rural and urban students in regard to creativity abilities, favouring the urban students.

### **5.5.3 The Motivation of Students**

Motivation is crucial to creative thinking in students, to the extent that creativity is unlikely to emerge otherwise. This research sub question examined participants' impressions from all three groups in regard to the relationship between motivation and student's creative thinking. The interviews began with this researcher asking the participants about the relationship between motivation and creative thinking. All participants agreed that motivation (intrinsic and extrinsic) is important for students and, without it, the student can not be creative. The finding was a unanimous agreement from the study participants and accords with extant research that there is a positive relationship between intrinsic motivation and creative thinking (Eisenberger & Rhoades, 2001; Fan & Zhang, 2009; Hennessey 2003; Mumford, et al., 2002).

However, the result of the current study is compatible with several studies (Choi, 2004; Prabhu et al., 2008) that find both intrinsic and extrinsic motivation support increase in level of creativity. Mumford et al. (2002) add that extrinsic motivation may have a positive effect on the students' creativity. In contrast, a few studies (e.g., Amabile and Conti, 1997) suggested that only intrinsic motivation is related to creativity, while extrinsic motivation is not related to creativity.

### **5.5.4 The relationship between Age and Creative Thinking**

This research sub-question asked all participants about the relationship between age and students' creative thinking and what is the best age at which creativity appears

in students. All participants in this study agreed that the student's age plays an important role in regard to the improvement of creative thinking. In regard to the best age at which creativity appears in students, there was some discussion on that. The age related responses of all participants in the current study are divided into two groups.

The first group which represented a few number of participants suggested that creative thinking appears at preschool age. This finding aligns with the Gardner (1982) study. The author suggested that the ability to be creative started at an early age in an individual (pre school stage). However, the second group which represented most participants believed that the creativity ability appears at secondary school stage. This finding is similar to the results of several studies (Kiehn, 2003; Ponomarev, 2008; Runco, 1999). Also, Claxton et al. (2005) states that creative thinking in individuals gradually increases until a peak at about 16 years of age. The Claxton et al. (2005) finding indicates that the optimal creativity for individuals is at the secondary school level, which supports the focus of this study on students in this school category. Specifically, students from grade 10 (15-17 years) participated in the current study (chapter 5). In addition, Cropley (2001) studied the relationship between age and intellectual performance, finding that intellectual performance increases rapidly and peaks in early adulthood which means at secondary school stage (see Figure 2.4).

#### **5.5.5 The relationship between Reflective-Impulsive Style and Creative Thinking**

This research sub question asked all participants about the relationship between creative thinking and reflective-impulsive style for students. Participants were generally in accord that creativity is linked to reflective style. This finding stems from direct

answers and the supporting statement that a person who is creative needs time to decide (reflective). Nevertheless, responses were mixed, with a minority view that the impulsive student has more ability than the reflective student in regard to creativity. The majority support the research that reflective students are more creative, for example, Al Soulami (2004), Frare (1986), Fuqua et al. (1975) and Olaseinde (1994). Al Soulami (2004) finds that students who are classified as reflective in their style usually score higher in the creative thinking tasks of the TTCT, and students who are classified as impulsive usually scored lower. In addition, the study shows a negative relationship between errors in the MFFT and the majority of creative thinking abilities. In regard to the relationship between errors and time to respond, many researchers (Buela-Casal et al., 2003; Frare, 1986) found in their studies there was a negative relationship between errors and latency (response) in the MFFT.

## **5.6 Summary**

This chapter presents the qualitative methodology, its selection, application, data collection and analysis. The results are first outlined and then discussed. This study can be summarised in five key findings: first, that the home and school environments are crucial factors in developing creative abilities in students (Cropley, 2001; Feurestein, 2000; Pena, 2000; Runco & Johnson, 2002; Whitlaw, 2006). Importantly, the effects of these key findings relate to higher creativity of students in urban areas, while in rural areas they engender less creative development (Al-Enezi, 2003).

The third finding is that motivation is necessary to improve creative thinking in students. Choi (2004), Fan and Zhang (2009), and Prabhu et al. (2008) find a strong relationship between motivation and creative thinking. Following that, age is a factor in

creativity. Creativity increases with age and the optimum years are between 13 and 18 years. Several studies (Claxton et al., 2005; Kiehn, 2003; Ponomarev, 2008) find that creative thinking firms with age and peaks around 16 years.

The final key point relates to creative thinking and the reflective dimension of cognitive style. There is a finding of a strong relationship between creative thinking and reflective style; however, there is a weak linkage between impulsive style and creativity. Al Soulami (2004), Fuqua et al. (1975), and Olaseind (1994) positively relate creativity with reflective style, while the relationship with impulsivity is weak.

The findings and discussion in this chapter draw the conclusion that the urban environment (home and school) have a greater positive effect on student's creativity than the rural environment. Greater maturity and motivation are factors that influence creative thinking in school children. In addition, reflective individuals are found to be more creative than their impulsive peers. The next chapter discusses these findings, observations and outcomes from the research questions through the theoretical and empirical dimensions of the thesis title.

## **CHAPTER 6: GENERAL DISCUSSION**

### **6.1 Introduction**

The focus of this thesis is a comparison of creative thinking and cognitive style (reflective–impulsive) in a sample of grade 10 male students in rural and urban Saudi Arabia. The proposed research goal was to examine the influences of the rural and urban environments on the creativity of these students. The first part of the study involved quantitative data collection. This phase was designed to determine the creativity scores of students using the TTCT figure B, and the MFFT reflective-impulsive test. The second part of the research adopted a qualitative methodology and sought to determine the views of educators including principals, supervisors, and teachers, regarding the nature of creativity in relation to their students and schools. Factors that the respondents envisaged as impinging on the level of creativity and the reflective-impulsive test results were also considered.

The discussion in this chapter concerns the findings of the two data collection approaches, and the interpretation of these in relation to existing research and literature concerning creative thinking and cognitive style. From examination and analysis of the findings, conclusions can be drawn to address the research questions which may lead to recommendations to facilitate positive change within the Saudi Education system.

The first part of this chapter describes the research designs selected for this thesis, followed by a discussion of the key quantitative and qualitative findings regarding the different characteristics of creative thinking and reflective-impulsive style of the students. The second section of this chapter considers the relationships between



the findings and establishing connections between creative thinking and the reflective-impulsive style for the study participants and consideration of the factors which impact on creative thinking, primarily in rural students.

## **6.2 Research Overview**

This section discusses the purpose of the study in relation to the research questions. This is followed by an interpretation of the findings from this research.

### **6.2.1 Research Methodology**

The appropriate methodology for this research was determined by considering the creativity research literature regarding data collection and analysis. As noted throughout the thesis, the primary data collection is derived through administering two tests. First, the TTCT Thinking-Figural, Form B which measures the standardised scores of five ability areas: fluency, originality, abstractness of titles, elaboration, and resistance to closure, and which also provides a creative strengths index score. The second test is the MFFT-20, which classified the students according to the number of errors and the latency (initial response) for each test item into four selective categories: reflective, impulsive, slow/accurate, and fast/accurate. As noted, the analysis consisted of applying descriptive statistics using the means and standard deviations of the TTCT creative thinking subscales, and the creativity index, in each of four categories of the MFFT (reflective, impulsive, slow/accurate, fast/accurate) for both the rural and urban participants. Inferential statistics were then used to test the hypotheses relevant to the research questions.

A key objective for this study was to consider the results within the context of previous research and thus support the comparability of the findings, and to build on relevant existing information regarding creative thinking. The purpose of research design, according to McMillan and Schumacher (2001), is to present valid, accurate results to answer the research questions. Data obtained for research may be examined using qualitative analysis, quantitative analysis, or a combination of both. Qualitative research often relies on interpretive or critical social science, while quantitative research relies on a positivist approach to social science (Neuman, 2006).

Both quantitative and qualitative data analyses have their advantages and disadvantages; Ackroyd and Hughes (1992) find neither markedly superior. The quantitative method measures responses to a limited set of questions from many participants, thereby facilitating comparison and statistical data analysis. A broad set of findings can be presented succinctly and achieve higher levels of reliability, minimising subjectivity and clearly identifying the variables under investigation. However, the quantitative method has disadvantages, including an inability to provide the researcher with information on the context of the situation for the phenomenon under study (Blanche, Durrheim, & Painter, 2008). The advantages of the qualitative method include flexibility in data collection, analysis and interpretation; the ability to informally engage with the study participants in their own language and on their own terms, thus extending comprehension of the data than would otherwise be available (Patton, 2002). Again, qualitative research is criticised through its personal and contextual nature which means standards of validity and reliability cannot be applied; there may be lack of anonymity in collecting data and bias may occur; further, it is time-consuming (Babbie, 2007). In a

case such as the Saudi culture, influences such as the gender and ethnicity of researchers can also impact on answers by interviewees.

### **6.2.2 Quantitative Research Findings**

The quantitative data collection and analysis involved 120 male students from three rural schools and 120 male students from three urban schools to determine the differences between rural and urban students in regard to creative thinking and reflective-impulsive style. The TTCT Figure Form B and the MFFT were completed by the participant students to facilitate the examination of differences between the TTCT characteristics (fluency, originality, elaboration, abstractness of title, and resistance to closure) and the MFFT status in different school regions (rural and urban areas). Following analysis, the results showed that there were differences in creative thinking between rural and urban students. The scores of the TTCT characteristics for the students in urban schools were significantly higher than those from rural schools (see s.4.6.1). In addition, there were significant differences between the MFFT status in rural and urban schools, with urban participants more reflective and fast-accurate than the students from the rural schools, who were more impulsive than their urban counterparts (see s.4.6.2).

Further analysis showed that there were relationships between the TTCT characteristics (originality, elaboration, and abstractness of title) and the MFFT status (reflective, impulsive, and fast-accurate) (see s.4.6). The TTCT characteristics were higher for the reflective and fast-accurate students in the urban schools when compared with the rural, more impulsive participants. However, differences were not significant between the MFFT status and the TTCT categories of fluency and resistance to closure

for the reflective and fast-accurate students in urban schools, and for their more impulsive rural counterparts. There were no differences between the scores for resistance to closure and the MFFT status.

***MFFT Status and TTCT Scores.*** Overall, there were differences in creative abilities (creativity index) between the MFFT status and the schools' location. The results showed that reflective, impulsive and fast-accurate students in urban schools scored higher in the creativity index than those in rural schools. Thus, students in urban schools were found to be more creative than those in rural schools.

The second part of the research sub-question sought to examine the differences in the TTCT characteristics between the individual schools. The results established significant statistical differences between TTCT characteristics and the individual schools, showing that fluency scores were significantly different in all schools except those in school 3 (rural) and school 5 (urban), which were not significant (see Table 4.8). The elaboration scores showed significant differences in all schools except school 3, which was not significant. The results for resistance to closure were significantly different in all schools except for school 6 (urban), which was not significant. The TTCT categories of originality and abstractness of title showed significant differences for all schools. Significant differences in the creativity index between the schools occurred, with the results for school 4 (urban) higher than other schools.

The TTCT subscales of fluency and originality in regard to students in rural and urban schools were noted. The MFFT factors of reflective, impulsive, and fast-accurate categories, when assessed against the TTCT subscales, show that the urban students had higher scores in fluency compared to the rural group. In this instance, fluency indicates

an ability to produce a number of figural images. In this study, the reflective category of students in both the rural and urban locations demonstrated higher scores in fluency. For the urban group, the fast-accurate students achieved only marginally lower fluency scores, whereas for the rural sector, scored lower than the impulsive category.

Whilst reflective students from both the urban and rural sectors gained the highest fluency scores, there were also a greater number of reflective urban students than rural participants. The relationship of reflectivity and creativity then influences the outcome. This conforms to findings linking reflective style and creativity from Dharmangadan (1981), Hongli and Yulin (2006), Sharma (2005), and Shutiva (1991).

The means for the TTCT subscale of originality for each of the MFFT categories (see Table 4.3) were significantly different between the rural and urban students. Originality concerns the number of statistically infrequent ideas and shows an ability to produce uncommon or unique responses. The means of the urban students' MFFT reflective, impulsive, and fast-accurate categories were higher in originality compared to the rural group. All reflective students scored higher in originality; however, students in the impulsive and fast-accurate categories in urban schools scored higher in originality than those in the rural schools.

As noted, the TCCT and MFFT results showed significant differences between rural and urban student participants. This pattern of differences was also highlighted in the educator interviews, and also confirms previous extant research in this regard as described by Lee (2008). The following section considers the qualitative research findings.

### 6.2.3 Qualitative Research Findings

The qualitative research involved data gathered from semi-structured interviews with the study's male participants: 30 teachers (15 teachers each from rural and urban schools), 12 principals (6 rural principals and 6 urban principals), and five supervisors from the Makkah Department of Education. The first question asked for a definition of the term creative thinking; the majority of participants (10 principals and 25 teachers) defined creativity as the production of new ideas that are useful for society; and a minority stated that the term referred to the creation of novel ways to solving the problems that people face in normal life. The findings for home environment, school environment, motivation, and age are discussed in turn.

**Home Environment.** The majority of participants agreed that home environment plays an important role in improving students' creativity; that parents who have a higher level of education, such as those in an urban environment, may positively affect their children's creativity, while the parents' role may decrease in rural areas where there are less facilities and thus less chance of the parents having attended secondary schools or higher education.

**School Environment.** The majority of participants concurred that the school environment is important in encouraging students' creativity. The majority of participants, including a high proportion of urban education professionals, considered that the school environment has an effect on students' creative thinking, based on the school administration's attitude toward creativity, and the facilities which support and encourage the creative students. These aspects were evident in the urban schools more than the rural schools; therefore, the school environment in rural areas was considered

to be less effective in improving students' creativity (cf. Reisman et al., 2002; Runco & Johnson, 2002; Scott, 1999). In addition, the role of the teacher in students' creativity was considered important by the majority of participants in all of the interviewed groups (teachers, principals, and supervisors). However, creative thinking was reported by the respondents to be influenced by teacher experience, and the greater number of participants were of the opinion that teachers with less experience in the school system were less effective (see s.5.5.2, cf. Fleith, 2000; Runco & Johnson, 2002; Sternberg, 2003).

**Motivation.** An individual's motivation is also important in determining creativity. The majority of participants believed that motivation both intrinsic and extrinsic, is necessary to improve the creative thinking of students. Some education professionals reported that extrinsic motivation such as reward plays an important role in enhancing the creative abilities of students. It was suggested that teachers should use a reward to improve motivation of students to support the students' creative thinking (see s.5.5.3; cf. Eisenberger & Rhoades, 2001; Fan & Zhang, 2009; Hennessey, 2003; Mumford et al., 2002). Given this well-supported theory, Albaili (2003) studied motivation in United Arab Emirates in similarly-aged male students as in this study. The researcher used motivational goal orientations such as effort, task, competition, feedback, social concern, and social dependency for students described as 'achievers' and 'non-achievers'. The findings are that the gifted group are significantly different from the other group for the variables of effort, task and competition. These variables may be considered as intrinsic motivation which may be engendered moreso in urban Saudi students with their superior resources than for their rural counterparts. In this case, improved resources may be advantageous for rural students' creativity.

**Age.** Participants were asked for their views on the relationship between age and creativity. All participant groups agreed that there is an age range at which a student's creativity appears. However, the participant responses can be divided into two distinct areas: the majority of educator respondents believed that creativity appears in students at secondary school stage that is between 13-20 years of age, whilst the minority group were of the opinion that creativity appears earlier.

#### **6.2.4 Summary**

The initial part of this section briefly summarises the findings from Chapter 4, Quantitative Analysis of Student Creativity, and Chapter 5, Qualitative Analysis of Student Creativity. First, the methodology selected for this study was determined as a quantitative research design due to the use of the TTCT and MFFT in data collection and the consequential descriptive and inferential statistical analysis. Second, the methodology included supporting qualitative research in the form of semi-structured interviews with relevant education professionals to determine their responses to a series of matters based on the research questions. The interpretation of the quantitative analysis was thus informed by the expert opinions of these education professionals.

The main quantitative findings are that differences in creative thinking occur between rural and urban students. The TTCT scores of selected characteristics in the participant students from the urban schools were significantly higher, and the MFFT results showed that the urban participants were more reflective and fast-accurate than the students from rural schools. Relationships were found between the TTCT characteristics (originality, elaboration, and abstractness of title) and the MFFT status (reflective, impulsive, and fast-accurate), and the TTCT characteristics were higher for



the reflective and fast-accurate students in the urban schools. Urban, reflective students also scored higher in the creativity index. Thus the students in the urban schools were found in this study to score higher in creativity than those in the rural schools.

Significant differences were found in the TTCT categories of fluency, an exception being schools 3 and 5; elaboration except for school 3; resistance to closure except for school 6, and in all cases for originality and abstractness of title. Whilst all schools showed significant differences in the creativity index, school 4 was highest.

In the qualitative analysis, the key finding for this study is that the respondents reported that the school environment is important in encouraging students' creative thinking, and that this is more evident in the urban schools. The rural school environment appears less prepared to facilitate students' creativity. Teachers were also considered to be important contributors to the stimulation of creativity in their students; however, this may be influenced by their length of service and teaching experience. In relation to the onset of creative thinking, the finding from the respondents is that creativity emerges between 13 to 20 years of age. The age of students in this current study (15-17 years) is representative of this range. Also, creative thinking is encouraged by intrinsic and extrinsic motivation. Finally, the home environment plays an important role in encouraging creativity; and that the level of parents' education is a variable to be considered as an influence on creative thinking.

The conclusion of this study is that the participating students in the urban schools demonstrated higher levels of creativity than those participating in the rural schools, and this is considered to be an outcome resulting from their experiences in school and their social environment.

### **6.3 Creative Thinking in Saudi Students**

The second section of this chapter concerns the comparison of the present findings to the existing literature and research in the area of children's creative thinking. The research in this study identified factors influencing creative thinking in male students in rural and urban schools in Makkah. This section discusses international perspectives and ways of identifying and fostering creative thinking, aspects of creative thinking in different cultures, and creative thinking at different developmental stages of learning. These perspectives are considered in relation to the findings of the current research.

#### **6.3.1 Fostering Creative Thinking**

Fostering creative thinking of students is an important step toward developing students' abilities and increasing the level of a country's economic prosperity (Cropley, 2001; Kim et al., 2009). In addition, Sternberg (2001) suggested that fostering creative thinking is more important than enhancing intelligence. Huang (2005) analysed several empirical studies in creative thinking, concluding that fostering creativity in students is beneficial in the further development of the characteristics of creativity. Pleschová (2007) concurs, reporting that the teacher, if fully aware of the importance of creativity in students, will be a positive influence in enhancing creative thinking. In Makkah, Al-Enezi (2003) agrees with this view of the teacher's role; however, the researcher finds that Saudi teachers are not necessarily developing creativity in the classroom. This is the case in rural schools in Saudi Arabia due to issues including lack of resources and the experience levels of teachers. The focus on creative thinking in these schools is limited.

Analysis of the interview data from this study indicates that the opinions of the educator participants are generally aligned with previous findings (e.g., Runco & Johnson, 2002; Sternberg, 2003). The results confirm that the teacher has an important role in fostering the creative thinking of students. Also, the findings of this study are consistent with other researchers (e.g., Al-Enezi, 2003; Lee & Seo, 2006) who find that the teacher's role varies depending on the schools' location and the teacher's experience, thus the teacher's role could therefore be positive or negative in fostering creative students. The current results show that the students in the urban schools scored higher in their creative thinking abilities than those in the rural schools and this is consistent with similar studies (e.g., Hongli & Yulin, 2006; Sharma, 2005) which report that teachers who foster the creative thinking of their students can be successful in improving their students' creative achievements.

The conclusion of this study is therefore that the focus on creative thinking in Saudi schools is limited in rural areas, when compared to the greater awareness and enhanced environments that Saudi urban students experience. Further, the teacher's influence is paramount with regard to fostering creative thinking in students.

### **6.3.2 Theorists on Creative Thinking**

The concepts associated with creative thinking differ between researchers and cultures. These varying approaches and outcomes are explored in this section. Four of the major theorists are examined in light of the findings from this research, Sternberg, Torrance, Cropley, and Kim. Their approaches and models are discussed below.

**Sternberg.** Creative thinking is the process by which knowledge is applied by the individual (Sternberg, 2000). This process is observed from divergent, not

convergent, thinking (Sternberg, 2006a). Sternberg (2003) observes that creative thinking in students should be encouraged in all its forms, including the use of rewards by the teacher. The current research utilises creative thinking concepts. Several studies (Dietrich, 2007; Ward, 2007) suggest that divergent thinking is not synonymous with creative thinking; however Bao, Hua, and Zhang (2007) report that divergent thinking plays an important role in improving the creative thinking of students. Kim (2008) prefers the use of the Torrance tests to the divergent thinking tests. However, to predict the creative achievement of students it is better to (In addition, this study finds from the responses of the educator participants, that encouragement and reward for creative students is important, again consistent with Sternberg's view. However, the encouragement and reward structures differed between the participating urban and rural schools. The conclusion for this study drawn from using Sternberg's approach is that urban students respond to the nurturing of creative thinking, as confirmed by their TTCT results which were higher than for the rural students who do not get the same level of encouragement.

***Torrance.*** Creative thinking is important throughout life, exemplified by academic achievement (Torrance, 1965). Torrance (1981, 1994) suggests that the teacher plays an important role in the creative thinking of students; however, this role may be positive or negative. Torrance used a specific test to measure the creative thinking of students (Kim, 2006). However, the main goal of Torrance's tests was to encourage and support the individuals that they may express their creative abilities; consequently the TTCT is a worthwhile strategy to enhance the creative thinking of individuals. If a person gets high degree in the TTCT, it does not infer that the person is creative (Kim, 2006, 2008). According to the results of the TTCT, Torrance (2000)

reports that the TTCT is considered a better test to predict the creative achievement than the IQ intelligence test measures. Also, Kim (2008) adds that the TTCT is better than the divergent thinking tests in regard to predicting the creative achievement of students. Torrance (1979) and Kim (2008) report that a clear idea of an individual's creativity is given by performance across all TTCT characteristics. The current study used the Torrance test figure form B. The results show that the students in urban schools scored higher in the TTCT subscales than the students in the rural schools. In addition, the qualitative analysis revealed that all educator participants agreed that the teacher is an important factor in the development of creative thinking in their students. The conclusion is that Torrance's model for this study is in line with extant research.

**Cropley.** Cropley (2001) is an advocate for creative thinking where the constant changes in the global community require new innovative ideas in line with the developments of the era. Fostering creative students is therefore an important goal in education to encourage the development of creative abilities in children, as creative thinking appears to peak in early adulthood (secondary school). Considering the school environment, Cropley (2001) asserts that "The fostering of creativity in the classroom is part of educational efforts aimed at the development of individuals capable of maximizing their own self-fulfilment" (p.136). Also, the teacher plays an important role to encourage the creative thinking of students if the teacher understands the value of creativity (Cropley, 2006b). Furthermore, it is important for the teacher to give students extrinsic motivation in order to encourage their creative abilities (Cropley & Cropley, 2008). This study's qualitative findings highlight that creative thinking should be encouraged in all students; it also shows that teachers in the participant urban schools encourage their creative students more than the rural teachers. The study highlights too

that motivation plays an important role in stimulating the creative thinking in students. The quantitative results also demonstrate that the students in the urban schools scored higher in their creative thinking tests than students in rural schools. The findings of this study thus align with Cropley's views that focus on students at the secondary school stage. The conclusion of this study is therefore that Cropley's theses are supported.

**Kim.** The creative thinking tests are important not only to identify the creative students, but also to encourage and support individuals to be creative in all fields of life (Kim, 2006). However, there are specific stages at which creativity appears. Kim (2008) reports that there is a period of time, approximately between eleven to fifteen years at which creativity and divergent thinking is stronger than at any stage before or after. On the other hand, the teacher in the school environment can play an important role in encouraging or discouraging the creative thinking of students. Kim, Lee, & Seo (2005) suggest that there are differences between teachers in regard to understanding creative thinking. Teachers who thoroughly understand the value of creativity may encourage and support the creative attributes of their students rather than ignore them, by enriching the surrounding environment. This current study focuses on students at the secondary school stage (15-17 years) and is aligned with Kim's views. The qualitative findings, also consistent with Kim's view, highlight that teachers and a suitable environment for creativity play an important role in encouraging the creative students.

### **6.3.3 Cultural Influences on Creative Thinking**

Individuals express ideas and art, for example, as aspects of their culture; thus culture has a substantial impact on creative thinking in students (Fielding, 1997; Sternberg & Lubart, 2000; Yue & Rudowicz, 2002). Several studies, including that of

Kharkhurin and Samadpour Motalleebi (2008), suggest that the concept of creative thinking differs between cultures. Rudowicz et al. (1995) studied creative thinking across cultures, finding that the creative abilities of students differ between cultures, and as the main differences were in originality and fluency; culture has an effect on creative thinking. Nevertheless, Al-Suleiman (2009) cautions against adopting findings from cross-cultural studies, claiming that

the differences in creative abilities between these cultures may not only be related to developed or undeveloped countries but related to the cultural values, customs, motivation, and other systems involved in that society. Thus, applying tests of creative abilities to various cultures (even with high validity results) without studying the exotic culture, values, literature, and beliefs, and consideration of these factors in each culture, would result in bias (p.81).

This current research was conducted with Saudi rural students who represent the Bedouin and urban students who are multi-cultural, and depicted as urbanites. The findings are that the urban students' achievements in creative thinking are higher than the Bedouin students. In the interviews, the educator participants confirmed that culture and environment play an important role in enhancing the creative thinking of their students. The findings of the current study are consistent with several other aligned studies (Kharkhurin & Samadpour Motalleebi, 2008; Hongli & Yulin, 2006; Rudowicz et al., 1995) that country and culture have an effect on the creative thinking in students. Further, Niu and Sternberg (2002) note that theories of creativity suggest that many Asians (and, arguably, Western Asian and Arab cultures) have similar but not identical concepts of creativity to European-based cultures. Cross-cultural studies of creativity

show differences in their divergent-thinking performance and creative expressions. The authors contend that a view of creativity is relatively culture-specific. The conclusion is therefore that there are urban-rural dimensions of Arab culture inherent in the Kingdom; the lesser resourced rural socio-economic environment produces inferior educational infrastructures and educational experiences, and this militates against freedom of creative expression.

Counterbalancing this lack of opportunity for rural students could be the rich artistic traditions of Bedouin society and greater conservatism regarding the pace of change in the Kingdom. As an example of this view, Rudowicz (2003) discusses attitudes towards creativity and values attached to creativity: “creative expression is a universal human phenomenon that is firmly grounded in culture and has its own profound impact on culture itself” (p.273). In noting that culture permeates educational goals and practices, Rudowicz (ibid.) foreshadows this study, where the skills and knowledge of teachers and their supervisors may be insufficient to counter a strong social cultural bias regarding creativity in rural students, especially if it can be classified as divergent thinking.

These effects could be related to the attitude of rural school administrations and teachers concerning their encouragement of the creative thinking processes in their students.

#### **6.3.4 The Influence of Age on Creative Thinking**

The studies on the onset of creative thinking in individuals can be divided into two groups: that the phenomenon appears at preschool stage (Gardner, 1982); and that it increases with age and the peak of creative thinking of individuals is around 16 years



(secondary school stage) (Claxton et al., 2005; Cropley, 2001). The current study involves students at secondary school stage. The results show that these students scored higher in the TTCT when compared with Nokali (2004) who conducted the TTCT on students in primary schools. The educator participant in the current study also highlighted that the age of the student plays an important role in creative thinking. However, the majority of educator participants believed that the peak of creativity is at the secondary school stage. The conclusion for this research is that the creative thinking level in young individuals rises with age until at least adulthood. This evidence is consistent with Cropley (2001) and Reed (2005) who report that creative thinking in children peaked over time, due to the fact that the knowledge and experience of individuals in regard to creative thinking increases with age among children and adolescents.

This section discussed this research within the context of the theories of Sternberg, Torrance, and Cropley. The conclusions are that both quantitative and qualitative outcomes of this study support Sternberg's approach that urban students respond to strategies that nurture their creative thinking abilities; that Torrance's model for this study is in line with extant research; and that Cropley's theses on fostering creative students and the age at which creativity peaks are both sustained. Further, the main research question posits that rural Bedouin students are at a cultural disadvantage to urbanites. A conclusion of this study is therefore that there are cultural effects which impact the creative thinking processes in rural students. Finally, in line with previous findings, especially Al-Nokali (2004) and Kim (2008), the creative thinking level in young individuals rises with age until at least adulthood.

The next section focuses on the second dimension of creative thinking and cognitive style where the discussion examines the reflective-impulsive style of the student participants in this study.

#### **6.4 Reflective-Impulsive Style in Saudi Arabia**

The reflective-impulsive dimension, as discussed at s.2.2.3, was produced by Kagan et al. (1964) and measured by the Matching Familiar Figures test to describe individual differences in problem-solving (Braet et al., 2007; Davies & Graff, 2006; Finch et al., 1982; Yu, 1997). There are two important points which need to be examined in regard to reflective-impulsive style in Saudi students. These points are; reflective-impulsive style and culture, and also reflective-impulsive style and creative thinking in Saudi Arabia.

##### **6.4.1 Reflective-Impulsive Style and Culture**

There are several cultural studies which have employed the MFFT (e.g., Frare, 1986, Kenny, 2009, Resendiz & Fox, 1985; Rozencwajg & Corroyer, 2005). All previous studies suggest that in their reflective-impulsive style, results differ based on culture. For example, Mexican students make more errors with less response time than students in the USA, Israel, and Japan, thus culture may have an effect on reflective-impulsive style (Resendiz & Fox, 1985). The current research found that the participant urban students in the Makkah area were more reflective than those in the rural schools, and this was supported by the responses from the interviewee participants. The findings of this research support the previous studies by Resendiz and Fox (1985). In this case, it appears that the cultural aspects of the more traditional areas of Saudi Arabia reflect on the child's freedom of expression. Without the exposure to a wider societal influence,

young Bedouins are constrained in their ability to think divergently, or are unable to communicate their creativity through the structured tests. This view is confirmed in the qualitative results, as the interviewees confirmed that they observed differences between the urban and rural students, attributing this to home, school and teacher influences.

#### **6.4.2 Reflective-Impulsive Style and Creative Thinking in Saudi Arabia**

There is a direct positive relationship between the reflective style and the creative thinking of students that is more apparent than for those who are impulsive (Al Soulami, 2004; Olaseinde, 1994). The findings in the quantitative research are that the reflective participants score higher in the creative thinking test than the impulsive students. This was supported in the qualitative research, where interview participants described a strong association between reflective style and creative thinking; whilst the relationship was reduced between impulsive style and the creative thinking process. The current results are aligned with previous research (e.g., Al Soulami, 2004; Olaseinde, 1994) in highlighting the strong association between cognitive style and the creative thinking patterns of school students.

A conclusion can be drawn that there are dimensions to the development of cognitive style (reflective-impulsive) in children: that of culture and environment. In this study, cultural influences were detected through the comparison of rural students, largely Bedouin, with multicultural urban children. Further, this section focuses on the relationship between reflective-impulsive style and creative thinking in Saudi Arabia society. There are a few supporting studies (e.g., Hongli & Yulin, 2006; Olaseinde, 1994) which were conducted using the creative thinking tests and the MFFT. Creativity in Saudi Arabia is thus bounded by location and circumstances; the evidence from this

study is that none of the rural schools students' scores means reached that of the urban students, and that the interview participants were of the opinion that the home environment was the dominant characteristic of the lower rural creativity. This was further illustrated by the MFFT results for the rural students of less reflective, and thus less mature, thinking style (cf. Rehn & De Cock, 2009).

## **6.5 Nurturing Creative Thinking**

The next section considers the factors that nurture creative thinking. The social environment that influences children's creative development comprises their family, school, teacher, school location, and the motivation of the student. Aspects of these dimensions which could prove beneficial to creative thinking are described in this section.

### **6.5.1 Parental Influence**

Parents (home environment) have a strong impact on the creative thinking of students (Snowden & Christian, 1999; Vong, 2008). Several researchers report that the role of parents may affect a student's learning and creative thinking (Al-Aqeel, 2005; Feuerstein, 2000; Kharkhurin & Samadpour Motalleebi, 2008; Lee, 2008; Whitelaw, 2006). In this study, the education professionals agreed with the proposition that parents are influential in fostering the creative thinking of their children. They confirmed that, as parents in urban areas have acquired further education, they arguably have a greater interest in encouraging creative thinking abilities than may be expected from parents in the rural areas, with a lesser exposure to education. The quantitative analysis found that the students in urban schools scored higher on the creative thinking test than students in the rural schools. The findings of the current research are compatible with many studies,

for example, Al-Aqeel (2005), Kharkhurin and Samadpour Motalleebi (2008), and Snowden and Christian (1999) which demonstrate that the role of parents is significant in encouraging or discouraging the creative thinking abilities of their children. In a study of Arab adolescents, Dwairy (2004) finds that gifted children were more positive in their attitudes toward their parents and displayed higher self-esteem than their non-gifted fellow students. Further, the author finds evidence that an authoritative parental style assists with the mental health of all Arab adolescents in the study; while an authoritarian parenting style impacts negatively on the mental health of the gifted, but not of the non-gifted adolescents. The Dwairy (2004) study indicates “that an authoritarian parenting style is a crucial factor that influences the well-being of gifted children and may affect their psychological adjustment” (p.275). The Dwairy finding has consequences for this study, as rural parents could take a more traditional view of their children’s behaviour than urban parents: for example, with less aspirations of an urban career for their children.

### **6.5.2 School Resources**

The school environment is another important factor in improving the creative thinking abilities of students (Fleith et al., 2002), as noted by the following researchers (Maker & Schiever, 1989; Ngara, 2008; Niwa, 2005). In this study, the education professionals were of the opinion that the school environment encourages and develops the creative abilities of students, especially in urban schools. The quantitative results show that the creative abilities in the majority of characteristics assessed on the standard TTCT tests for students in the urban schools were higher. This finding is in agreement with the work of several previous researchers (Fleith et al., 2002; Ngara, 2008; and

Niwa, 2005) that highlighted the school environment is essential to increase the creativity level of students.

Resources are a crucial aspect of performance. Researchers reported that the provision of suitable resources in the school is important in order to develop the creative abilities of students (Al-Enezi, 2003; Loveless, 2001; St John, 2001). The majority of the education professionals in this study agreed that resources in rural schools are limited compared with urban schools. The resources in question may include science, art, or sports equipment, and also include library functions, computers in the classroom or computer laboratories, faster internet access, intra-school networking, and opportunities for cross-school competitions and excursions. For example, Al-Hammadi, (2010) compared two writing samples (essays) from adolescents who attended two Saudi secondary schools for boys and girls, finding that boys produced significantly more words, sentences, and paragraphs by using computers than those who used pen and paper. However, girls scored identical grades with handwritten and computer formats and performed consistently at par with the boys using computers. The technology appears as a form of motivation for boys to achieve their potential. Greater acceptance of rented buildings and less emphasis on purpose-built schools which are designed to accommodate technology and laboratories may occur in the smaller towns. Further, the gender-based duplication of all resources arguably has a higher impact in remote areas than in urban areas; the latter have more opportunities for sharing amongst the schools.

These factors are relevant to the teacher's role in rural schools in regard to stimulating students' creative thinking abilities without appropriate resources, the

opportunity to elicit creative thinking in students is adversely affected. This is demonstrated by the quantitative analysis which shows that the students in the urban schools collectively scored higher in all tests than the students in the rural schools. The findings of the current study are consistent with many studies (Al-Enezi, 2003; and Loveless, 2001) and support the conclusion that sufficient suitable resources are essential to facilitate the development of the creative thinking in students.

### **6.5.3 Teachers**

Teachers who understand creative thinking can encourage their students to be creative (Runco & Johnson, 2002). Sternberg (2003) reported that teaching creatively positively affects the academic achievement of students. Abdallah (1996), Beghetto (2006), and Whitelaw (2006) suggest that teachers who trained and understood the value of creative thinking were better able to foster creative students. The majority of the interview participants in this study were of the opinion that the teacher plays an important role in encouraging creative students, thus impacting on student achievement. This finding is mitigated by the effect of the teachers' input, depending on the location of the school. In the quantitative study, the students in the rural schools achieved lower scores in their creative ability tests when compared with students in the urban schools, and this conforms to the findings of Cartwright and Allen, (2002).

Saudi school teachers' conceptions of creativity were studied by Aljughaiman and Mowrer-Reynolds (2007), finding that teachers had difficulty conceptualising creativity, and the range of classroom behaviours which may indicate creative students. The authors find differences between the "teachers' reported support for creativity enrichment and virtual lack of related classroom practice" (p.17). This characteristic of

teachers' practice supports the opinion of the majority of the education professionals in this study that many of the teachers in the rural schools have less classroom experience. Of concern, the study participants observed that these teachers may not attend training classes and thus would arguably perpetuate a weaker interpretation of the nurturing of creative thinking that the Saudi government desires. As a combination of these factors, students in the rural schools have reduced abilities to think creatively. Arguably, given the Aljughaiman and Mowrer-Reynolds (2007) report, teachers in the urban schools attend training classes and may have a higher level of experience, so they are in a position to encourage creative students. As noted in the current study, urban students in the quantitative study scored higher in the TTCT tests and in their academic achievement than students in the rural schools. Thus the findings of this study are consistent with the previous studies such as Sternberg (2003), Runco and Johnson (2002), and Whitelaw (2006).

A teacher's experience plays an important role in understanding and developing the creative thinking of students (Lee & Seo, 2006; Yeh, 2004). Abdallah (1996) and Beghetto (2006) report that teachers who have a high level of experience in teaching techniques that initiate creativity are better able to develop and encourage the creative thinking and academic achievement of their students. This research found that the majority of the education professionals agreed that the teacher's level of experience is important in improving the creative thinking of students; agreeing that teachers in urban schools have a higher level of experience in regard to creative thinking, so there is the potential for the encouragement of students in the urban schools to be more creative than the students in rural schools. This was confirmed, by the findings of the current study which shows that urban students scored higher on the creative thinking tests than



the students in the rural schools. The findings of the current study are in alignment with the previous studies of: Abdallah (1996), Lee & Seo (2006), and Yeh (2004).

The teacher who understands creative thinking and uses suitable methods in the classroom initiates creative thinking in their students and gives opportunity for students to develop their creative abilities (Ololube, 2006; Westby & Dawson, 1995). According to Maker et al., (2008), creativity development is supported through active learning, student choice, access to varied materials, exploration, self-evaluation, problem finding, and problem solving. The education professionals in the current study offered the view that teachers in the urban schools have a higher level of experience in teaching, so they often adopt more appropriate teaching methods to foster creativity than the teachers in the rural schools. In the quantitative analysis, the students in the urban schools scored higher in creative thinking tests than participant students in the rural schools. The findings of this current study are consistent with the previous studies (Ololube, 2006).

Encouragement of the creativity of students by teachers may motivate creativity in other students. This may also create an atmosphere of competition among students in regard to creative thinking (Loveless, 2001; Sternberg, 2003). The current study found that encouraging students is an important aspect towards improving the creative thinking of students. However, the majority of the teachers in rural schools in this current study had less experience and were less encouraging of the creative students; also the parents in the rural areas were less encouraging of the creative thinking of their children when compared with those in the urban areas. As a result, the current study shows that the students in urban schools scored higher than the students in the rural schools in creative thinking. The findings of the current study are in alignment with

previous research (Kim et al., 2005; Sternberg, 2003) that emphasises teachers who understand the value of creative thinking and provide a suitable atmosphere in the classroom are more likely to encourage the creative thinking of their students. Given that teachers are trained in engendering creative thinking in their students, it may be difficult for them to overcome the school culture. Saidani and Thornberry (2010) note that the relationship between the teacher and the school administration reflect the same lack of autonomy and appreciation of obedience that the teachers use with their students; the same power distance and lack of ability to question and think creatively also marks teachers' behaviour towards their students. Accordingly, teachers frequently take the safe option and are discouraged from embarking on innovative educational solutions. Those who are trained in creative thinking and promote free thinking and innovative decision-making in their students are frequently confronted with bureaucratic impediments. This is a factor that can occur in all levels of Arab education.

#### **6.5.4. Rural and Urban Comparison**

General evidence indicates that creative thinking abilities differ depending on the student's location (e.g., Ayoroa, Bailey, and Crossen, 2010; Stanley et al., 2008). In previous research, students in urban schools scored higher in their creative thinking abilities than those in rural schools (Hongli & Yulin, 2006); whilst Shutiva (1991) finds differences in the creative thinking abilities between rural and urban students in favour of the urban students for the majority of the TTCT abilities. In this study, interview participants believed that urban students are more creative than those students in the rural schools; further, students in the urban schools scored higher in the creative thinking test (TTCT) than the rural students. In discussing the characteristics of

creativity of students, Sternberg (2006b) suggests, and it is a conclusion of this thesis, that students from diverse cultures or backgrounds have strengths in learning, and therefore creative thinking, which are unrecognised and neglected in traditional teaching. It is within the capacity of education professionals to become aware of these strengths and incorporate them into instruction to achieve better outcomes for these students. The current findings are consistent with previous research (Ayoroa, Bailey, & Crossen, 2010; Preston, 2006) showing that rural schools have less resources and the teachers are less experienced. As a consequence, rural students are lower in their academic achievement than urban students.

#### **6.5.5 Motivation**

Intrinsic motivation comes from an inherent interest, and is a factor that is related to the creative thinking of students (Amabile & Conti, 1997; Prabhu et al., 2008). Extrinsic motivation from reinforcement (e.g., reward), is also related to the creative thinking of students (Mumford et al., 2002). Sternberg (2003) notes that by reward, the teacher encourages students to be creative. Hennessey (2003) posits that intrinsic motivation comprises meaning, challenge, purpose, creative flow, interest, and learning. Csikszentmihalyi (1988) argues that structured activities enable creative flow to occur if they are designed so that the level of challenges and skills can be varied and controlled. Extrinsic motivation, according to Hennessey (2003), is the expectation of reward which can be applied without having a negative impact on intrinsic motivation or performance. Relevant to this study, Csikszentmihalyi (1996) notes tensions associated with maturation and the resultant impact on the individual and their creativity, particularly during puberty and as a factor in the growing independence of

young adulthood. Anning (1988) and Wentz-Gross et al. (1997) find that children learn when they have social support in their environment and that socialisation is a factor of creativity.

The (home and school) environment in rural areas is arguably less encouraging and less motivating for students than those students in the urban areas. Motivation may take many forms as creativity encompasses all curricula and activities; the children's interests may be motivated through exposure to a range of stimuli and experiences such as playground equipment, laboratories and libraries. Further, an individual's interest and involvement can be stimulated by competition, and by attending sports events, exhibitions, scientific experiments and theoretical debates. As noted, the Saudi government has many programs, and national competitions to provide recognition and reward for outstanding behaviours, which has recently extended to international competition on a wide range of disciplines, such as the arts, science and sports. At this point, the parts that intrinsic and extrinsic motivation play for urban students should be acknowledged, inasmuch as any greater exposure to creativity competition for reward than is experienced by rural students may impact their long-term creative potential. This potential may be actively recognised and encouraged through such extra competition or testing, or on the other hand, it may suppress fuller potential of creative potential by eroding motivation and risk-taking (cf. Amabile, 1982) and "without high levels of intrinsic motivation, creative performance is highly unlikely" (Hennessey, 2003. p.61).

The conclusion of this thesis is that a reward system for creative thinking is implicit in the Saudi school system and extends through to tertiary education, where an individual's creativity may reach fruition. However, recognition of these abilities in

children is greater in the cities than in the remote areas, and this is illustrated by the outcome that the students in the rural schools scored lower in their creative thinking tests than the students in the urban schools, thus perpetuating this trend. The findings of the current study are consistent with previous studies carried out by Ayoroa, Bailey, and Crossen (2010), Hongli & Yulin (2006) that suggest the students in rural areas demonstrate less creative ability when compared with the urban schools, because the rural (home and school) environment does not encourage students to be creative.

In this section, the aspects of family, school, teacher, location, and motivation were discussed in relation to the literature and support for extant findings from this study. All variables were found to influence the nurturing of creative thinking in Saudi students. Location is posited to be the central factor in this study, as the other variables were directly or indirectly affected by this factor. Families, for example, exerted control over children's creative thinking through their urban or rural societies, and the concurrent level of education of the parents. Urban parents were found to understand the effects of creativity on academic and social positioning, and therefore place the child in a better competitive position upon finishing school. Rural parents, with their traditional lifestyle, arguably did not fully understand the necessity for change.

Location was also a factor in the school environment; with regard to the allocation of resources. The duplication of all resources into several school establishments for each regional town: primary, intermediate and secondary schools, each for boys and girls, results in the massive duplication of resources in a small remote settlement. These schools were also subject to high enrolment variation due to the birth rate and the movement of semi-nomadic Bedouin tribes from town to town seeking

pastures for their livestock. Temporary schools provided through the Ministry of Education renting buildings did not provide an optimum environment for stimulating in the students' creative thinking, as permanent facilities such as libraries, laboratories, and quality technological installations are not feasible.

Teacher characteristics were also impacted by location. Teachers in the rural areas were less experienced, exhibited absenteeism, and sought positions in urban areas. They also had less training, and evidence from the quantitative research in this study indicated that their collective ability to nurture creative thinking in their students lagged behind that of their urban counterparts. In this study, in a comparison of six schools using the TTCT tests, each urban school scored higher on all subscales than each rural school; arguably lessening the ability of rural students to compete through less effective teaching styles and competencies. Finally, motivation was also a factor, as children who do not receive appropriate creative stimuli and encouragement are less capable of expressing their creativity to the same extent as urban students.

## **6.6 Summary**

The main research aim for this thesis was to determine the impact of the Saudi rural environment on the creativity of students in this region. The creative characteristics of the rural students were also contrasted with those of the urban students to ascertain the influence of a city environment.

This research design utilised the TTCT Figure Form B and the MFFT tests to obtain the quantitative data to determine the differences between the TTCT characteristics and MFFT status in different school regions. The results showed that there were differences in creative thinking between the rural and urban students, with

students in the urban schools achieving significantly higher TTCT scores; and significant differences between students on MFFT status in rural and urban schools. Urban participants were more reflective and fast-accurate than the students from the rural schools, who were more impulsive. Urban, reflective students also scored higher in the creativity index; thus the participant students in the urban schools were found in this study to be more creative than those in the rural schools.

The theories of Sternberg, Torrance, and Cropley were discussed in the previous section. The conclusions are that this research supports the approach of all three of these researchers. In relation to Sternberg, urban students do receive and respond to the level of nurturing of creativity in their schools. The Torrance model elicits results in this research that support current research. Finally, Cropley's views on fostering creative thinking and the age at which creativity peaks are supported.

The study also concludes that cultural differences prevail in this study. Rural, Bedouin students are at a cultural disadvantage to their urban counterparts as cosmopolitan students scored higher in their creative thinking tests than the rural students. Cultural influences therefore can affect the creative thinking processes of rural students.

Finally, the influences of family, school, teacher, location, and motivation were considered; all variables were found to substantially influence the nurturing of creative thinking in Saudi students. Of these, location is the linking characteristic impacting on the other influences, as they were directly or indirectly affected by the urban or rural environment. Rural families are constrained by their circumstances, whilst urban families tend to accept the necessity of change and divergent thinking to meet that

change. Rural schools are also constrained by the lack of resources that encourage creativity.



## **CHAPTER 7: SUMMARY AND RECOMMENDATIONS**

This thesis explores differences in creative thinking abilities between students in the urban and regional areas in Saudi Arabia through comparisons of their creative thinking, and reflective–impulsive cognitive style. The primary question (s.1.4) is the effect of rural isolation and the fewer opportunities for rural students to express their creativity, compared to the greater range of influences and stimuli of the urban environment for city students. The research questions focus on the differences which exist between the two groups and the following points.

1. The supervisors' evaluation of students' creativity in rural and urban schools;
2. The principals' opinions on student creativity in their schools and the factors that impact on creativity; and
3. The teachers' opinions on student creativity in their schools and the factors that impact on creativity.

The previous chapter presents the conclusions and general discussion for the thesis. This chapter concludes the thesis, and is presented as a summary of the chapters, followed by the strengths and limitations of this thesis and the study conclusions. Drawn from the findings and conclusions of the study, there are recommendations offered that may be of assistance to administrators in the Ministries of Higher Education and Education in Saudi Arabia, and to school supervisors, principals and teachers. Finally, there are suggestions for future research on this important subject, determining the creative thinking abilities of Saudi school students.

## 7.1 Summary of the Thesis

The literature establishes the importance of creativity and imagination to facilitate the process for project or task completion, and to explore the parameters for change in all fields such as the arts, sciences, engineering, and medicine. Creativity therefore has a role in the curriculum (Cropley, 2001; Guilford, 1968; Sternberg, 1999). The challenge is therefore to define creativity, measure it, analyse its effects on urban and rural school students, and use these findings to assist in creative pedagogy. The quantitative research for this study concerned measuring and analysing the responses of Saudi male students in grade 10 in rural and urban schools in relation to creative thinking and the reflective-impulsive cognitive style, using the TTCT Figural Form B and the MFFT. The qualitative research explored the perspectives of the education professional participants (teachers, principals, and supervisors) in regard to creative thinking and the reflective-impulsive style of participant students in the rural and urban schools.

The literature review presented in Chapter 2 explored the theoretical and empirical research on creative thinking and the reflective-impulsive cognitive style, initially presenting definitions of creative thinking. Researchers first suggested that creative thinking is a process used to solve problems (Brown, 1989; Tegano et al., 1991), or an aspect of personality (Guilford, 1954; Weisberg, 1986); other studies defined creative thinking as a process used to produce something new (Boden, 2001; Kharkhurin & Samadpour Motalleebi, 2008; NACCCE, 1999). Creative thinking theorists can be classified as: biological (Runco, 2007; Torrance et al. 1977); psychoanalytic (Freud, 1920; Kubie, 1958); constructivist (Bruner, 1975; Piaget, 1972;

Vygotsky, 1967); behaviourist (Mednick, 1962; Skinner, 1953); humanistic (Maslow, 1968; Rogers, 1976); and factor structure theory (Kim, 2006; Torrance, 1966). Other matters explored in the literature survey included the effects of social environment on students' creativity. The influence of parents and the home environment (Lee, 2008; Whitelaw, 2006), the school environment (Ngara, 2008; Niwa, 2005); motivation (intrinsic and extrinsic); personality traits; and age can also impact on creativity.

The last section described cognitive style and its classifications, including the reflective-impulsive element of the holistic-analytic style; and the relationships with creative thinking. The finding of this study is that reflective students are more creative when compared with those who were impulsive, concurring with Al Soulami (2004) and Olaseinde (1994).

Chapter, 3 Pedagogy and creative thinking in Saudi Arabia, discussed the educational system in Saudi Arabia providing background for the primary research on educational professionals and students. The chapter commenced with a brief history of education on the Arabian Peninsula before the Saudi regime, locating the majority of schools in the Makkah region. The next section described the education system under the Saudi regime from the 1930s, and the gradual assumption by the government of the responsibility for the education of all Saudi children, directly in public schools, or administratively in private schools. The financial resources dedicated to education and training were noted, followed by the education policies of the government with emphasis on the secondary schools. The next section discussed the characteristics of the Saudi education system in the rural and urban schools, including the available resources which could impact on creativity. Differences in culture between the rural Bedouins and

the urbanites in Saudi Arabia were then discussed. Within this contextual theme, Chapter 3 presented an overview of creative thinking in Saudi society, and the role adopted by the Ministry of Education with its creativity programs, and others, to encourage creativity in students. Issues in implementing these programs, such as inflexibility of some approaches, the lack of resources, and the sometimes limited means of identifying creative students were shown. The differences between the rural and urban schools in regard to creative thinking, resources, and the size of classes were also explored.

The methodology and analysis for the primary research for this thesis begins in Chapter 4, Quantitative Study (research and results). The sample comprised 120 rural and 120 urban Saudi male students (aged 15 to 17 years) in grade 10, from six secondary schools, three rural and three urban. The TTCT and the MFFT tests were conducted with the student participants to identify any differences between the rural and urban students in regard to their creative thinking and reflective-impulsive style. The results show that the reflective and fast-accurate students in the three urban schools scored higher in TTCT factors than the three rural schools, with one suburban school scoring higher than all of the other schools. The research continues with the qualitative study in Chapter 5. The qualitative method selected was based on semi-structured interviews conducted with five supervisors from the school districts involved, six principals from each of the three rural and urban schools, and 30 Saudi male teachers, five from each school. There were five key findings, the first of which is that the home environment is crucial in fostering creative thinking; second, the parents' standard of education influences their encouragement of creativity in their children. The remaining findings relate to the importance of the school in encouraging creative thinking in the

students. These findings encompass location, the teacher's experience, and the resources available. These factors were found to be more positive and therefore more beneficial to the urban school environments. As a consequence rural schools lacking these benefits are less able to foster students' creativity than their urban counterparts. Following these findings, the interviewees nominated intrinsic and extrinsic motivation and age as variables in improving the creative thinking of students. The interviewees nominated the ages between 13 to 20 years as the period where creativity becomes apparent, a factor which supports the selection of secondary students for this quantitative research study. The final point regarding the qualitative findings was the relationship between creative thinking and the reflective-impulsive style. The professional education participants reported that a strong association appears to exist between the reflective students and their ability to think creatively, and this was more evident in the urban students. By reporting that impulsive students were less creative than their peers, the interviewees confirmed the analysis result that the rural students demonstrated a weak relationship between the impulsive student and the ability to think creatively.

Finally, the influences of the family, school, teacher, location, and motivation were considered; all variables were found to significantly affect the nurturing of creative thinking in Saudi students. Of these, location is a primary influence. Rural families are constrained by their circumstances, whilst urban families tend to accept the necessity of change and divergent thinking to meet that change. Rural schools are also disadvantaged by lack of the resources that encourage creativity.

## 7.2 Strengths of the Study

The strength of this study lies in using theories regarding creativity, cognitive development and location to determine the differences between Saudi urban and rural school children. Although Saudi Arabia has achieved remarkable progress, the majority of this progress concerned urban areas. There is arguably rural reluctance regarding rapid change and a greater acceptance by urban dwellers where change may be tolerated. The differences in creativity identified in this study between the rural and urban school leavers may affect attitudes toward tertiary education and the ability of the individual's adaptability in later life.

There are implications that may be derived from the quantitative and qualitative findings. The TTCT/MFFT tests appear to be a good measure for identifying and educating the gifted and for identifying creativity in the general student population. However, in this study there was a divide between the urban and rural school children samples, where the collective strength of the urban students dominated over the less measured responses from the rural participants. The results showed first that reflective urban students surpassed reflective rural schools by a factor of nearly two; and second, that fast-accurate urban students gained three times their rural counterparts' means. This is a counterpoint of the finding that the home environment is crucial in developing creative thinking in children and is influenced by the parents' standard of education. In both cases, the findings were that the more educated urban parents nurture creativity in their students to a greater extent than occurs in rural areas. Of the influence of the school environment in encouraging creative thinking, both the teacher's experience and the resources available were significant factors that were found to be beneficial in urban

school environments. Rural schools are therefore less able to foster students' creativity than their urban counterparts.

These implications address an aim of this thesis (see section 1.3), which is to explore factors which may be employed to nurture a more open attitude in students, and use these findings to add to theory and also assist the education authorities to adjust resources and curricula, if they so desire. Finally, these findings, and the conclusions and recommendations drawn from them, are of value to Saudi Arabia and to other emerging economies where there is a disconnection between the outcomes for urban and rural students.

### **7.3 Limitations of the Study**

Whilst all research is subject to limitations of scope and sampling techniques, there are limitations which need to be considered when evaluating these results.

1. The sample for the quantitative research using TTCT figural form B and the MFFT involved male students in grade 10, which limits generalisation to other school grades or classes, to female students, or other areas than the Makkah school district;
2. The sample for the 47 interviewees involved male supervisors, principals and teachers, thus other samples, including female interviewees or other school districts, may have produced different results; and
3. The results of this study, that the urban environment (home and school) may have a greater positive effect on student's creativity than the rural

environment, do not show the causality, only the relationship between variables.

## 7.4 Conclusions

The findings and discussion in this chapter suggest that the home and school environments, location, greater maturity, and motivation are factors that influence creative thinking in school children; and age is important when encouraging creative thinking. It may be that the parents who choose to live in urban areas are different in many ways from those in rural areas. In addition, reflective individuals are found to be more creative than their impulsive peers. These points raise important issues in relation to creative thinking and reflective-impulsive style. Fostering creative thinking of students requires a suitable environment, therefore teachers and principals require training to appreciate the value of creative thinking which permeates all school curricula. The Saudi Government and the Ministry of Education recognise creativity through their institutions and programs, encouraging inter-school competitions and the reach of school competition across borders. Pre-school teaching courses are thus the starting point to use the government programs as resources, especially for rural schools that lag in facilities and programs. As the Ministry introduces or renews elite programs, the rural schools have the opportunity, should they wish to do so, of pressing their case for resources for mathematics, sciences, arts and sports.

The quantitative findings of this study indicated that Saudi students (grade 10) in urban schools have significant differences in originality, elaboration, abstractness of title, and creativity index of the TTCT figure B than Saudi students in rural schools. In addition, the students in urban schools scored higher on reflective style in the MFFT



than those in the rural schools. Consequently, students in the urban schools demonstrated greater creativity and reflective process in their cognitive style, while the students in the rural schools were less creative and impulsive in their style. Also, the impulsive and fast-accurate students in the urban schools scored higher in the TTCT than those students in the rural schools. The conclusion is therefore that the participating rural schools' administrations could offer more facilities to foster creative thinking, through direct inputs or by accessing relevant competitive sources; this could also include using the MFFT-20 to explore the reflective and impulsive styles of new students. The reason for the test is to identify students' styles from the first term, especially those who are impulsive in their style and may benefit from understanding the differences in style. The improved facilities could be used to address the rural schools' discrepancies in facilities; allow rural teachers access to a greater range of curricula materials, and provide them with access to appropriate training in the recognition of creativity in students. Of interest is the role of the teachers' curricula supervisors, who should also be in a position to assist teachers in the identification and recognition of gifted and creative students.

The qualitative findings also showed that interviewees considered urban students to be more creative than their rural counterparts, due in part to influences from the urban environment. Interviewees supported the quantitative finding of a strong relationship between creativity and reflective style, while the relationship was weak between creativity and impulsive style. The findings through the interviews support the conclusion that the school environment in urban areas plays an important role in the creative thinking of the students. It appears that the urban teachers have a greater understanding of the value of creative thinking they have greater knowledge in

education and creativity field through access to training, and they have more experience than the teachers in the rural schools. This leads to the conclusion that the rural teachers require support from the Department of Education to gain access to training, especially developing strategies to enhance the creative thinking abilities of their students. In addition, this research focuses on students in grade 10 (15-17 years), which is consistent with the interviewee reports that creative thinking appears at the secondary school stage; thus these students can benefit from increased attention to aspects of their emerging skills at this stage.

The results of the literature survey detailing the factors influencing the development of creative thinking abilities leads to the conclusion that, whilst intrinsic factors are important, extrinsic factors such as rewards can assist students' motivation towards creative thinking. In conclusion, teachers should consider all possible responses to classroom problems to give students the opportunity to introduce new ideas.

The study concludes there are differences between individual schools in regard to creative thinking and reflective-impulsive style. Such differences may refer to teachers' experiences or the school environment; its facilities, location near community assets, and its administration. Although teachers' experience differs from one school to another, the finding was that the majority of rural teachers were less experienced than their urban counterparts and this aspect impacts on their ability to encourage creativity in the classroom, laboratory, or on the playing field. According to the qualitative findings, there is also the aspect to consider of rural teachers showing a lower understanding of creativity, and thus a decreased ability to enhance creative thinking in

their students. The conclusion is that more attention is required to enrich the knowledge and experience of rural teachers to ensure equity for their students.

A further conclusion is that the urban environment (home and school) has a greater positive effect on student's creativity than that offered by the rural environment. Maturity (age) and motivation are factors that influence creative thinking in school children. In addition, reflective individuals are found to be more creative than their impulsive peers. The urban environment was considered by the interviewees instrumental in enhancing creative thinking in students, and the study participants also reported urban students more advanced in their creative thinking. While there may be means for encouraging rural parents to foster creative thinking in their children, this aspect is more readily approached through teacher training and perhaps inter-school creative competitions, which are available through the Ministry of Education.

In this study the urban students are more creative than their rural peers, and this occurs due to their experiences in urban school and social environments. Without the exposure to a wider societal influence, young Bedouins, for example, are constrained in their ability for divergent thinking, or unable to communicate their creativity through the TTCT and MFFT tests. This aspect again centres on widening the rural students' experiences, perhaps through the schools scheduling 'parents and teachers' meetings to report on students' progress and to explain the value of creative thinking and explore the methods parents can use to develop their children's talents.

The focus on creative thinking in Saudi schools is limited in rural areas. A teacher's attitude to creativity is highly influential in encouraging creative thinking in the classroom and school environment. Interviewees reported that the urban teacher-

student relationship is closer than that found in rural schools. The notion of encouraging creative thinking may be enhanced by training rural teachers for greater engagement with their students enabling an informed opinion of their inherent creativity. From using Sternberg's (2003) approach, it is concluded that urban students respond to the level of nurturing they received for their creative thinking, and this is confirmed by their TTCT results which were higher than for rural students. The case for rural schools in Saudi Arabia is: due to issues including lack of resources and the experience levels of teachers, the focus on creative thinking is limited. Further, teachers' experiences and competencies are subject to location. Factors relating to experience and access to training resulted in rural teachers being less competent in their understanding of the intrinsic and extrinsic factors that encourage creativity in students. Thus the Department of Education in the Makkah area could allocate greater funding for the rural schools, as described, to assist in equalising creative opportunities for rural students.

There are cultural effects to be considered regarding the attitude of rural school administrations and teachers concerning the creative thinking process in students. These cultural effects in rural areas require Ministry attention to design programs that address the differences manifest in creative thinking between the urban and rural students, and collectively between the urban and rural schools. The creative thinking level in young individuals increases with age until at least adulthood; therefore there is an opportunity to redress the urban and rural differences at the secondary school level. Creative thinking programs aimed at rural secondary schools could include enhanced facilities, teacher training and enhanced parent communications.

This study identified factors, including culture and the child's age, that impact on cognitive style. Urban participants were more reflective and fast-accurate than the students from the rural schools, who were more impulsive. Urban, reflective students also scored higher on the creativity index; thus the students in the urban schools were found in this study to demonstrate greater creativity than those in the rural schools. Whilst the majority of individual schools showed significant differences in creativity, school 4 was the highest. As observed above, the urban school environment is conducive to initiating creative thinking skills, although there are some differences between the individual schools in each environment, as well as in the urban and rural collectively. A study by the Department of Education in Makkah could be undertaken to identify the differences in resources, and in teacher capacities. This could lead to an evaluation committee to promote greater equity between schools in regard to fostering creative thinking in their students.

A reward system for creative thinking is part of the Saudi school system and extends through to tertiary education, where an individual's creativity may reach fruition. However, recognition of these abilities in children is greater in the cities than in the remote areas; evidence from this study is that students in rural schools scored lower in creative thinking tests than students in urban schools, thus perpetuating this trend. Rural children who do not receive appropriate creative stimuli and encouragement may not be as capable of expressing their creativity to the same extent as urban students. Therefore, the reward system may be separated so that one half is awarded to urban students and the other to rural students. Whilst an initial difference could occur, based on the urban and rural differences of the findings of this study, a future balance should

occur, given that the resource disparity and teacher training factors are addressed through accelerated programs by the Ministry of Education.

As part of the implications which may be drawn from this study, students from diverse cultures or backgrounds have strengths in learning, and therefore creative thinking, which are unrecognised and neglected in traditional teaching (cf. Fleith et al., 2002). It can be within the capacity of education professionals to become aware of these strengths and incorporate them into instruction to achieve better outcomes for these students.

## **7.5 Recommendations**

The recommendations for this thesis concern theory, educational practice policies for the Ministry of Education, and future research. These are set out first as discussions on the theory, then practical considerations, and lastly, recommendations for the Saudi Education authorities including the Ministry of Higher Education and Ministry of Education in Saudi Arabia.

### **7.5.1 Recommendations for theory**

The selected model for this study is sourced within factor structure theory, where creativity can be sourced from a number of abilities that are part of divergent thinking: fluency, originality, and flexibility. As these factors can be measured, and this is the theory that tends toward greater utilisation today, it is recommended that future research on creativity in the school children of Saudi Arabia remains consistent with this approach. Further, this research utilises the TTCT figural form (B), as this test minimises cultural, gender, race, language, and socio-economic effects. The test also

has a high predictive validity over a wide age range and has been developed and evaluated over a long period.

Cognitive strategy consists of the action of rehearsal, elaboration, and organisational strategies; a cognition-centred approach focuses on one dimension whilst cognitive style is diffuse. The methodology for this study thus adopts cognitive style to draw in theory from the other dimensions, and this is facilitated by the use of the reflective-impulsive continuum which combines individuals' decision making time and their performance in problem-solving situations. The instrument generally employed for this measurement is the MFFT from which the number of errors and the latency of first response for each test item are recorded. An important consideration from the MFFT is Resendiz and Fox's (1985) observation that same-age children from diverse cultures developed from fast-inaccurate to slow-accurate with the Japanese children maturing faster than the Mexicans. Arguably, this occurs as Mexico, an emerging economy, lagged with a less-developed educational system. This may be occurring in Saudi Arabia, thus it is recommended that future research adopts the reflective-impulsive model, that is, the MFFT, to continue tracking the expected accelerated cognitive development of Saudi school children.

### **7.5.2 Recommendations for educational practice**

Developing creativity in students has been established over a long period as a means toward developing flexibility in problem-solving and decisionmaking. There is ample evidence in the literature, for example Sternberg (2006a) and in the popular media of the benefits of creative thinking and this is portrayed throughout human endeavour: the professions, creative arts, sciences and sports. Arguably, creativity

underpins successful national growth and a mature and stable society that acknowledges and utilises its creative skills.

Creative thinking should be accelerated in Saudi society to provide its cohorts of graduates with the skills and knowledge to address the new emergent job categories inherent in the information and communications technologies, tourism, cultural pursuits and research. Saudi society must adapt to the new world order where the country is taking its place as a desirable destination for culture, business and leisure. In a country of familial relationships, guidance to children through inter-school functions, regional festivals, competitions and international events, can be a focus for adult interest and participation. A child who is invited to submit a work and compete in a regional or international event produces an impact within the child's family, school, and local society. To achieve a greater awareness of creative outcomes in society, the Ministry of Higher Education can introduce relatively modest initiatives and strengthen its existing programs. These can be adopted and implemented by the Makkah Education Department.

### **7.5.3 Recommendations for Saudi education**

The recommended initiatives include a pre-service teachers' course which promotes awareness of students' creative thinking potential, and assists in the training for in-service teachers and educators to encourage creativity in students. Post graduate qualifications and further research are also encouraged. The Saudi Ministry of Education could consider the following recommendations:



### 7.5.3.1 Ministry of Higher Education

1. Fostering creativity in Saudi children could be included in teachers' professional development programs by introducing a course into their degree, entitled 'Creativity Development', to train teachers to identify and encourage creative thinking in individuals.
2. Encouraging the Saudi universities (especially Um AL Qura University in Makkah) to include creativity in their professional development programs for in-service teachers, and to provide training in creative thinking practices for other educators such as seminars on fostering creativity and developing abilities in individuals.
3. Saudi universities should organise awareness programs on creativity: such as 'Creativity Week' including an annual conference, establish a website to promote creativity research, sound education practices, the role of family and school, in regard to the development of an individual's creativity.

### 7.5.3.2 Ministry of Education

1. A new subject at secondary school level, *Develop your creativity*, could be considered as a stimulus for Saudi students to recognise and develop their talents.
2. Supervisors in the Makkah Department could be trained to focus on effective teaching methods in developing the creative thinking of students.
3. Saudi teachers could be encouraged to consider creativity in their students through pre-semester courses, and by forming groups for discussing research

and experiences regarding creativity development in students, with urban teachers offering leadership to their rural counterparts.

4. In line with the notion of an annual Creativity week, the Saudi Ministry of Education could offer scientific, artistic, and sporting competitions for students to further develop the abilities of creative students. This could be an opportunity for school excursions and competitions.
5. The Ministry of Education in Saudi Arabia should ensure fair division of resources: facilities and equipment, and similarity of teacher skills between all schools, rural and urban, male and female.
6. Every year, a random sample of rural and urban Saudi schools in coordination with the Department of Education, should conduct the MFFT-20 to identify the reflective and impulsive style of their students.

## **7.6 Future Research**

This study finds there is a lack of research on the comparison between rural and urban students in Saudi Arabia in regard to their creative thinking abilities and the reflective-impulsive style. There is scope for future research, such as a combined approach in studying creativity in both boys' and girls' schools. The outcome of an empirical study based on similar theoretical underpinnings as this thesis, could also identify emerging trends in Saudi students' creativity, for which to target Ministry programs. Whilst validity is enhanced by retaining the common approach adopted by this thesis, a comparison study of students in rural and urban Saudi schools could be conducted using the TTCT and cognitive style (dependent-independent fields).

For international comparison studies, a greater range of research opportunities arise. There is an urgent need to understand the differences in creativity between emerging and developed economies; further studies could explore similarities and contrasts between urban and rural students in this regard. There is also scope for comparison studies between different age groups in different countries which could be used to trace the development of creativity under different environments. This gives the opportunity to grow a baseline of data on creative thinking, similar to international comparisons on mathematics and science.

Finally, the pathways followed throughout this journey towards a PhD have been a constant source of discovery and enlightenment, and I am privileged to have taken the journey. I recommend this thesis to the reader, and trust that each individual gains some insight into the great benefits that creative thinking bestows on the individual, and collectively, on his or her nation.

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## **Appendixes**

Appendix A: Torrance Test of Creative Thinking Figural B

Appendix B: Translation of Torrance Test of Creative Thinking Figural B

Appendix C: Matching Familiar Figure Test

Appendix D: Translation of Matching Familiar Figure Test

Appendix E: Interviews

Appendix F: The interview responses

Appendix G: Letter to the Director of the Educational Department in Makkah area

Appendix H: Translation of appendix G

Appendix I: Approval of Victoria University Human Ethics Committee for collecting  
the data

Appendix J: MEMO to the secondary schools in Makkah area

Appendix K: Translation of appendix J

Appendix L: MEMO to the supervisors in the Educational Department in Makkah

Appendix M: Translation of appendix L

Appendix N: Information and consent forms for students' participants

Appendix O: Information and consent forms for educators' participants

Appendix P: Data collection processes

## **Appendix A:**

### **Torrance Test of Creative Thinking Figural B**





# THINKING CREATIVELY WITH PICTURES

By E. Paul Torrance

## FIGURAL RESPONSE BOOKLET B

NAME \_\_\_\_\_

AGE \_\_\_\_\_ GENDER \_\_\_\_\_

SCHOOL \_\_\_\_\_

GRADE \_\_\_\_\_

CITY \_\_\_\_\_

DATE \_\_\_\_\_



Streamlined Edition

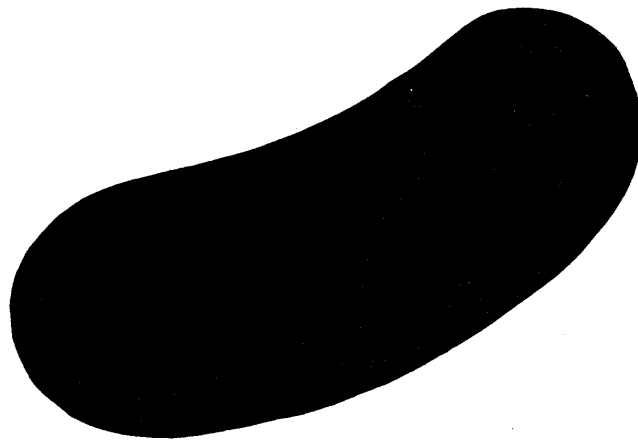
SCHOLASTIC TESTING SERVICE, INC.  
480 Meyer Road  
Bensenville, Illinois 60106-1617

### **Activity 1. PICTURE CONSTRUCTION**

On the opposite page is a curved shape. Think of a picture or an object which you can draw with this shape as a part.

Try to think of a picture that no one else will think of. Keep adding new ideas to your first idea to make it tell as interesting and as exciting a story as you can.

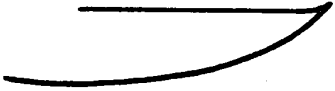
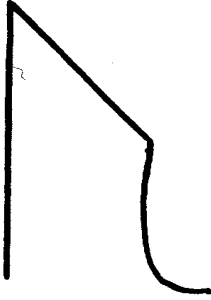
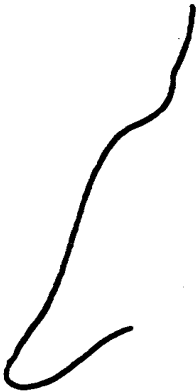

When you have completed your picture, think up a name or title for it and write it at the bottom of the page in the space provided. Make your title as clever and unusual as possible. Use it to help tell your story.

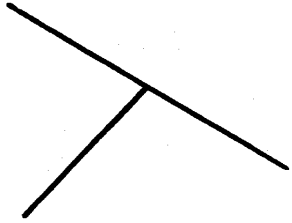


**YOUR TITLE:** \_\_\_\_\_

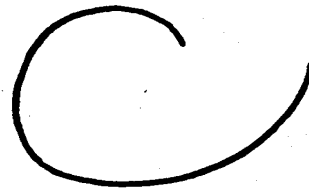
**Activity 2. PICTURE COMPLETION**

By adding lines to the incomplete figures on this and the next page, you can sketch some interesting objects or pictures. Again, try to think of some picture or object that no one else will think of. Try to make it tell as complete and as interesting a story as you can by adding to and building up your first idea. Make up an interesting title for each of your drawings and write it at the bottom of each block next to the number of the figure.

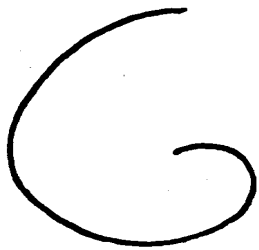
 1. _____	 2. _____
 3. _____	 4. _____



5. \_\_\_\_\_



6. \_\_\_\_\_



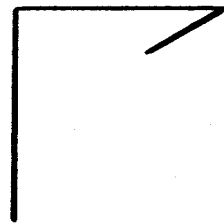
7. \_\_\_\_\_



8. \_\_\_\_\_



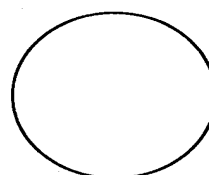
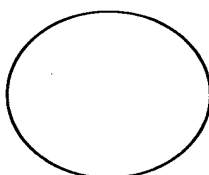
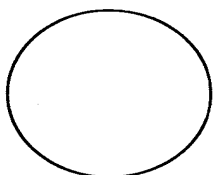
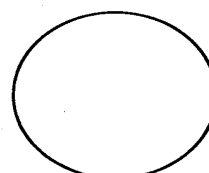
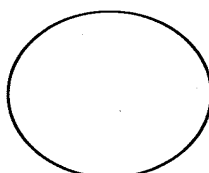
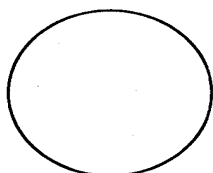
9. \_\_\_\_\_

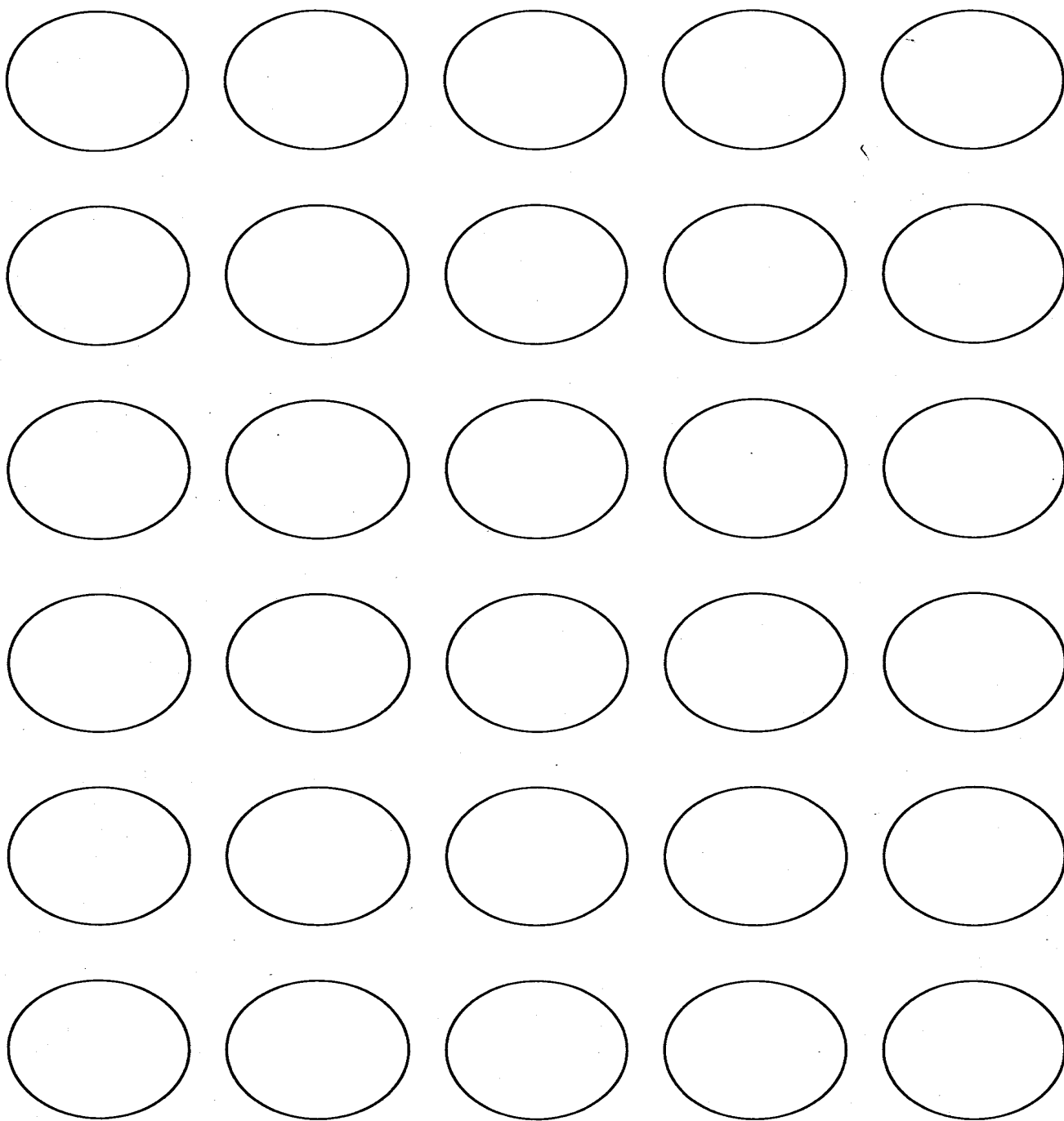


10. \_\_\_\_\_

**Activity 3. CIRCLES**

In ten minutes see how many objects or pictures you can make from the circles below and on the next page. The circles should be the main part of whatever you make. With pencil or crayon add lines to the circles to complete your picture. You can place marks inside the circles, outside the circles, or both inside and outside the circles—wherever you want to in order to make your picture. Try to think of things that no one else will think of. Make as many different pictures or objects as you can and put as many ideas as you can in each one. Make them tell as complete and as interesting a story as you can. Add names or titles below the objects.





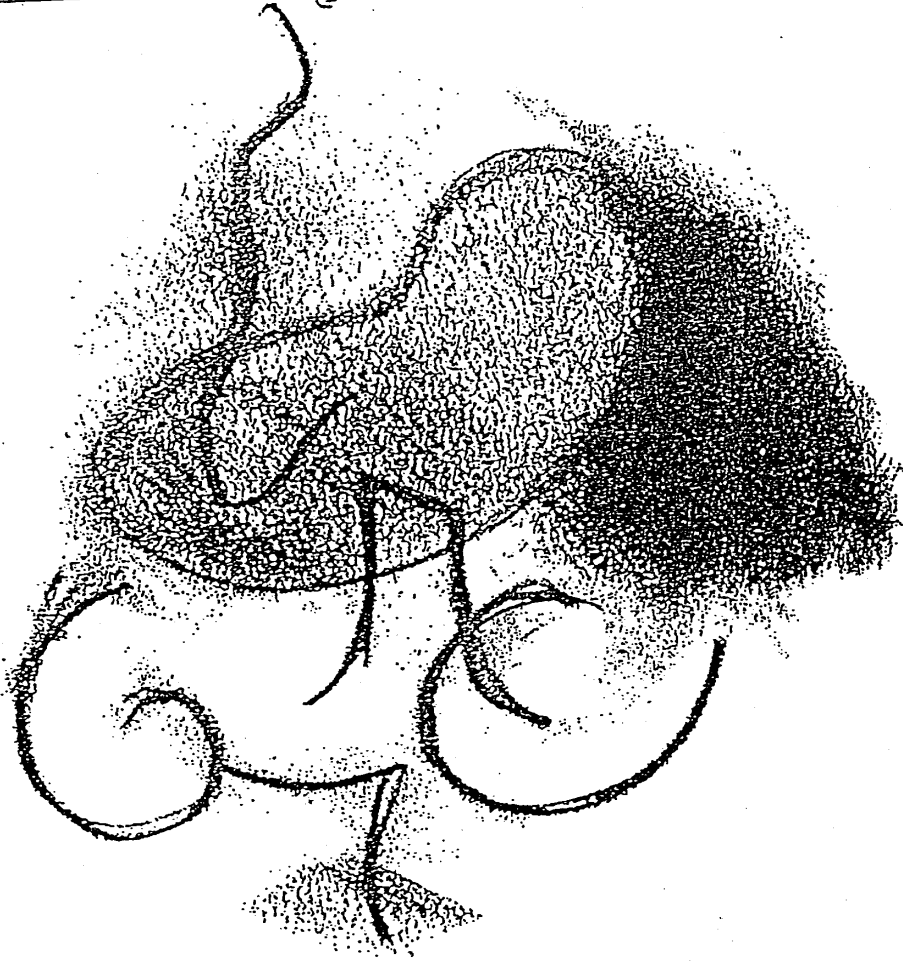
**Appendix B:****Translation of Torrance Test of Creative Thinking****Figural B****(Arabic language)**



# التفكير الابتكاري باستخدام الصّور

(الصورة ب)

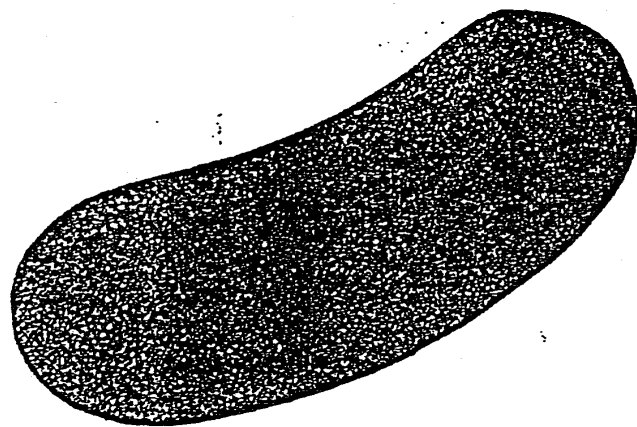
الاسم \_\_\_\_\_  
 تاريخ الميلاد \_\_\_\_\_  
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 العمر \_\_\_\_\_  
 الفرقة الدراسية \_\_\_\_\_  
 التاريخ \_\_\_\_\_



وضع : إ. بول ستورنس (د. ف)  
 ترجمة : عبدالله م. سليمان (د. ف)  
 إعداد : وفؤاد أبو حطب (د. ف)  
 الناشر : مكتبة الأنجلو المصرية بالقاهرة ١٩٧١

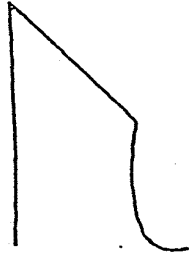
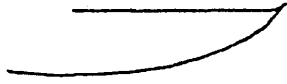
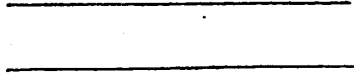

### النشاط الأول : تكوين الصورة

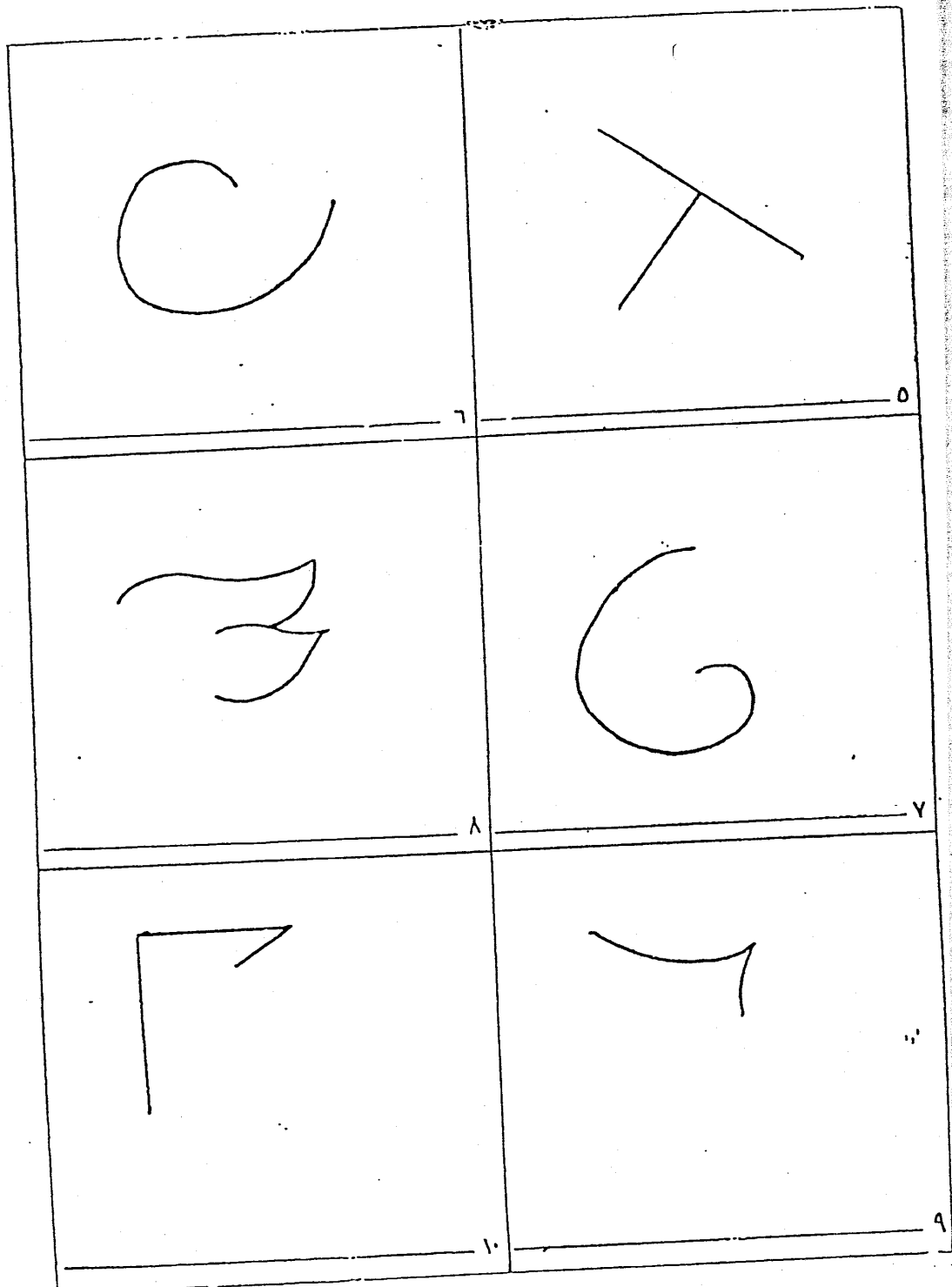
تجد في الصفحة المقابلة شكلاً "منحنياً طوناً" بالأبيض ، فكر في صورة أو موضوع ما يمكنك أن ترسمه بحيث يكون هذا الشكل جزءاً منه .  
 حاول أن تفكر في صورة تعتقد أنه لم يفكر فيها أحداً غيرك ثم استمر في إضافة أفكار جديدة إلى فكرتك الأولى لكي تجعلها تحكي قصة شيرة للاهتمام .  
 بعد أن تكمل الرسم فكر في اسم أو عنوان له ، واكتبه في أسفل الصفحة . حاول أن تجعل العنوان ذكياً وغير مألوف قدر المستطاع . استخدم هذا العنوان كي يساعدك على أن تحكي قصتك .



### النشاط الثاني: تكملة الخطوط

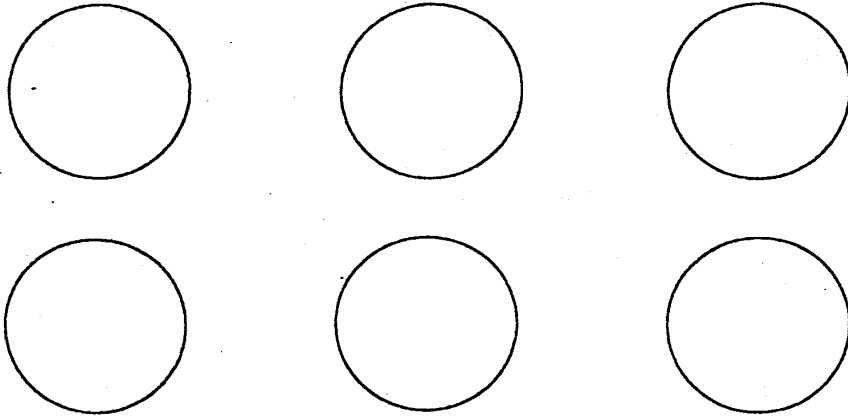
تستطيع بإضافة بعض الخطوط إلى الأشكال الناقصة على هذه الصفحة والصفحة التالية أن ترسم موضوعات أو صوراً مثيرة للاهتمام. حاول أن تفكر في بعض الموضوعات أو الصور التي سوف لا يفكر فيها أحد غيرك. حاول أن تجعل هذه الموضوعات أو الصور تحكي قصة أو قصصاً كاملة ومثيرة للاهتمام بأن تضيف إلى فكرتك الأولى وتبنى عليها. اكتب أسفل كل رسم عنواناً مثيراً للاهتمام في المكان المخصص لذلك بجدول رقم الرسم.

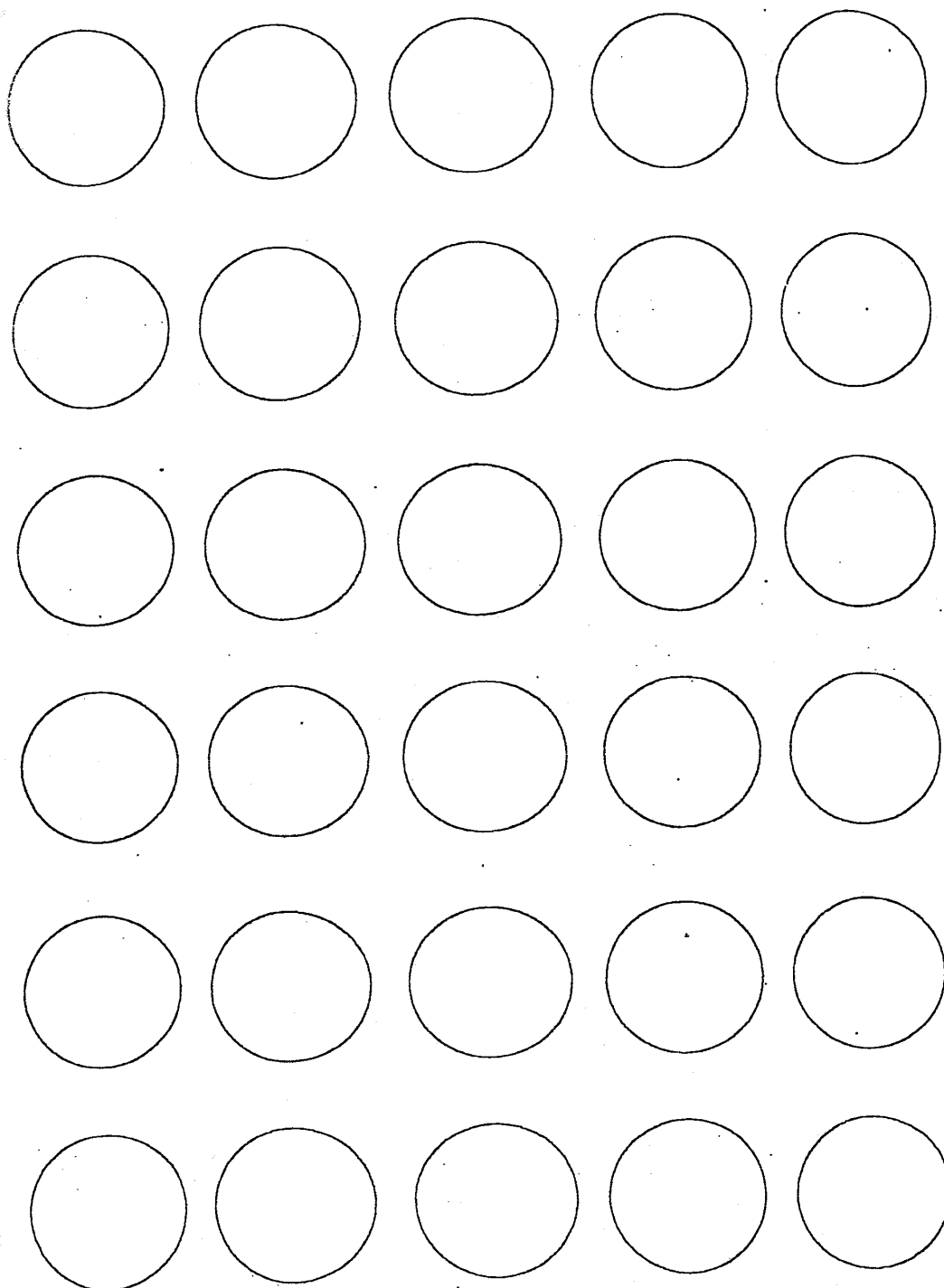
	
	



### النشاط الثالث : الدوائر

في عشر دقائق حاول أن ترى كم من الموضوعات أو الصور تستطيع أن ترسم مستخدماً الدوائر الموجودة في أسفل هذه الصفحة والصفحة التالية . يجب أن تكون الدوائر الجزء الأساسي من كل صورة أو رسم . أضف خطوطاً بالقلم الرصاص للدوائر لكي تكمل الصورة . تستطيع أن تضع علامات في داخل الدوائر أو خارجها أو في داخلها وخارجها معاً في أي مكان تريد لكي ترسم الصورة . حاول أن تفكر في أشياء لم يفكر فيها أحد . ارسم أكبر عدد ممكن من الصور أو الموضوعات المختلفة وضع أكثر ما تستطيع من الأفكار في كل صورة . اجعل هذه الصور تحكي قصة كاملة مثيرة للاهتمام . أضف أسماء أو عناوين مناسبة أسفل كل صورة .





**Appendix C:**  
**MATCHING FAMILIAR FIGURE TEST (MFFT)**



[illegible]

### التعليمات

يقوم الفاحص بتدريب المفحوص على المفردتين الأوليين ( الرجل العجوز والكتاب ) قائلا له ٠٠ « سوف أعرض عليك بعض الصور لأشياء متعددة مألوفة فى الطبيعة وكل مجموعة منها تتكون من صورة أساسية توجد على الصفحة اليمنى وثمانى صور أخرى تشبهها توجد على الصفحة اليسرى ولكن واحدة فقط بين ثمانى الصور هى التى تشبه الصورة الأساسية طبق الأصل ٠ والمطلوب منك أن تشير إليها وإذا أخطأت فحاول مرة ٠٠ ومرة الى أن تصل لها وسنتدرب سويا على المجموعتين الأوليين وعندما ترى نفسك قد فهمت ما أريد أن تفعله فلنبدأ فى بقية المجموعات » ٠ ويجب أن يكون وضع الكراسة أمام المفحوص بحيث تكون الصورة الأساسية الى أعلى والبدائل الى أسفل ٠

يسجل الفاحص زمن الاستجابة الأولى فقط سواء اكانت صحيحة أم خطأ فإذا كانت صحيحة انتقل الى المفردة التالية أما اذا كانت خطأ فليحاول مرة أخرى وهكذا الى أن يصل للصورة طبق الأصل ويسجل له عدد الاخطاء فى كل مفردة على حدة ٠٠ ويسجل الفاحص هذه النتائج فى ورقة الاجابة التى تكون معه دون أن يراها المفحوص لأن بها أرقام الاجابات الصحيحة ٠٠ ويراعى تسجيل اسم المفحوص وبقية بياناته على ورقة الاجابة قبل البدء فى تطبيق الاختبار يجب أن لا يتعجل الفاحص المفحوص فى الاجابة وإذا لاحظ أى اعياء على المفحوص فليتوقف عند نهاية مفردة ما ويستكمل التطبيق فى وقت آخر ٠ يجب أن يتواجد الفاحص والمفحوص وحسدهما فى مكان مريح بقدر الامكان وبدون مثيرات أخرى تبعث على تشتت تركيزه ومضىء بحيث يرى المفحوص الاشكال والاختلافات بينها بوضوح كامل ٠

**Appendix D:**

**TRANSLATION OF MATCHING FAMILIAR FIGURE  
TEST**

**Answer sheet**  
**Secondary**

Note: first two items are practice

**Item**

1. Old man...2
2. Book...4
3. Ship...6
4. Telephone...5
5. Bird...1
6. Man...4
7. Lion...3
8. Apple...8
9. Pen...3
10. Shoe...1
11. Fish...7
12. Watch...2
13. Bottle...6
14. Tree...4
15. Car...7
16. Map...2
17. Face...1
18. Hair Brush...4
19. Camera...6
20. Flower...5
21. Spider...1
22. Television...8

**EL-Faramawy 1985**

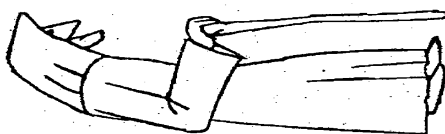
## **Instruction for the Matching Familiar Figure Test**

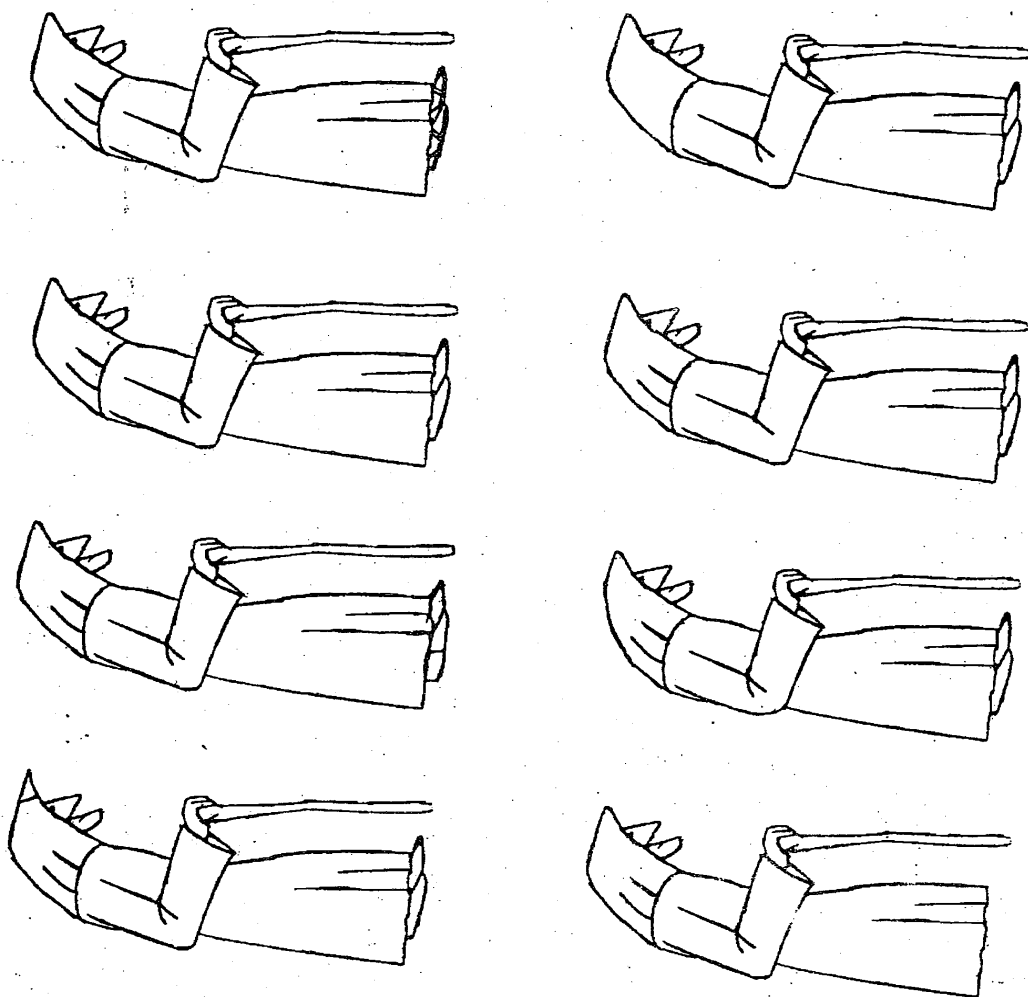
The examiner will show you a picture of something you know and then some pictures that are similar to you will have to point to the picture on the bottom page. Lets' do some for practice. 1. The examiner will show you some practice items and help you to find the correct answer. Now we are going to do some that are a little bit harder. 2. You will see a picture on the top page and eight pictures on the bottom page. Find the one that is just like the one on top and point to it.

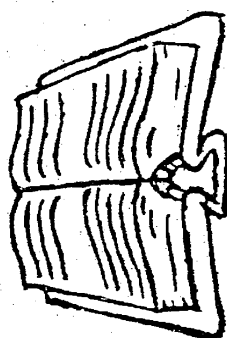
### **Note to examiners:**

The examiner will record the latency of the first response the total number of errors for each item and the order in which the errors are made. If the participant is correct, the examiner will praise them. If wrong, the examiner will say, "NO, that is not the right one. Find the one that is just like this one (point). Continue to code responses (not time) until the participant gets the item correct. The examiner should take into consideration:

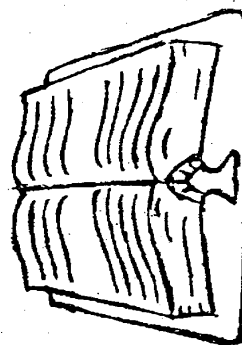
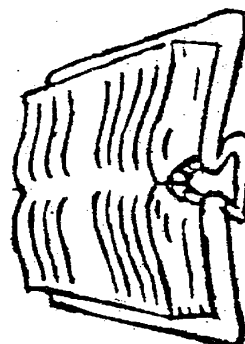
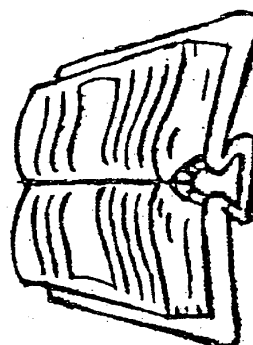
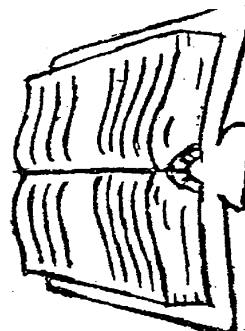
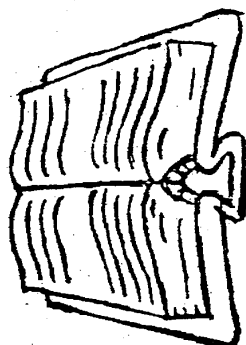
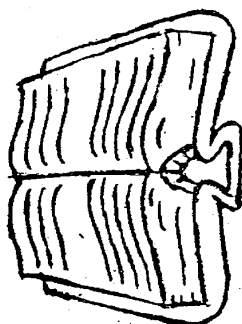
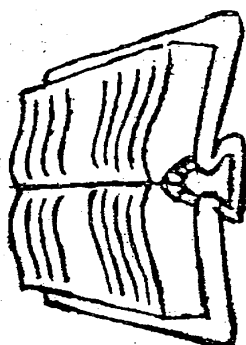
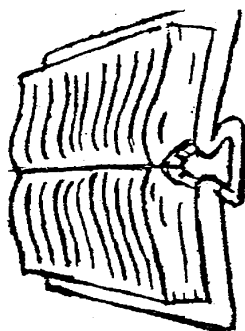
- 1- The place for the test is comfortable.
- 2- If the participant becomes tired, the examiner should stop the test and complete it later.

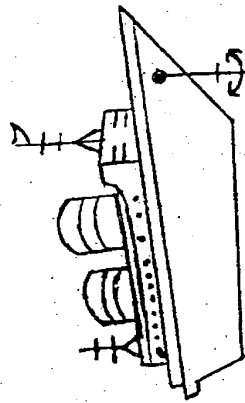


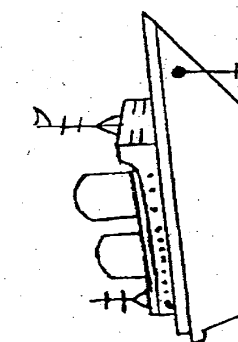
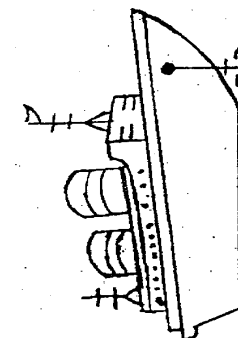
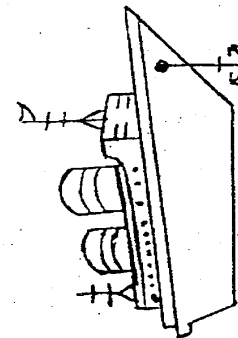
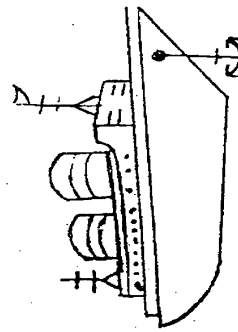
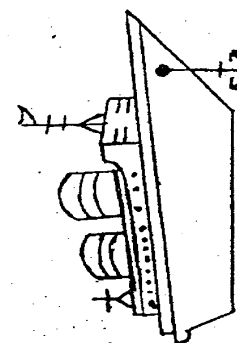
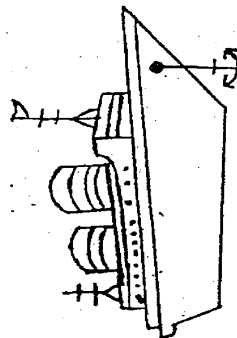
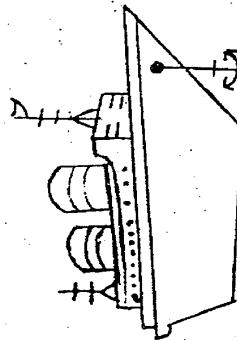
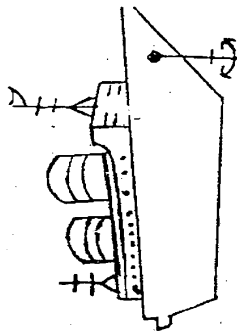


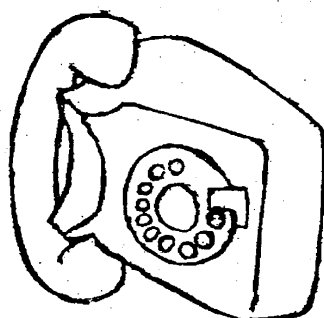


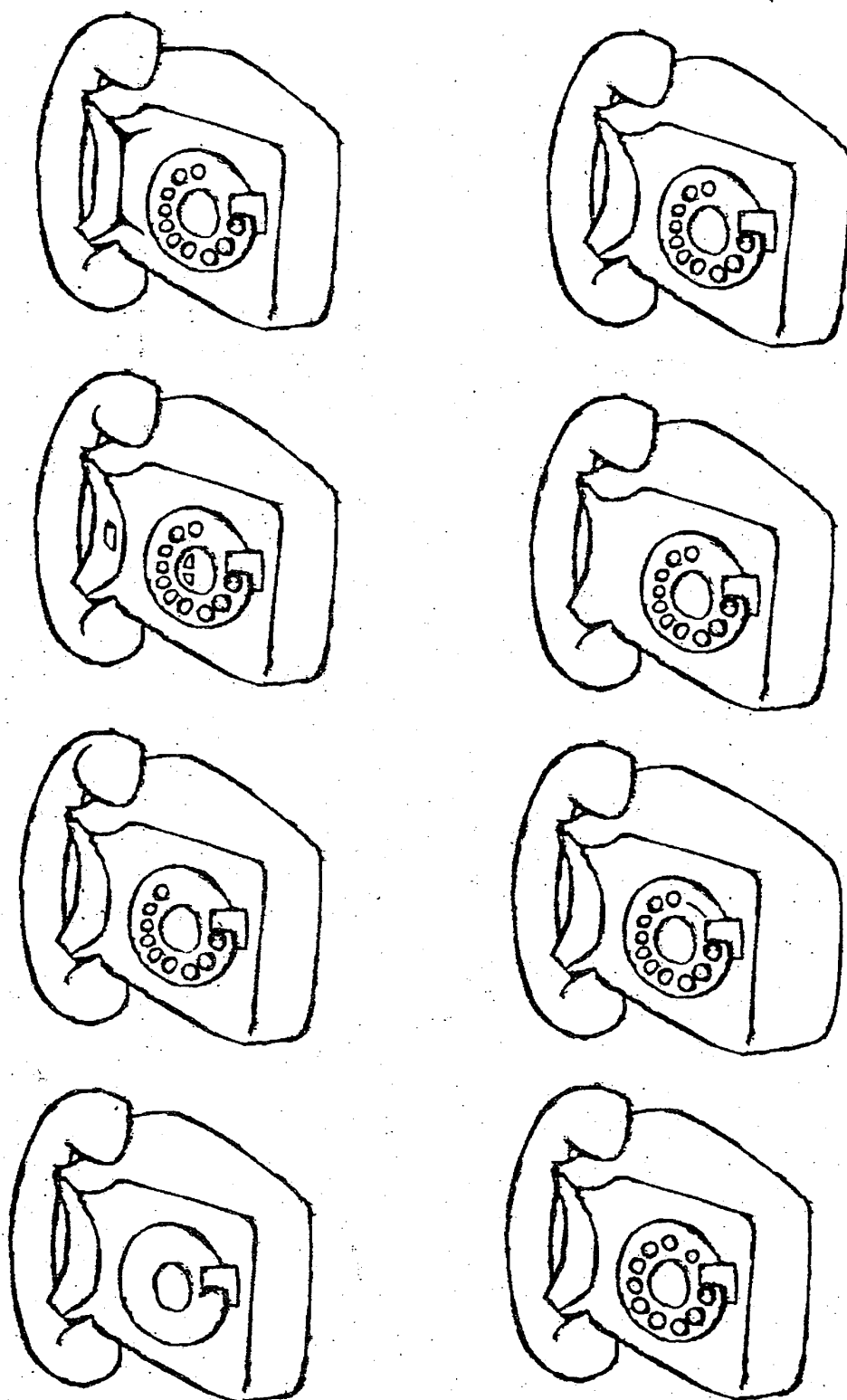


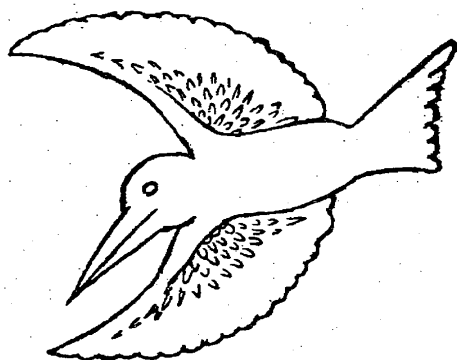


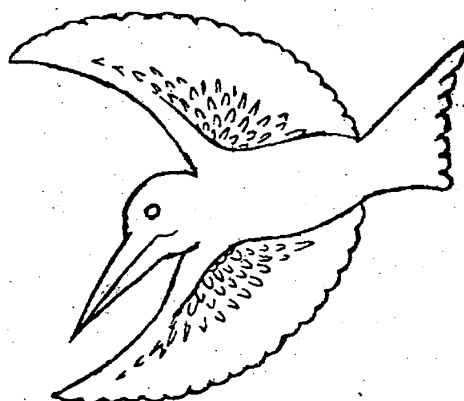
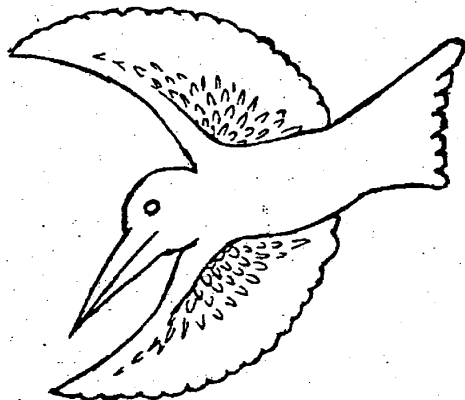
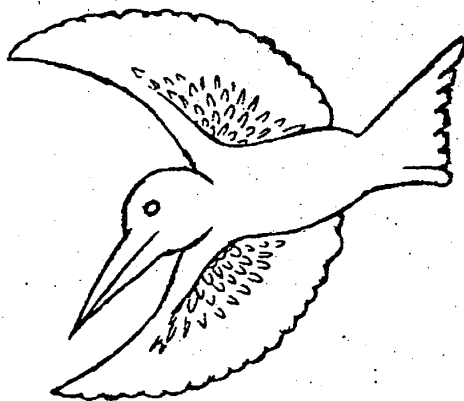
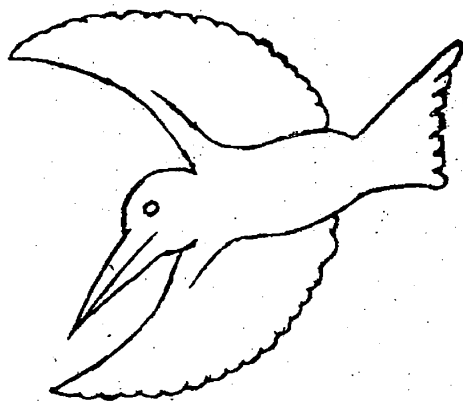
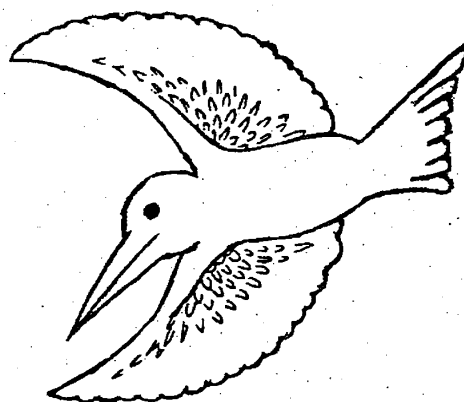
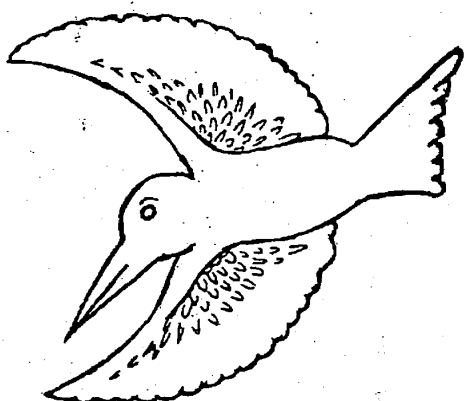
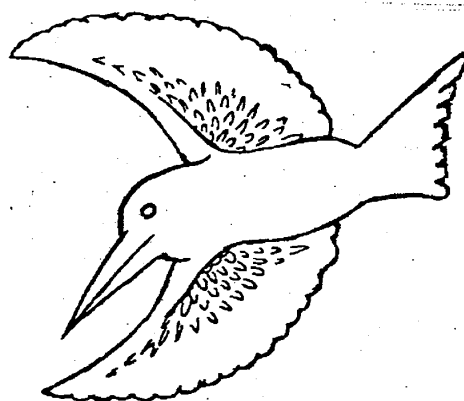
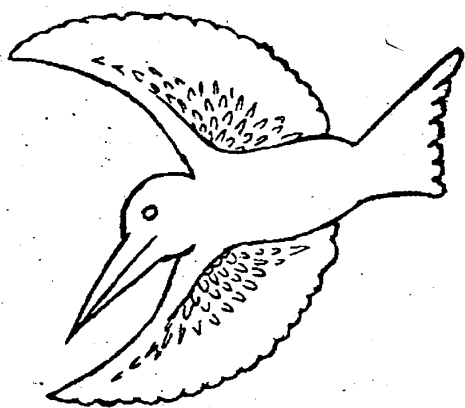


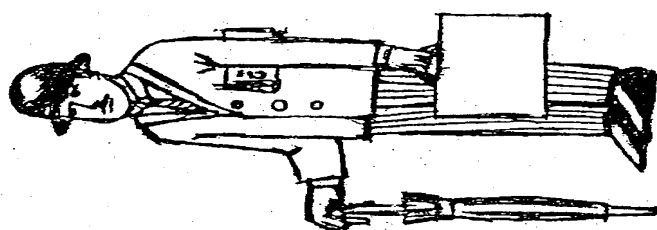




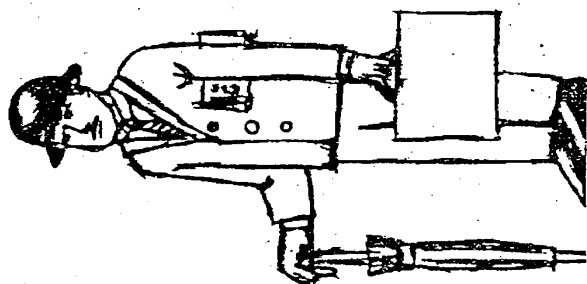
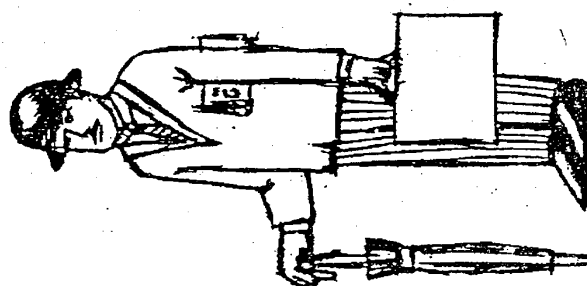
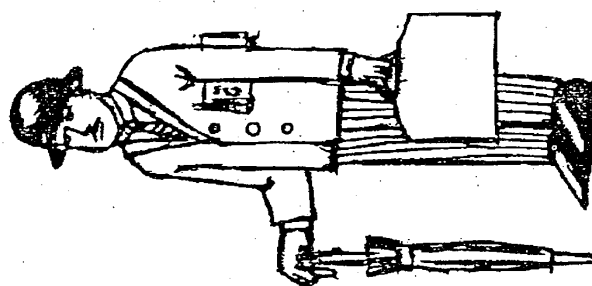
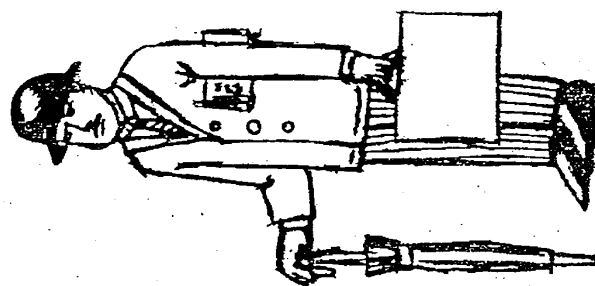
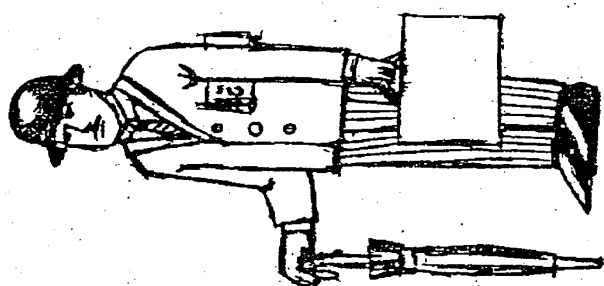
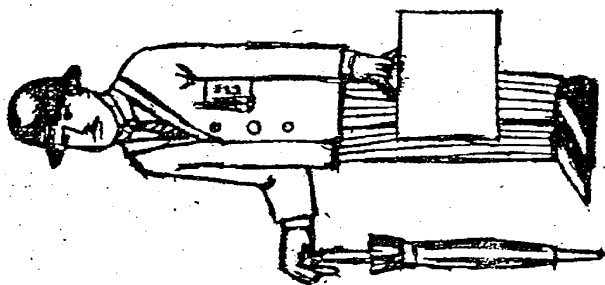
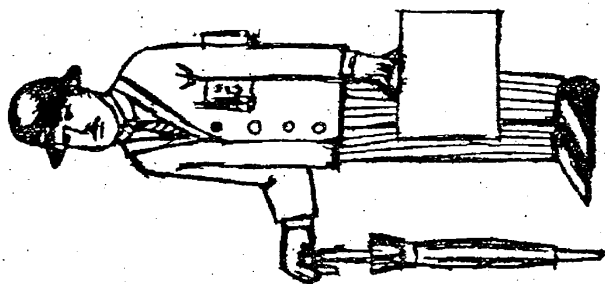
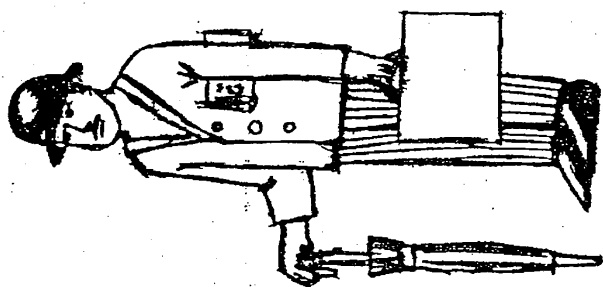


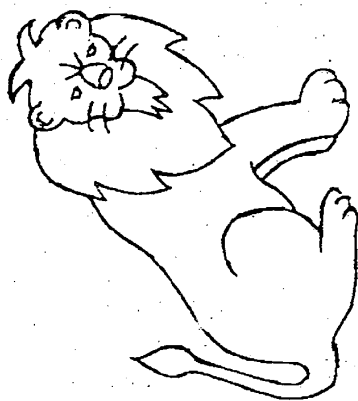


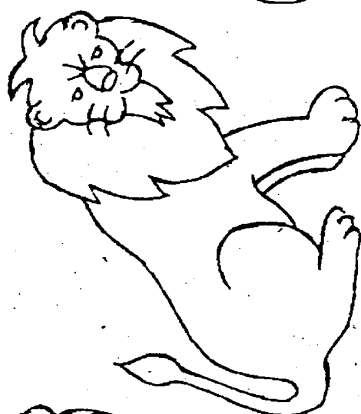
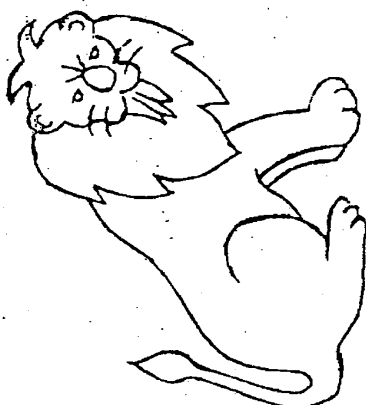
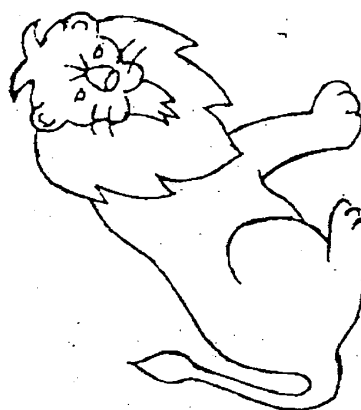


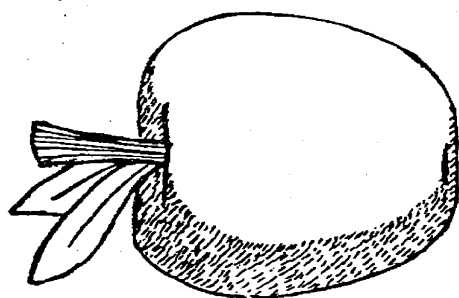


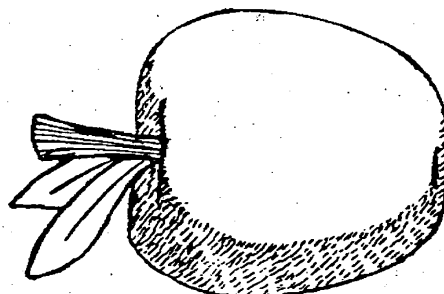
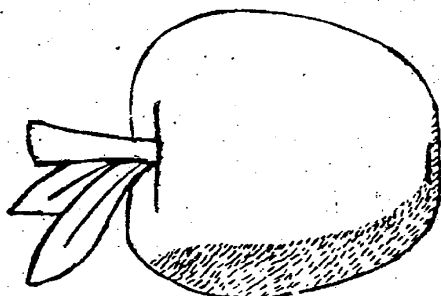
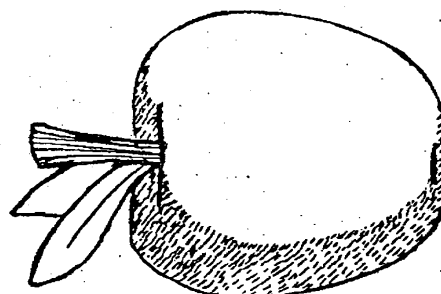
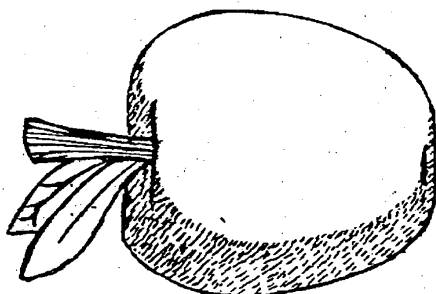
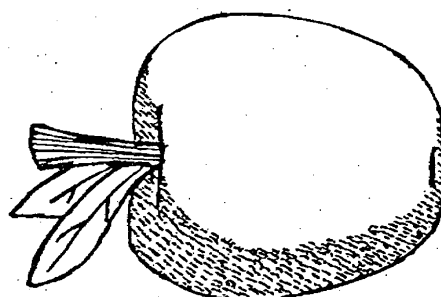
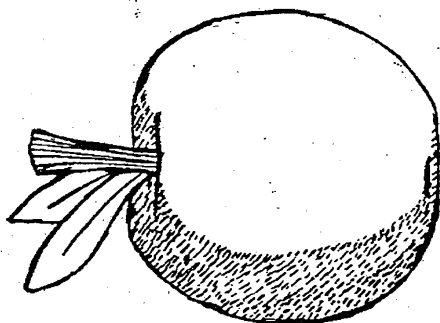
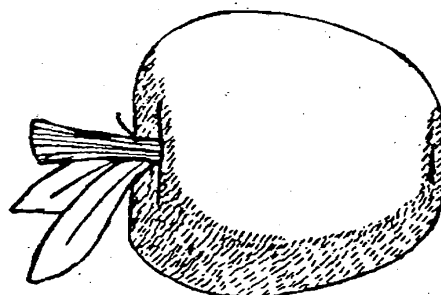
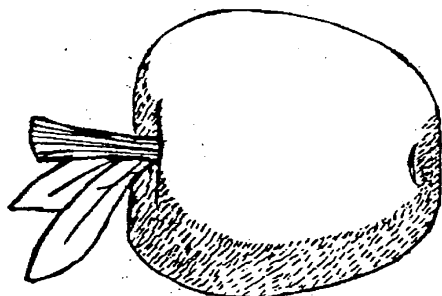


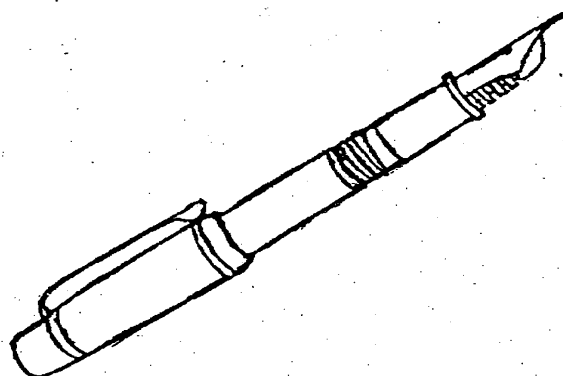


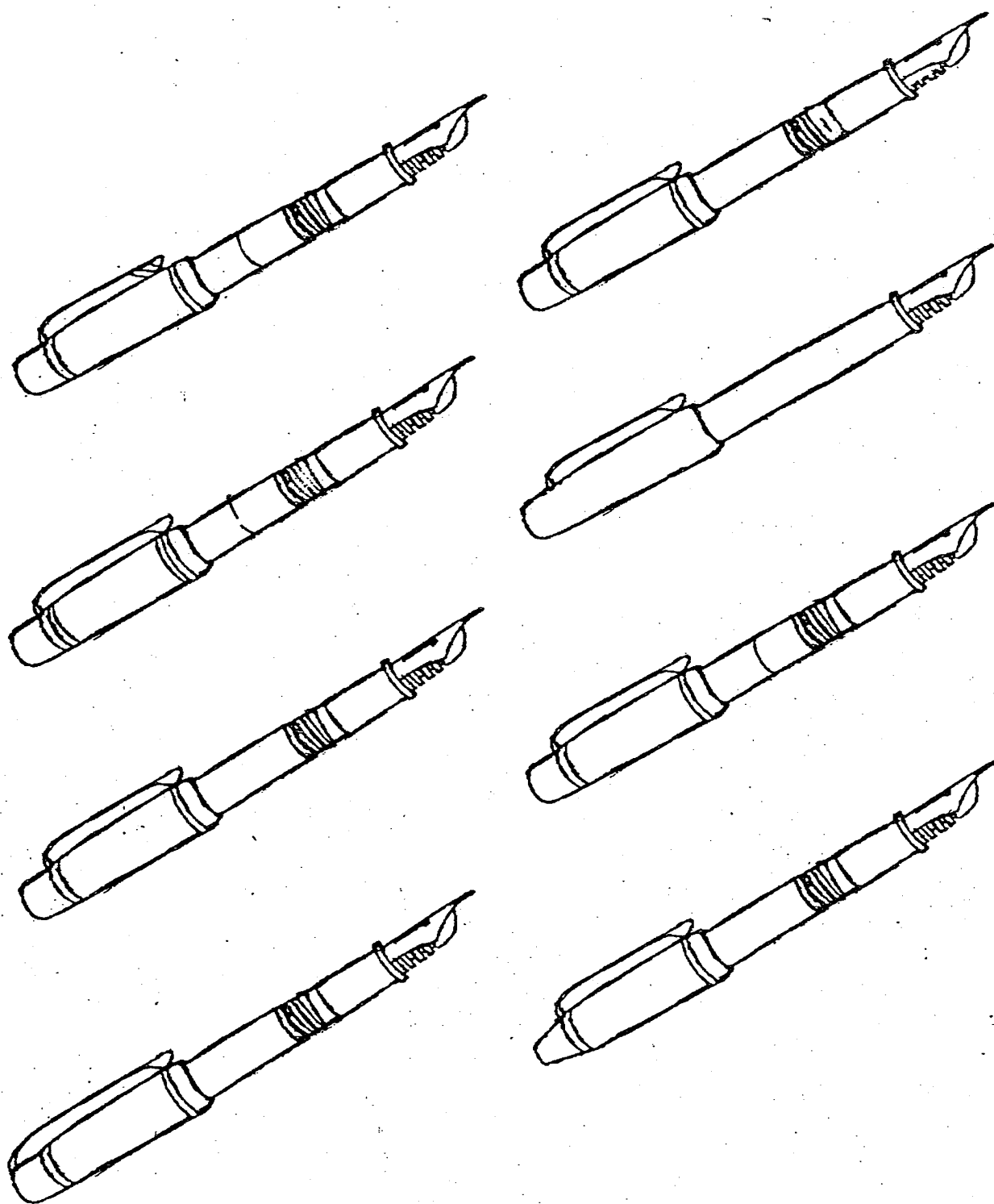


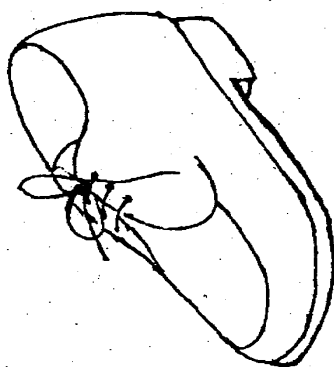




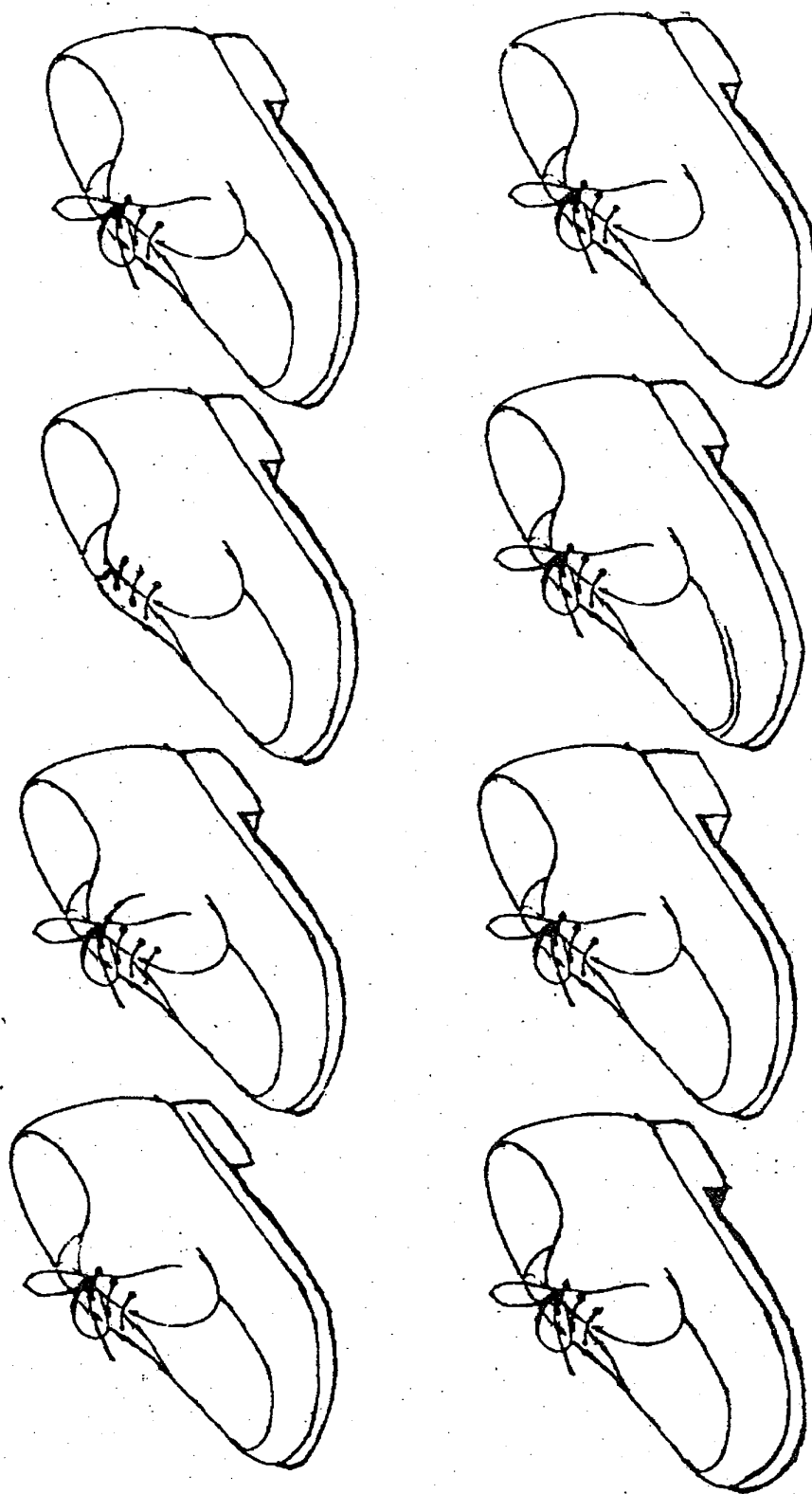


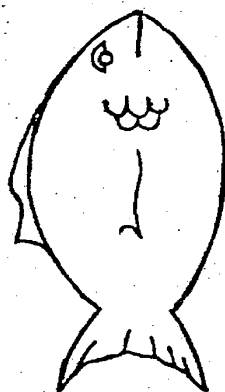


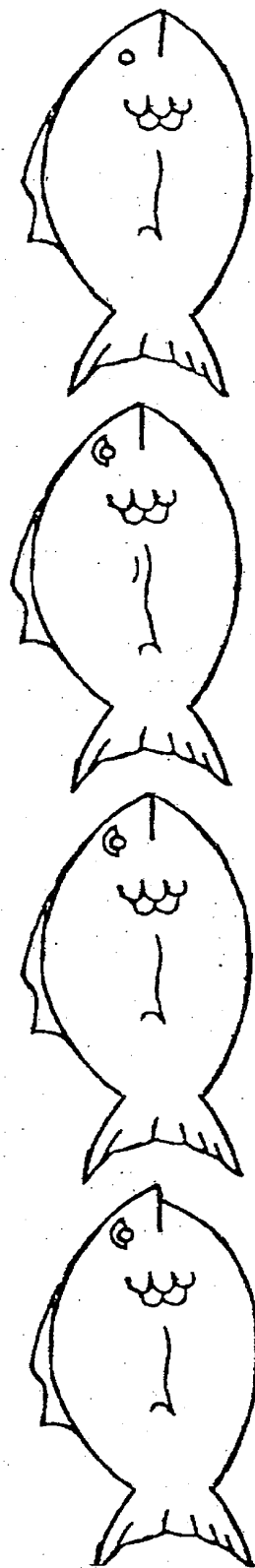
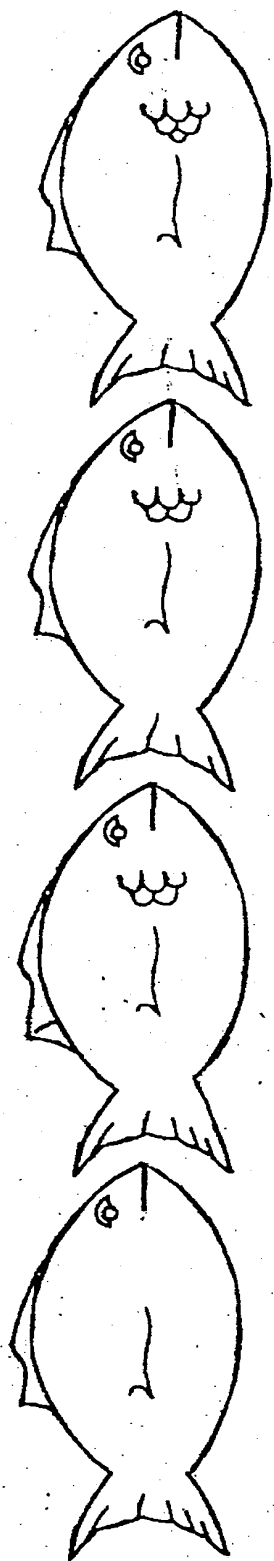


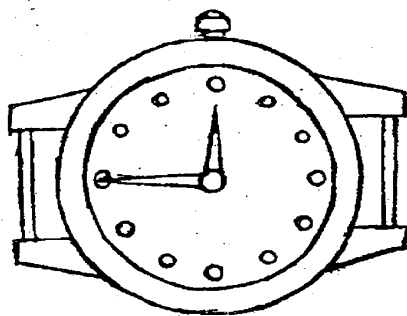


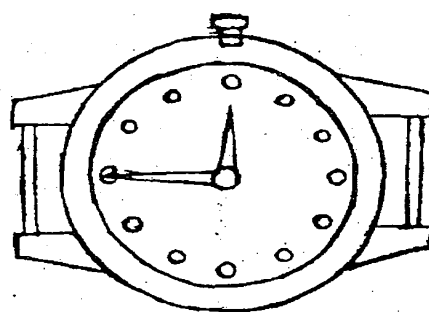
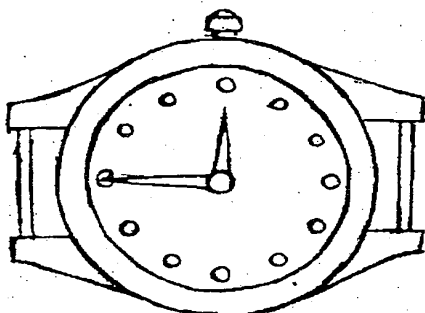
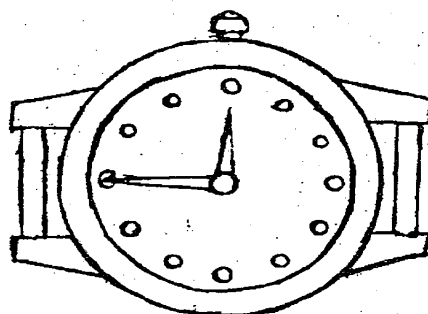
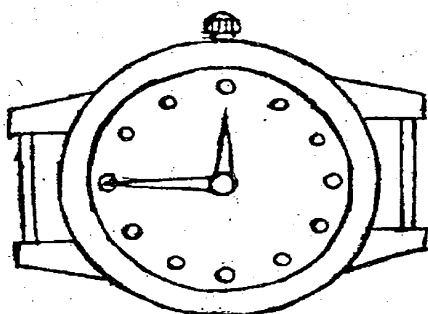
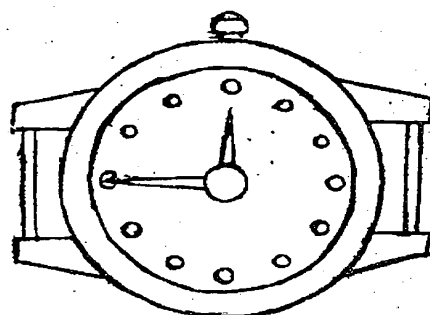
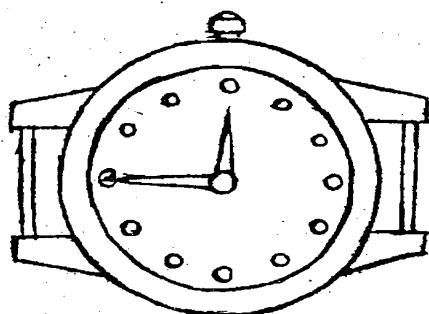
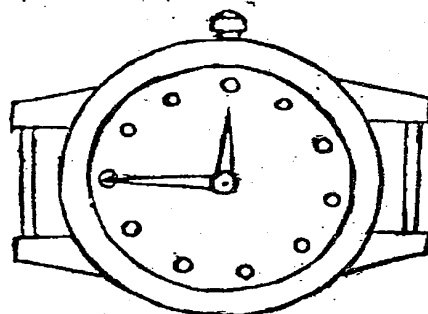
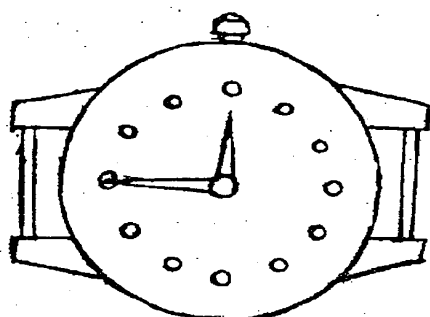


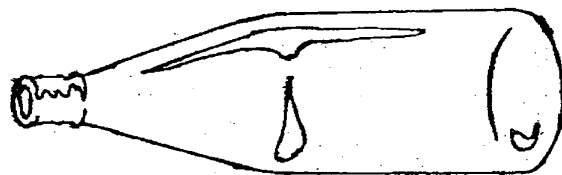


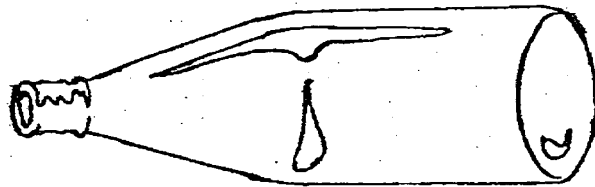
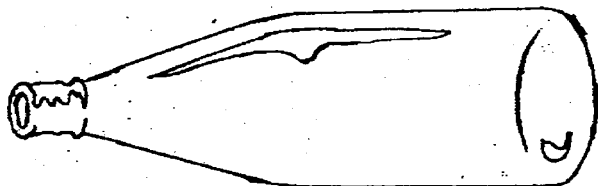
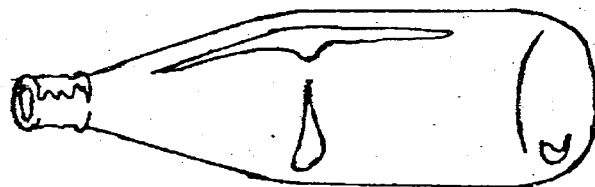
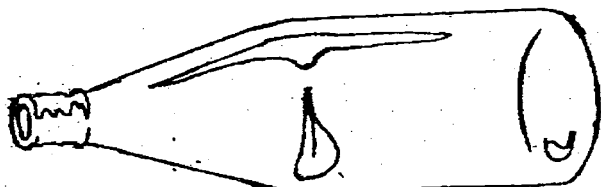
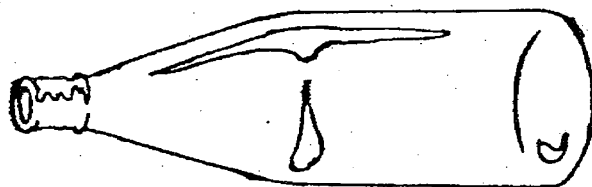
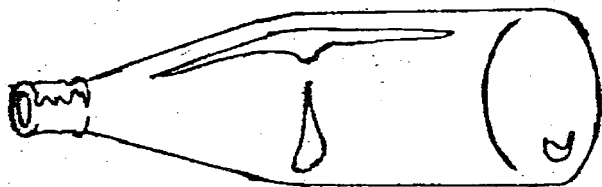
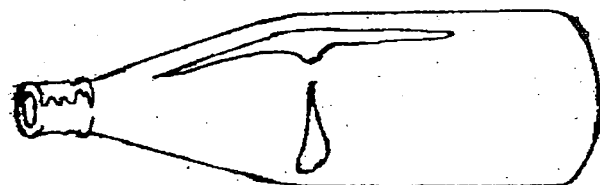
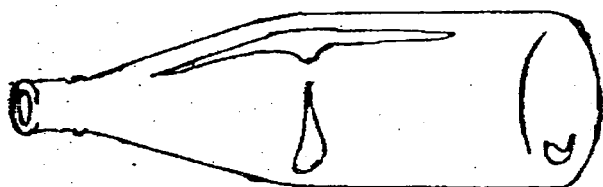


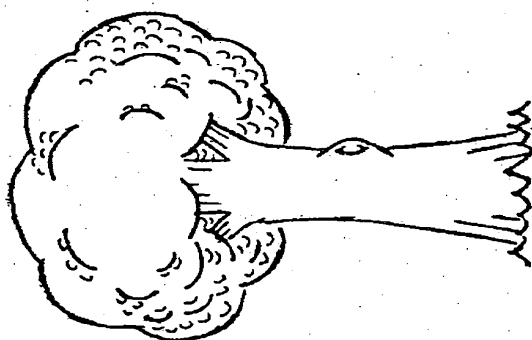




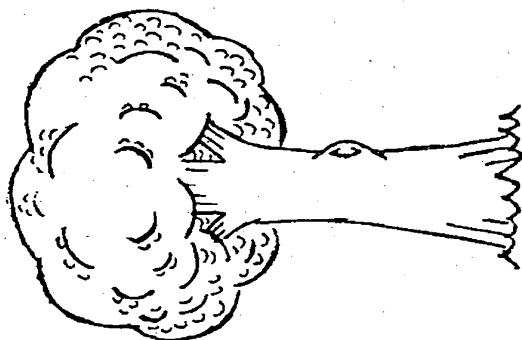
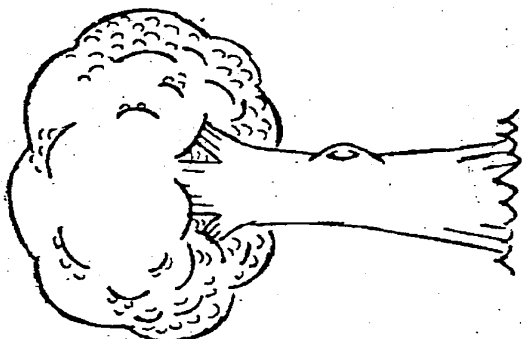
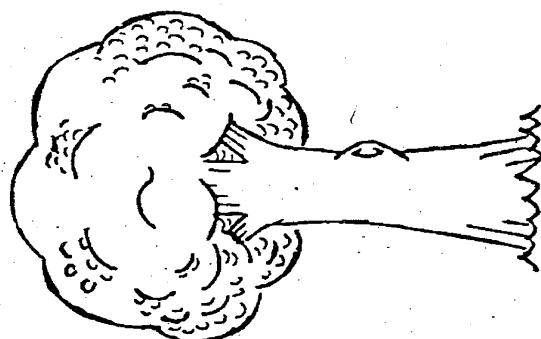
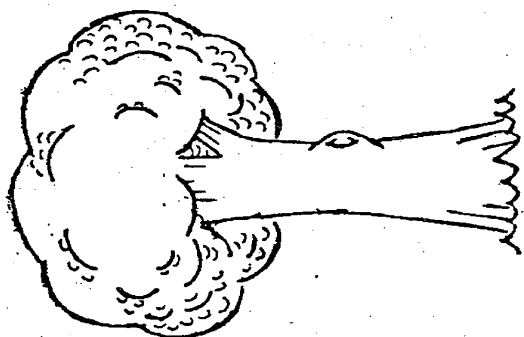
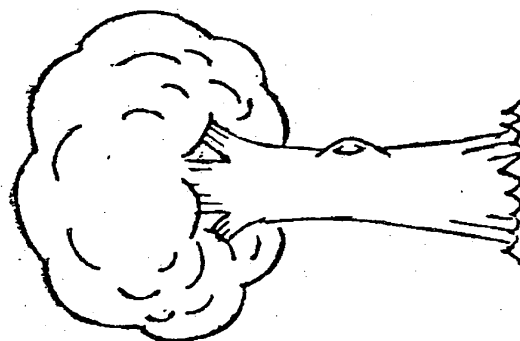
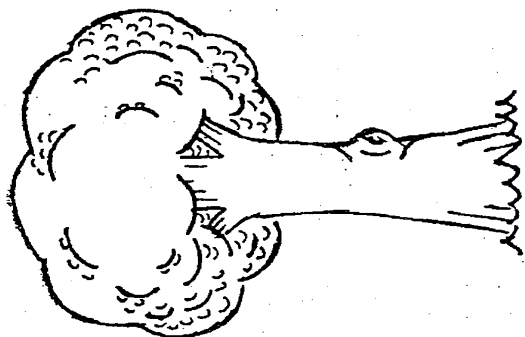
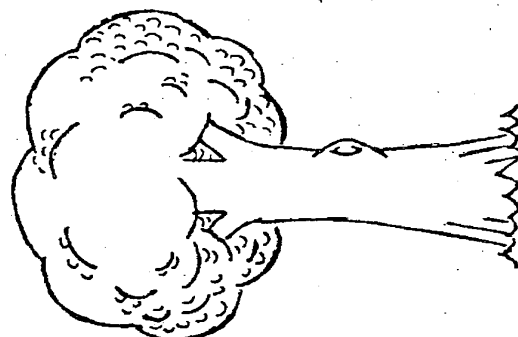
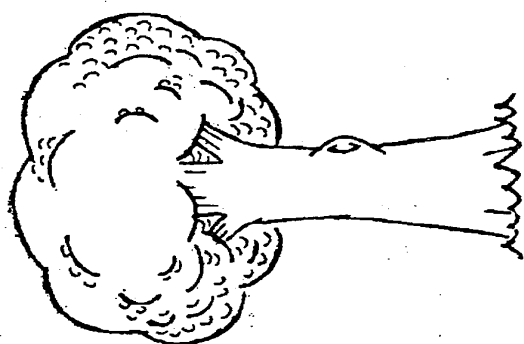


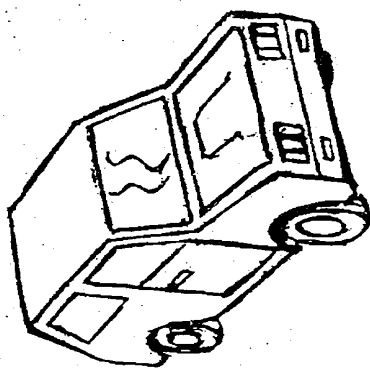


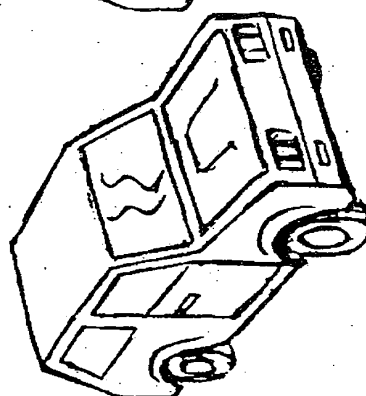
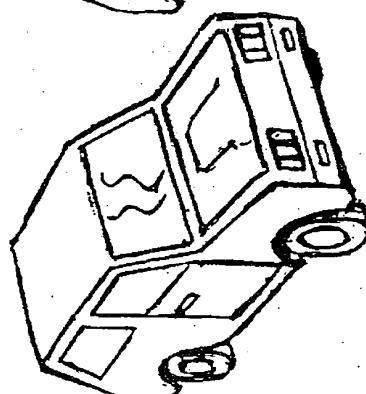
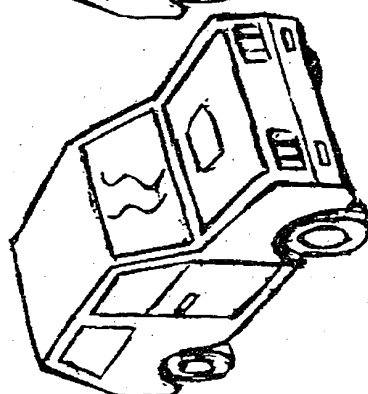
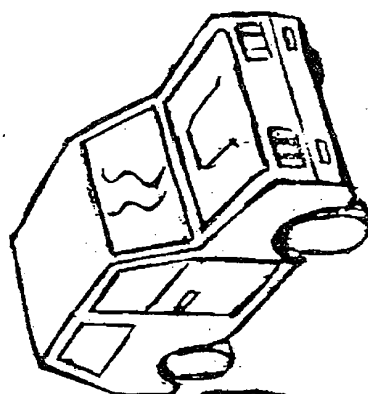
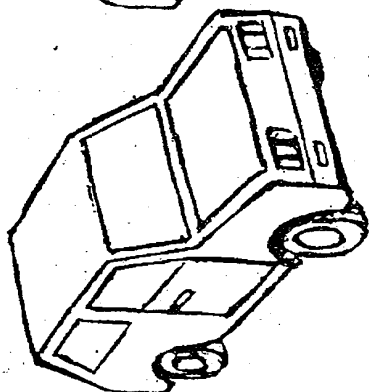
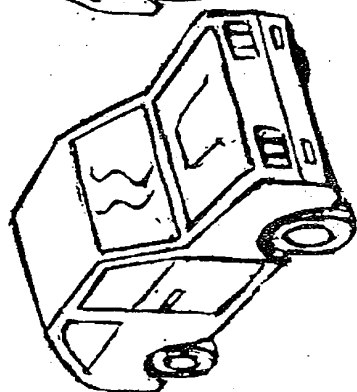
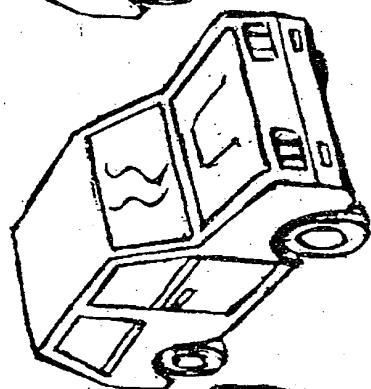
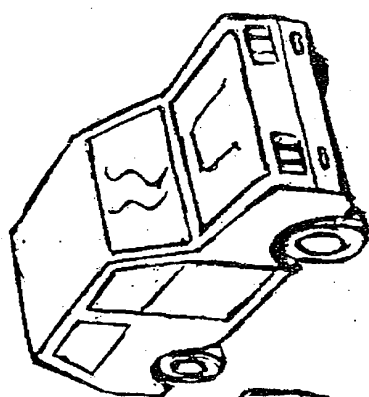


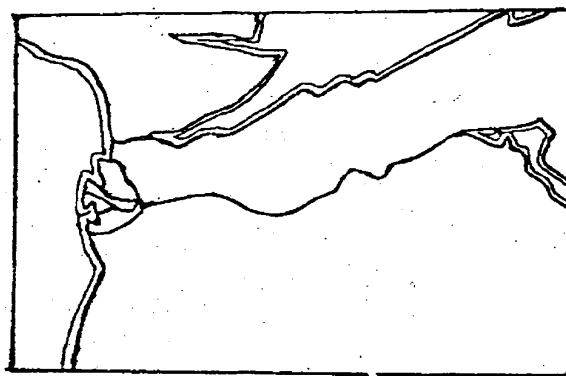


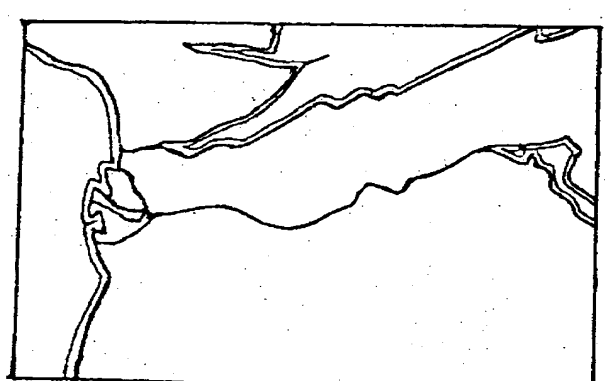
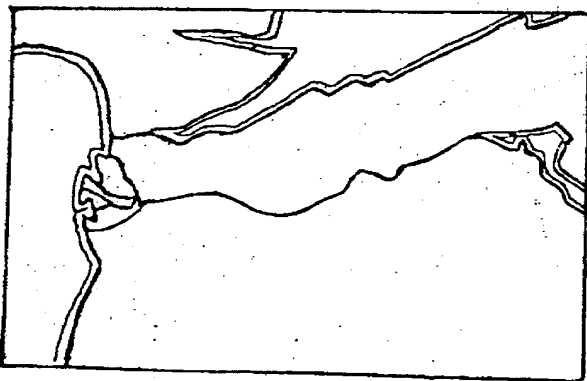
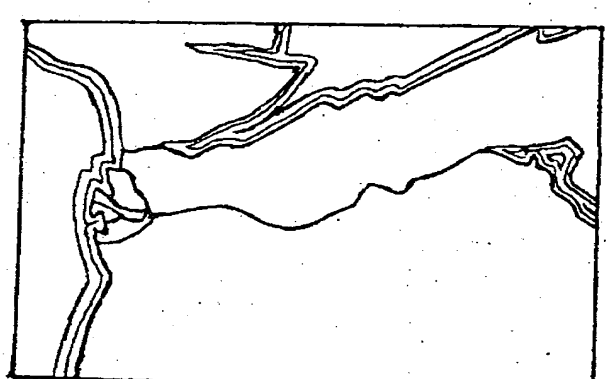
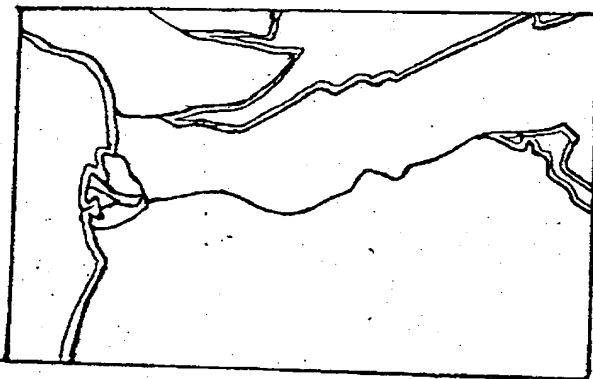
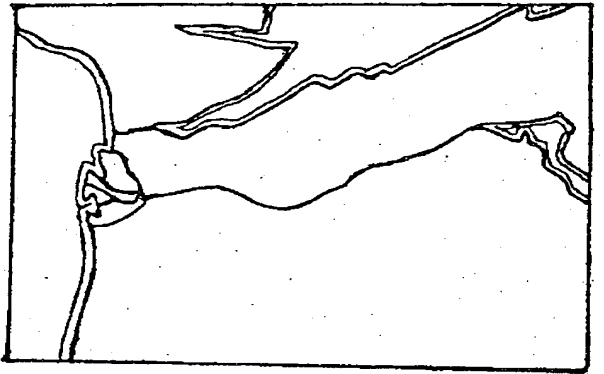
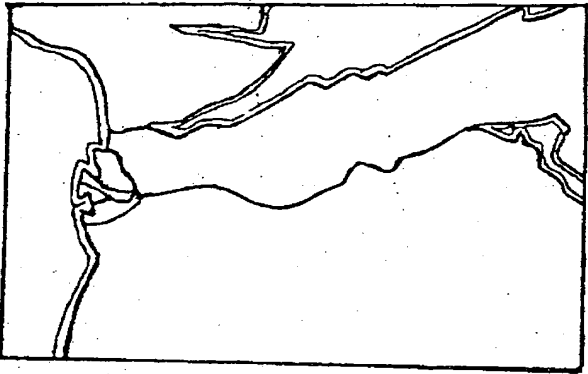
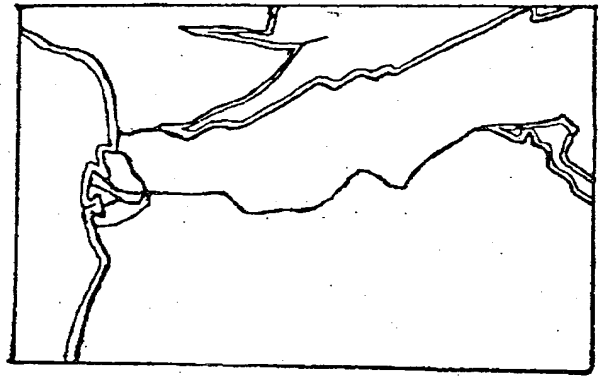
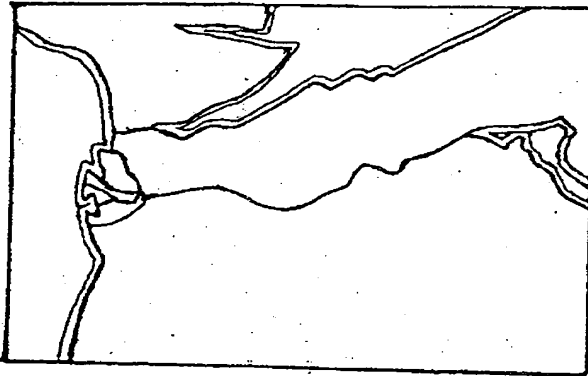


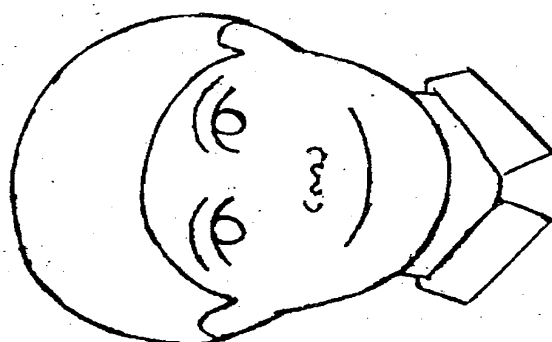


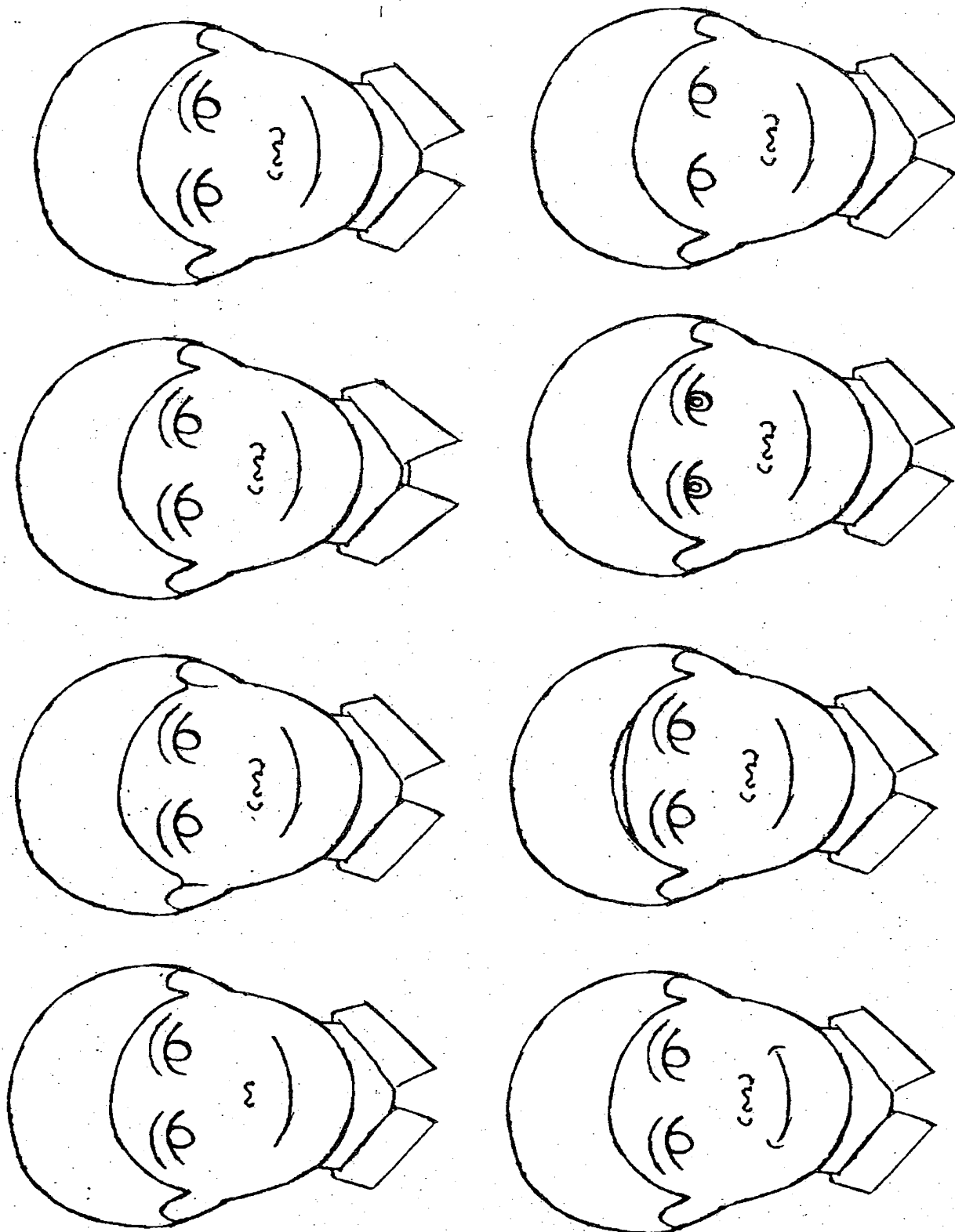


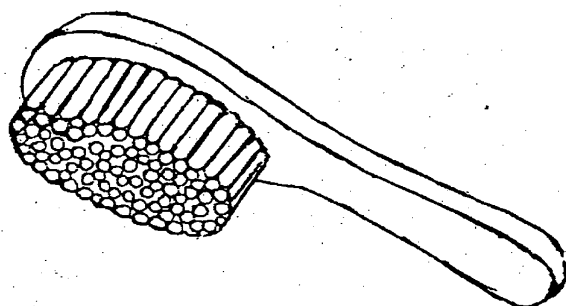




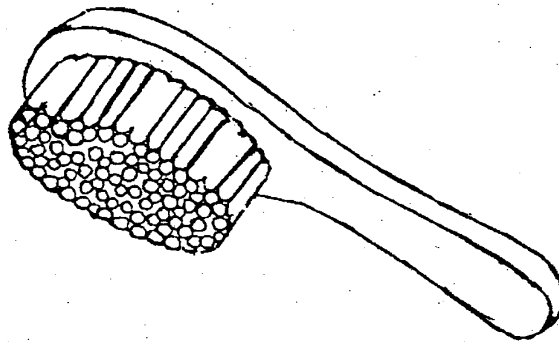
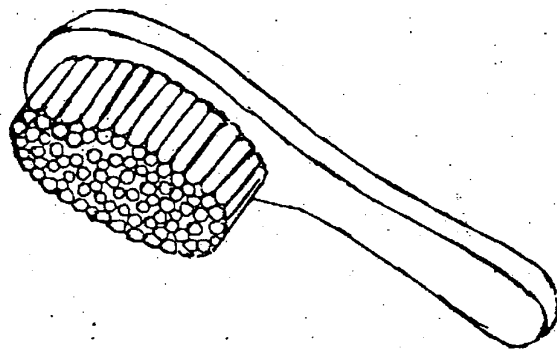
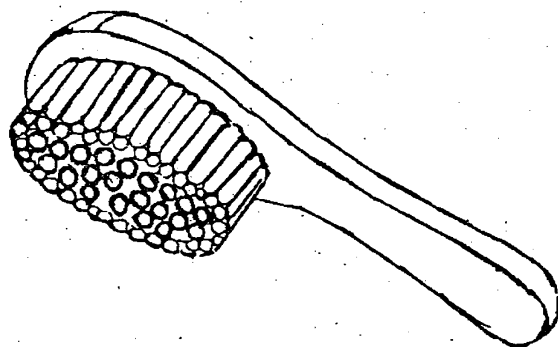
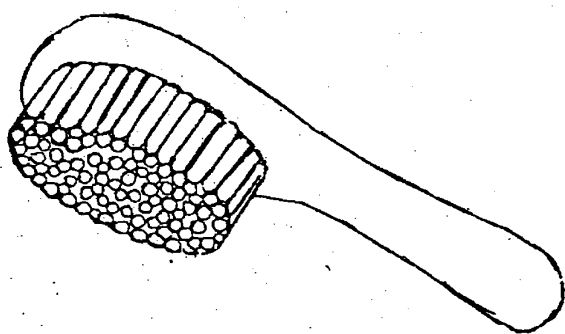
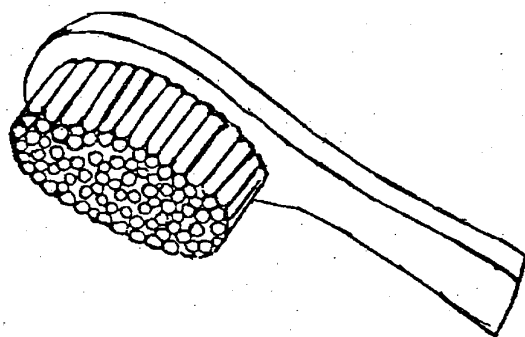
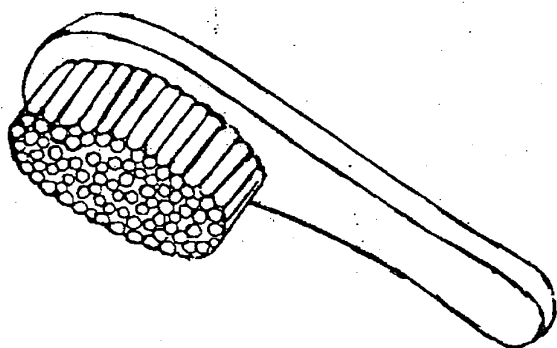
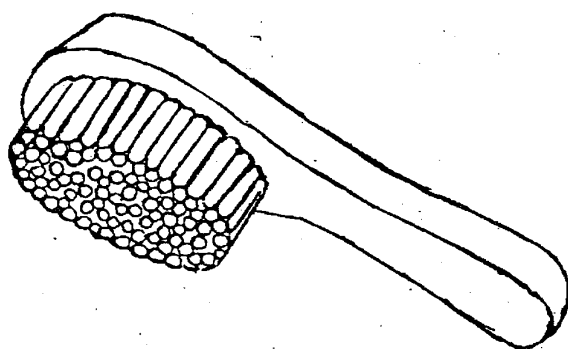
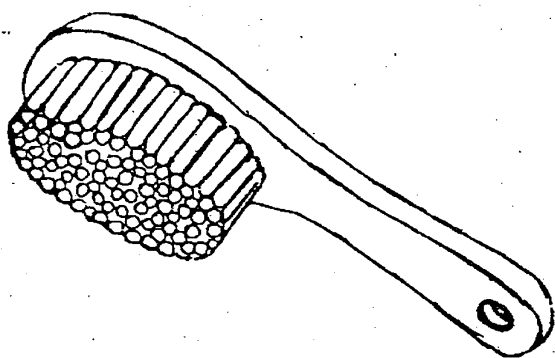


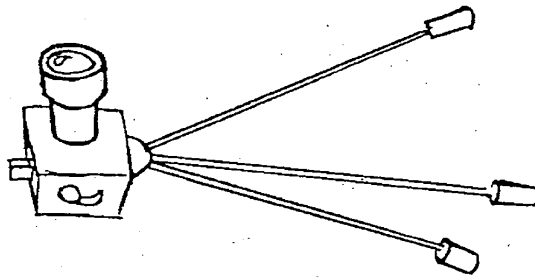


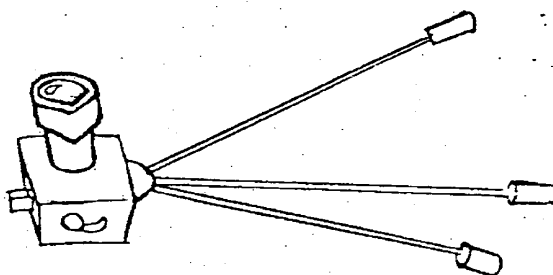
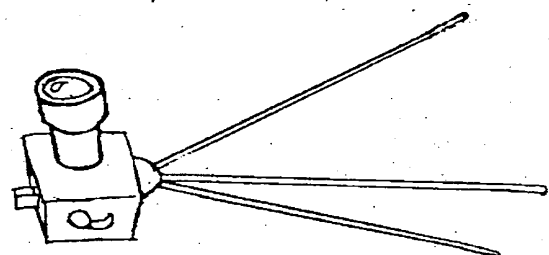
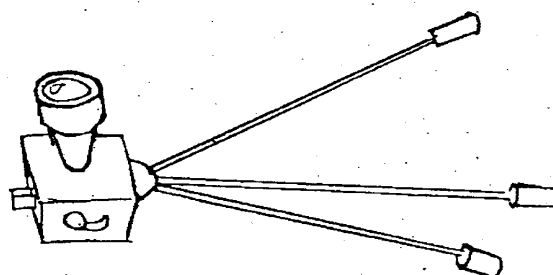
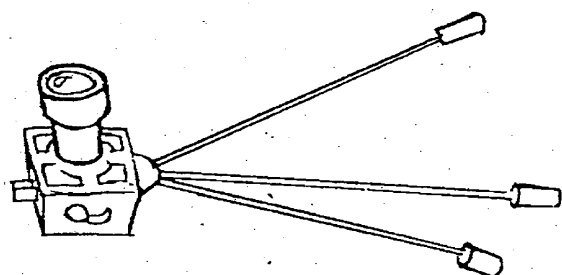
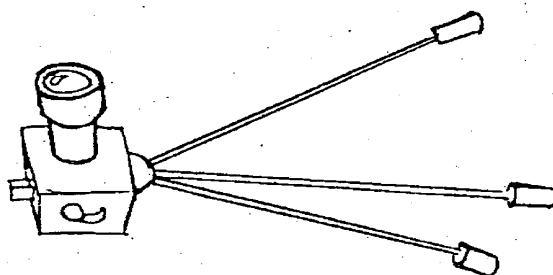
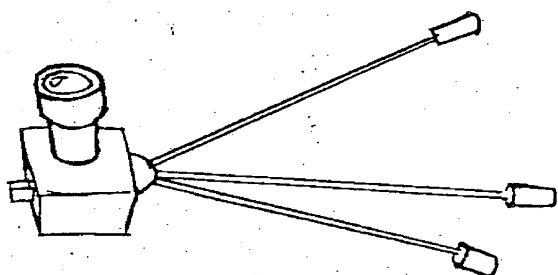
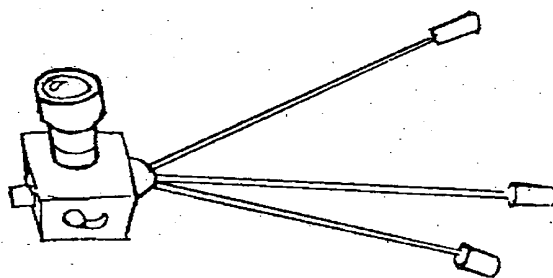
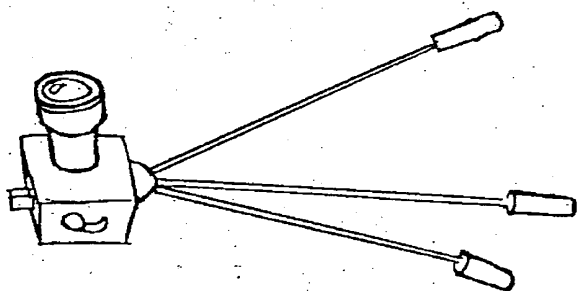


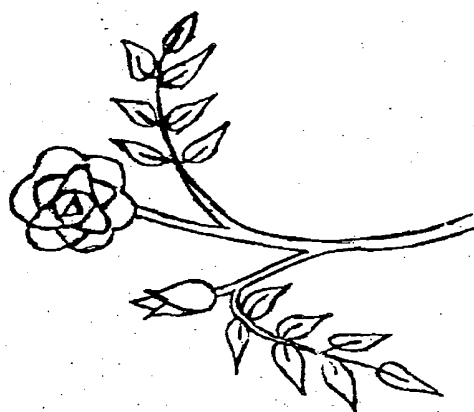


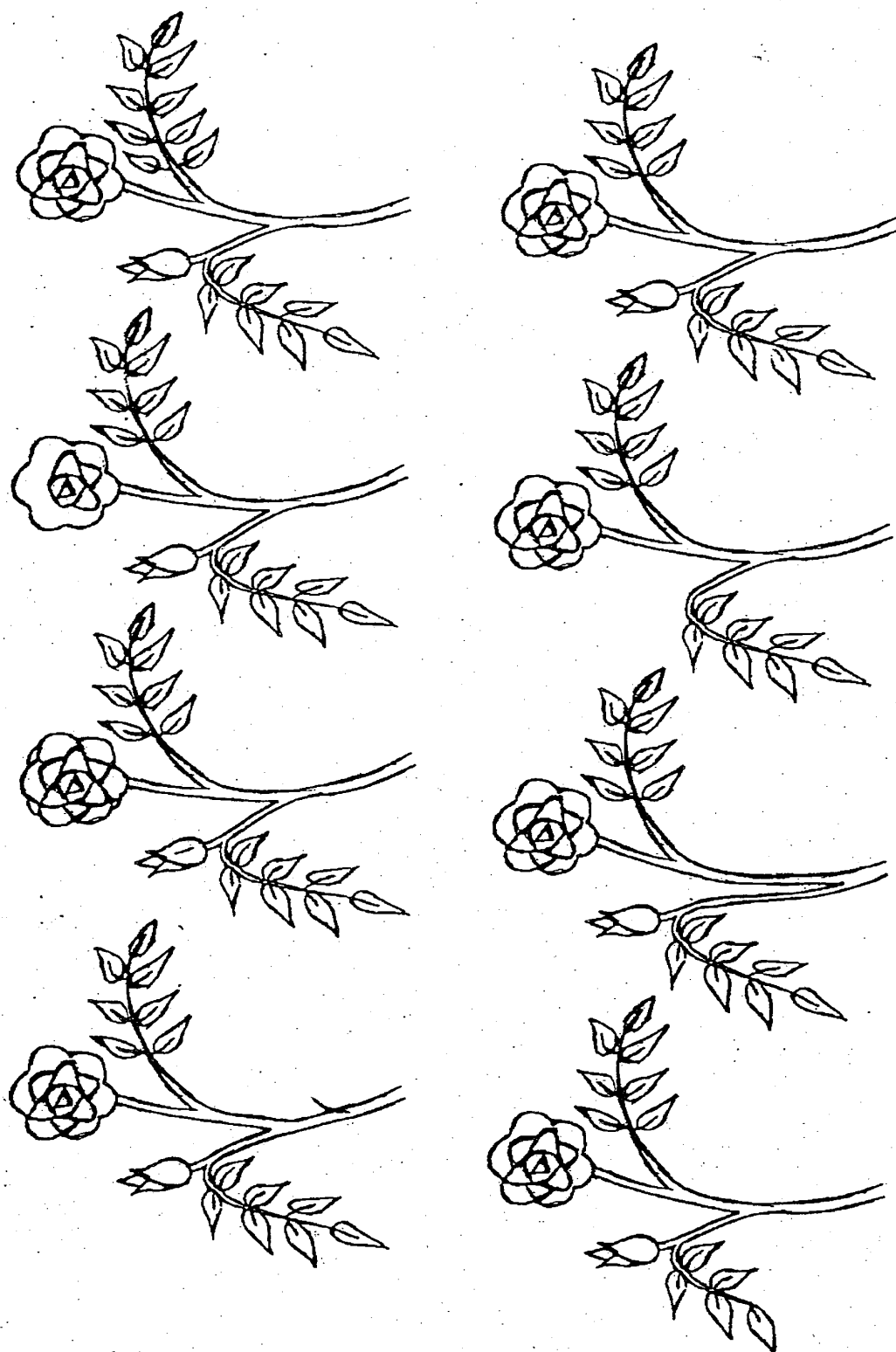


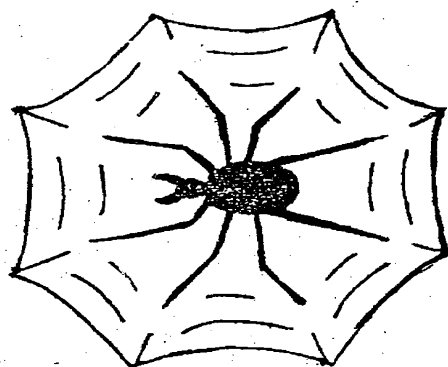


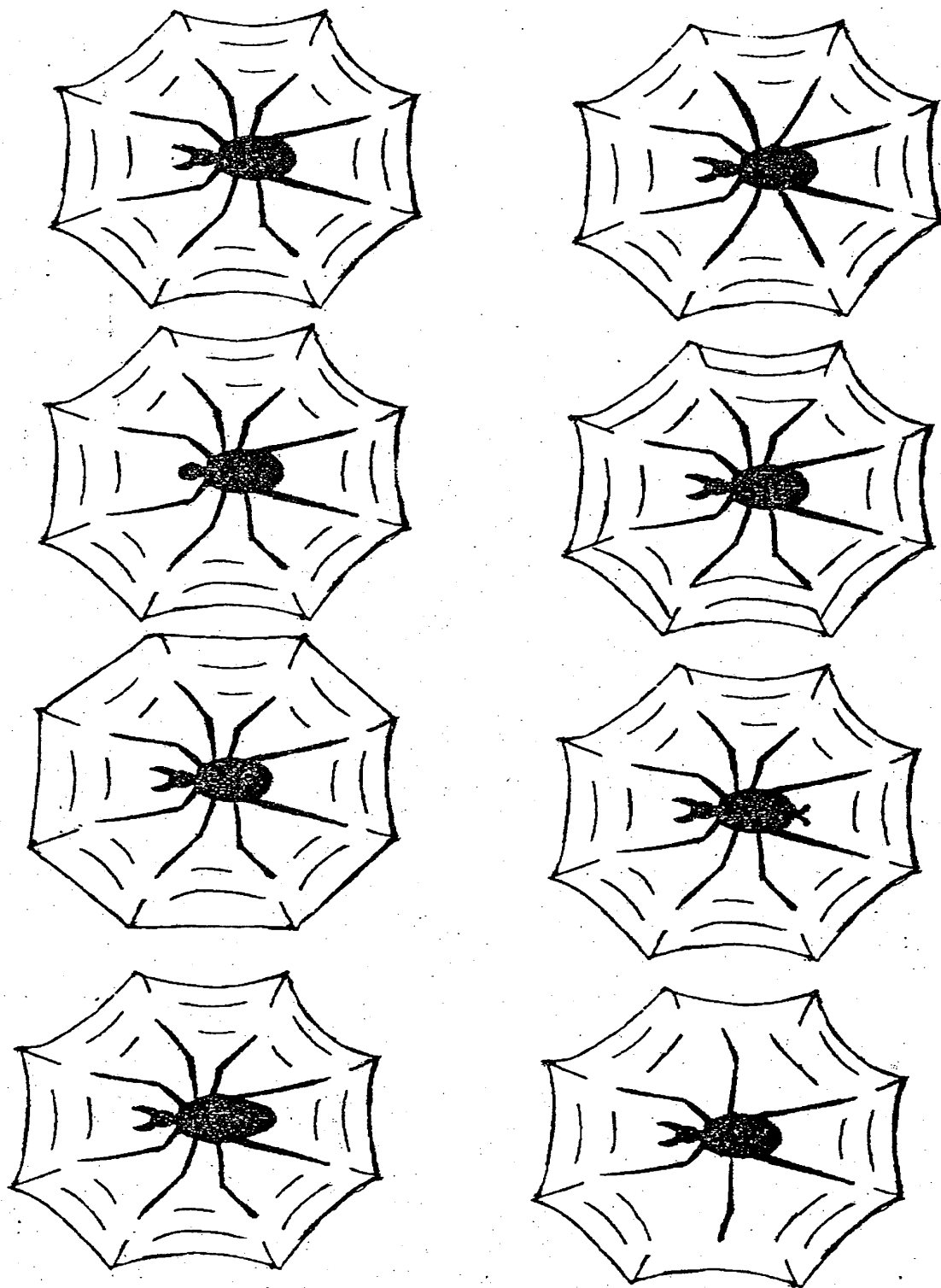


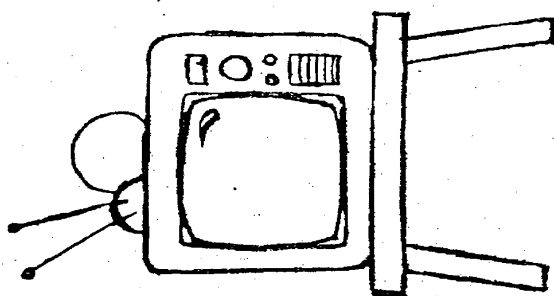




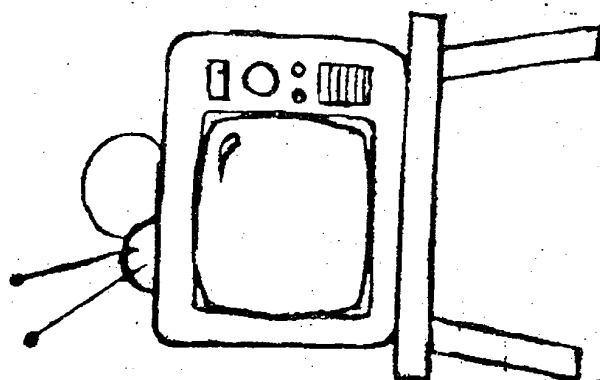
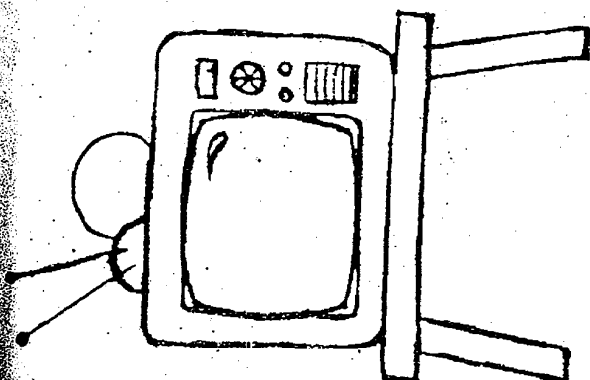
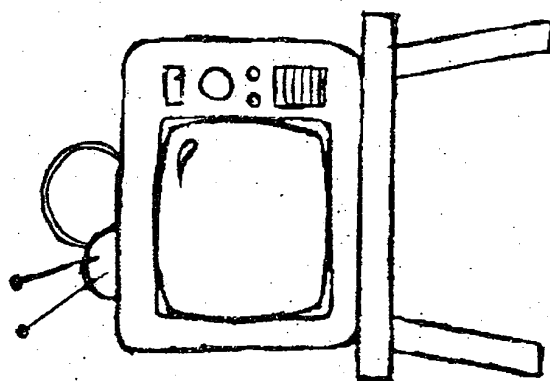
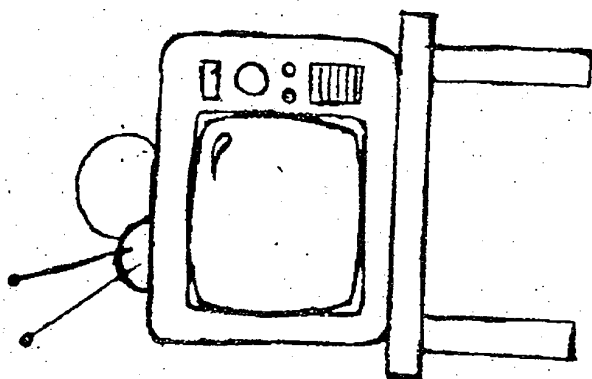
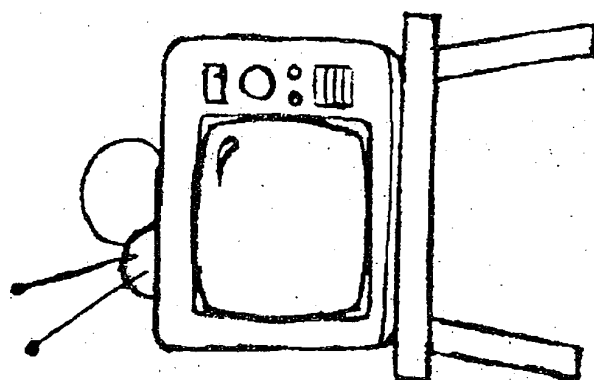
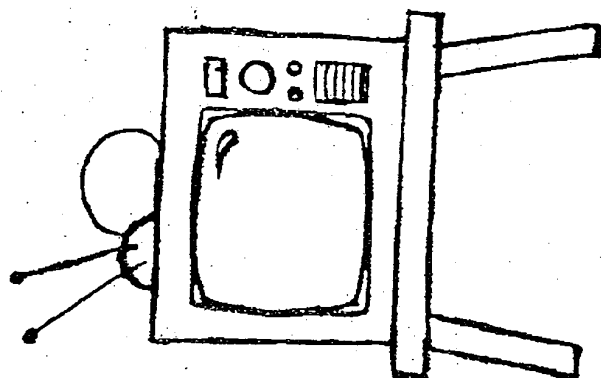
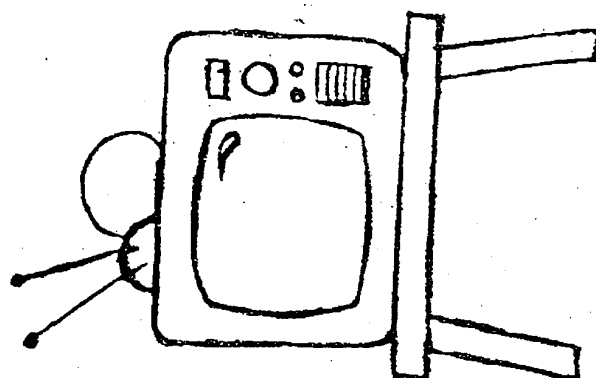
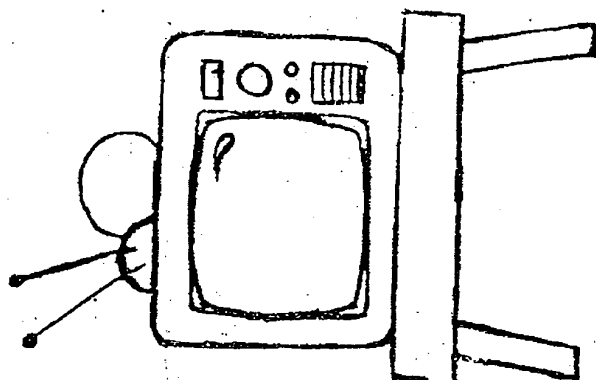












**Appendix E:**  
**INTERVIEWS**

**Before the interview, the researcher must:**

- Tell the participants that the interview may take approximately 15-30 minutes.
- Tell the participants that the interview will be recorded and transcribed; the researcher will show the interviewee the transcription before he analyses the data.
- Emphasise that only the researcher has the power to access and use the contents of the interview.

**A-Supervisors**

Name.....

Age.....

Specialisation .....

Level of experience.....

Residence.....

Academic background.....

**Interview Guide:**

As you know, my study is about the comparison between rural and urban students in reflective-impulsive (cognitive style) and creative thinking. In this case, the interview will focus on the differences between the two groups of students and the aspects that may affect a student's creative thinking. Any question before we start?

- 1) Do you think there are differences between rural and urban students in their ability to think creatively?
- 2) Do you think rural teachers are more helpful in improving a student's creative thinking than urban teachers are?
- 3) Do you agree that the school environment plays an important role in enhancing the student's creative thinking?
- 4) Do you agree that the home environment plays an important role in encouraging the student to be creative?
- 5) Do you agree that the level of experience of academic teachers in rural areas is less than teachers in urban areas?
- 6) Do you agree that motivation is important for a student's creative thinking?
- 7) Do you think that impulsive students are creative? Why?
- 8) Do you think that the age plays an important role in improving creative thinking for students? And at what age is a student's creativity most apparent?
- 9) Do you think that the teacher's encouragement may increase students' creative thinking? And to what extent?

10) Do you agree that the school must provide many facilities for students in order to improve their creative thinking?

11) Do you think there is a relationship between cognitive style and creative thinking?

### **B- Principals**

Name .....

Age .....

Residence.....

Specialisation .....

Grade taught.....

Level of experience.....

Academic background.....

Years of teaching experience whether in rural or urban.....

1- What does the word 'creative thinking' mean in your opinion?

2- How many years have you worked at this school?

3- How would you describe the school?

4- Do you think teacher plays an important role in enhancing the creative thinking of students? If the answer "Yes" to what extent is this effect?

5- Do you think the environment of the school helps students to be creative?

6- Do you think the rural parents are more active in encouraging creative thinking in their children compared to in urban settings?

7- Does the school provide all the services and facilities for students?

8- How is the general academic level of school students in your school?

9- Do you think that the students' creative thinking is reflected in their decisions?

10- What are the problems students may face thinking creatively at school?

11- Do you agree that the age of the student plays an important role in creative thinking?

12- Do you agree that reinforcement, reward and motivation are very important to improve creative thinking?

13- Do you think classroom overcrowding affects a student's chances of improving their creative thinking?

### **C-Teachers**

Name .....

Age .....

Residence.....

Specialisation .....

Level of experience.....

Academic background.....

Years of teaching experience .....

- 1- What does the 'creative thinking' mean in your opinions?
- 2- To what extent does the school improve a student's creative thinking?
- 3- Do you think that there is a relationship between creative thinking and reflective-impulsive dimension of the cognitive style? How?
- 4- Do you think that the impulsive student has a creative ability? Why?
- 5- Do you think that the teacher's methods may enhance a student's creative thinking?  
If yes, to what extent?
- 6- Do you agree that the cognitive style is essential for individuals? Why?
- 7- Do you think that the home environment may help to increase or decrease the level of students' creative thinking?
- 8- Do you think that the reflective students are normally creative thinkers?
- 9- Do you think that students who make several errors and attempts are creative students?
- 10- Do you think that there is a relationship between a student's creativity and their ability to make quick decisions?
- 11- Do you think that the curriculum improves a student's creativity?
- 12- Do you think that motivation is important to improve a student's creative thinking?
- 13- Do you believe creative thinking is important?

14- Which teaching methods do you think may help to improve a student's creative thinking?

15- Do you think the age of a student is important for creative thinking? Explain?

16- In your opinion, what is the age at which creativity appears in students?

**Appendix F:**  
**THE INTERVIEW RESPONSES**

## Section one: Supervisors

Semi structure Interviews	Question 1 Do you think there are differences between rural and urban students in their ability to think creatively?	Question 2 Do you think rural teachers are more helpful in improving a student’s creative thinking than urban teachers are?	Question 3 Do you agree that the school environment plays an important role in enhancing the student’s creative thinking?	Question 4 Do you agree that the home environment plays an important role in encouraging the student to be creative?				
Participants	Language							
	English	Arabic	English	Arabic	English	Arabic	English	Arabic
Supervisor 1	Yes. Many reasons: 1- Different environment 2- Families in the urban areas are more educated than rural family. 3- Teachers in rural areas are less active than teachers in urban areas.	- - -	No Students in rural settings have less creativity.		Yes It works to develop the students’ creativity.		Yes If parents are interested in creativity the result is certainly high.	
Supervisor 2	Yes Students in the urban are more creative than those in rural setting.		No Rural teachers are less active in dealing with student's creative.		Yes To encourage the students’ creativity, teachers must understand the meaning of creativity.		Yes If parents understand creativity their children will be more creative	
Supervisor 3	Yes Students are more creative in the city and many are involved in competitions outside Saudi.		No Rural teachers have a low awareness of creativity.		Yes If the School is a ware of the importance of creativity the level of students' creativity will increase.		Yes This role will be positive if families are educated.	
Supervisor 4	Yes Parents in rural areas are less educated, so they do not care about their children with regard to creativity.		No Students are less creative in rural areas. They participate less competitions.		Yes School has an important role to improve creativity for students.		Yes It is an important role. This role will be positive if the educational level of the family is high.	
Supervisor 5	Yes In regard to creativity, rural students have less than urban students.		No For many reasons: 1- Teachers in rural areas have less career experience 2- Teachers in rural areas do not attend training classes.	- -	Yes If the school values creativity, it will be apparent in the students.		Yes This role will be positive if parents are educated.	



Semi structure Interviews	Question 5 Do you agree that the level of experience of academic teachers in rural areas is less than teachers in urban areas?		Question 6 Do you agree that motivation is important for a student's creative thinking?		Question 7 Do you think that impulsive students are creative? Why?		Question 8 Do you think that the age plays an important role in improving creative thinking for students? And at what age is a students creativity most apparent?	
Participants	Language							
	English	Arabic	English	Arabic	English	Arabic	English	Arabic
Supervisor 1	Yes There are significant differences between schools.		Yes Motivation is very important. Without it, students can not be creative.		They may be creative but in small percentages. Creativity needs more time for making decisions.		Yes Creativity appears obviously most at age 14-19 years.	-
Supervisor 2	Yes Rural teachers are less experienced than urban teachers in using suitable teaching methods.		Yes It is very important.		I don't think so because creativity needs reflection before making decisions.		Yes It is appears From age 15-19 years.	-
Supervisor 3	Yes.		Yes There is no creativity without motivation.		I don't think so because creativity needs some time to think before making decision.		Yes The best stage is in secondary level (15-17 years).	-
Supervisor 4	Yes This is one of the principal reasons for the lack of creativity for students in rural settings.		Yes Without motivation the students could not solve the problems in creativity ways.		Solution needs time and that is not existent in the impulsive student.		Yes The best age for creativity is from 13-17 years.	-
Supervisor 5	Yes The reason is that most teachers in the village recently graduated from institutes therefore have less experience.		Yes Without motivation there is no creativity.		May be creative but in small percentages.		Yes To a great extent.	

Semi structure Interviews	Question 9 Do you think that the teacher's encouragement may increase students' creative thinking? And to what extent?	Question 10 Do you agree that the school must provide many facilities for students in order to improve their creative thinking?	Question 11 Do you think there is a relationship between cognitive style and creative thinking?			
Participants	Language					
	English	Arabic	English	Arabic	English	Arabic
Supervisor 1	Sure, encouragement is important for students' creativity.		Yes, facilities are important, but school administration must be persuaded as to the importance of creativity.		I think so, if a student is reflective when making decisions, he will be creative.	
Supervisor 2	Sure, encouragement is important for creativity. If student has not encouraged he can not achieve his work.		Yes, services are important, also teachers play an important role in improving creativity for students.		I think so, because creativity needs contemplation before making decisions.	
Supervisor 3	Yes. To great extent perhaps 95%.		It is necessary, but it is provided in the urban schools more than rural schools.		Yes, there is a positive relationship between reflective style and creativity (70%).	
Supervisor 4	Yes, it is very important.		Yes, it is important. But the facilities in rural schools are less than urban schools.		Yes, there is strong relationship between creativity and reflective style.	
Supervisor 5	Yes, it is important to improve students' creativity.		Yes, it positively affects the students' creativity.		Yes, there is a positive relationship between creativity and reflectivity (80%).	

## Section two: Principals

Semi structure Interviews	Question 1 What does the word 'creative thinking' mean in your opinion?		Question 2 How many years have you worked at this school?		Question 3 How would you describe the school?	
Participants	Language					
	English	Arabic	English	Arabic	English	Arabic
Principal 1	To innovate in the work field.		7 years		Students' standard is good in this school, also teachers' standard is good. In comparison, Services in the urban better generally than rural areas.	
Principal 2	To present new ideas which people will accept.		22 years		Students' learning style is low. Teachers are not interested in creativity. In relation to services, they are not too bad.	
Principal 3	To create new things		21 years		Students' standard and teachers' level are good. Regarding facilities in this school, there is not enough.	
Principal 4	Creation of a new thing		12 years		Students' standards in grade 10 is weak, also teachers' standards in this school are weak. In regard to services, they are acceptable.	
Principal 5	Producing new ideas.		3 years		Students' level are average. But teachers' standard are good. We have weak services in this school.	
Principal 6	Producing new thing.		7 years		Students' and teachers' standard are good. Whereas, the services are not too bad.	
Principal 7	To present new and useful ideas.		25 years		Students' standard are excellent. We are participating in creativity competitions. Teachers' standard is excellent. In regard to services in this school, they are well completed.	

<b>Principal 8</b>	Work proficiency.		13 years		Students' standard are excellent and teachers in this school are experienced in teaching, also we have excellent services.	
<b>Principal 9</b>	To get a new thing.		10 years		Students' standard are very good. Whereas, Teachers' level and services are excellent.	
<b>Principal 10</b>	Presenting a new and useful idea for society.		7 years		Students and teachers' standard very good , also services in this school are very good	
<b>Principal 11</b>	Bring a new idea.		8 years		Students' standard are very good. Whereas, teachers' standard are excellent.	
<b>Principal 12</b>	Unexpected, new ideas.		6 years		Students' standard are average, while teachers' level are very good. Services in this school are good.	

Semi structure Interviews	Question 4 Do you think teacher plays an important role in enhancing the creative thinking of students? If the answer "Yes" to what extent is this effect?		Question 5 Do you think the environment of the school helps students to be creative?		Question 6 do you think the rural parents are more active in encouraging creative thinking in their children compared to in urban settings?	
Participants	Language					
	English	Arabic	English	Arabic	English	Arabic
Principal 1	Yes, to a great extent in improving the student's creative thinking.		Yes, it helps the students in a percentage perhaps reaching 80%.		No, there are differences between parents in rural and urban. Most parents in rural areas are illiterate, so their children are less creative than urban areas.	
Principal 2	It depends on the teacher, if the teacher is interested in creativity sure, he will improve creativity of students.		Yes, it helps the students in a percentage perhaps reaching 50%.		No, because parents in rural settings are illiterate, so their role will be negative in regard to creativity of students.	
Principal 3	Yes, I think teacher helps to develop the students' creativity in a percentage perhaps reaching 70%		Yes, it helps them to be creative in a percentage perhaps reaching 70%		I think that parents in the city are more active in encouraging their children's creativity than parents in rural areas, because parents in rural areas are less educated than urban parents.	
Principal 4	Yes, teacher's role perhaps reaches 50% and 50% for student.		Yes, because it educates and gives every thing to the students. I suggest if the Ministry of Education employ the specialists for activity classes for every school will benefit.		Parents in the urban areas are more interested in their children' creativity than those in the rural areas. Because parents in rural areas are less educated compared with urban parents.	
Principal 5	It depends on the teacher, if the teacher is interested in creativity, he can encourage and support student's creativity.		Yes, the school here may help the creativity for students.		Parents in rural areas are less educated than urban parents, so their effect on the development of students' creativity is low.	
Principal 6	Yes, they play an important role perhaps reaches 80%		Yes, it helps in the creativity of students.		Parents in rural areas are less educated, so their effect in development of students' creativity is low when compared with the educated parents in urban areas.	
Principal 7	Yes, teachers play an important role in improving and encouraging the students' creativity.		Yes, school environment helps to improve the students' creativity to a		I think parents in urban areas are more interested in developing creativity in their children than	

			great extent. The best evidence is that student in this school participated in the international competitions for creativity.		parents in rural areas.	
<b>Principal 8</b>	Yes, teachers play an important role in regard to encouraging students' creativity.		Yes, school environment helps to improve students' creativity to a great extent.		No, I don't think parents in rural areas are encouraging creativity of their children, because they are less educated.	
<b>Principal 9</b>	Yes, teachers play an important role in improving students' creativity.		Yes, the school here helps and improves students' creativity.		No, parents in the city better help their children in order to be creative than parents in rural areas.	
<b>Principal 10</b>	Yes, to a great extent.		Yes, the school environment helps to improve the students' creativity to a great extent. Some students here participated in many competitions of creativity in and outside Saudi Arabia.		No, parents in rural areas are less active in encouraging their children's creativity compared with parents in urban areas.	
<b>Principal 11</b>	Yes, teachers play important role to improve children' creativity.		Yes, the school has an effect on improving the students' creativity.		No, because parents in rural areas less educated, so they don't know the value of creativity.	
<b>Principal 12</b>	Yes, the teacher plays an important role in improving students' creativity.		Yes, the school here works to improve students' creativity. Many students in this school participated in many competitions of creativity inside Saudi Arabia.		No, because parents in rural areas are less educated than urban parents, so they give less encouragement to their children's creativity.	

Semi structure Interviews	Question 7 Does the school provide all the services and facilities for students?	Question 8 How is the general academic level of school students in your school?	Question 9 Do you think that the students' creative thinking is reflected in their decisions?			
Participants	Language					
	English	Arabic	English	Arabic	English	Arabic
Principal 1	The facilities in this school are weak compared with urban schools.		The academic level of the students in this school is weak.		Not all students reflections are creative.	
Principal 2	Yes, there is a library and one lab in this school, but all facilities are very limited compared with urban schools.		The academic standard of the students in this school is low especially year 10.		Yes, to an extent perhaps 90%	
Principal 3	All facilities in this school are very weak. We need many tools for the lab.		The academic level of school students is good.		Yes, creativity needs reflective style in most cases to make decisions.	
Principal 4	Yes, this school provides students study requirements, but still limited compared with urban areas.		The academic level of school students is average.		Yes, because creativity needs reflection. On the other hand, the impulsive students often are not creative.	
Principal 5	The school has a lab for scientific materials, but lacks a lot of the main materials. Also, we have no library in this school.		The academic level of school students is better than other schools in rural areas.		Yes, I do.	
Principal 6	This school has low possibilities compared with urban schools.		The academic level of school students is good.		Yes. To a great extent perhaps 80%.	
Principal 7	Yes, we provide the students with what they need.		The academic level of school students is very good to excellent.		Yes, the creativity needs the reflective style, but not in all cases.	
Principal 8	Yes, this school provides students with all study requirements.		The academic level of school students is excellent.		Yes. To a great extent.	
Principal 9	To great extent, the school provides the students with what they need.		The academic level of school students is good (80%)		Yes. To a great extent.	

<b>Principal 10</b>	Yes, to a great extent.		The academic level of school students is very good.		Yes, to a great extent.	
<b>Principal 11</b>	The school provides the students with what they need.		The academic standard of the students in this school is good.		Yes, to a great extent.	
<b>Principal 12</b>	Yes, this school provides students with all their learning requirement such as: books, the access to internet and means.		The academic level of school students is good.		Yes, to a great extent.	

<b>Semi structure Interviews</b>	<b>Question 10</b> What are the problems students may face thinking creatively at school?	<b>Question 11</b> Do you agree that the age of the student plays an important role in creative thinking?		<b>Question 12</b> Do you agree that reinforcement, reward and motivation are very important to improve creative thinking?		
<b>Participants</b>	<b>Language</b>					
	<b>English</b>	<b>Arabic</b>	<b>English</b>	<b>Arabic</b>	<b>English</b>	<b>Arabic</b>
<b>Principal 1</b>	The school administration and teachers do not reward the creativity of the students in the school.		Yes, and the best age for creativity is at age 12 to 15 years.		Yes, it is very important for improving the student creativity.	
<b>Principal 2</b>	There are no problems that hinder creative thinking in this school.		Yes, and the best age for creativity is at age 13 to 25 years.		Sure, if the school rewarded creative students, they will do better.	
<b>Principal 3</b>	There are some problems that face students in this area such as: family and society. This environment does not help to develop creativity of students.		Yes, and the best age for creativity is at age 8 to 30 years.		Yes, it is very important and affects the students' creativity positively	
<b>Principal 4</b>	Most problems that are faced by students in this school are the teachers who have less experience, so they don't care about students' creativity.		I think there is no specific age for creativity, but we can say from 14 years and above.		Yes, it is very important. If the creative student is not rewarded, he can't produce.	



<b>Principal 5</b>	There are no problems in this school.		Yes, and the best age for creativity to appear is at age 15 to 21 years.		Yes, the rewarding may increase the level of creativity of the students.	
<b>Principal 6</b>	There is no problem in this school.		Creativity begins to appear from 7 to 18 years.		Yes, it is very important if there is no creativity.	
<b>Principal 7</b>	There are no problems		Yes, generally it begins from 9 to 18 years.		Sure, the rewarding has a great role in encouraging student creativity.	
<b>Principal 8</b>	There are no problems.		Yes.		The rewarding is very important in improving the students creativity.	
<b>Principal 9</b>	There are some problems, but we solve them.		Yes, I do		The rewarding is important to develop students creativity.	
<b>Principal 10</b>	There is no problem in this school.		Yes. To a great extent.		The rewarding is very important in improving the students' creativity.	
<b>Principal 11</b>	There is no problem in this school.		Yes, and I think the best age for the appearance of creativity is from 14 to 20 years.		Sure, rewarding is very important for creativity.	
<b>Principal 12</b>	There is no problem in this school.		Yes, and I think the best age for creativity to appear is 16 years.		Yes, rewarding is very important for student creativity.	

<b>Semi structure Interviews</b>	<b>Question 13</b> Do you think classroom overcrowding affects a student's chances of improving their creative thinking?	
<b>Participants</b>	<b>Language</b>	
	<b>English</b>	<b>Arabic</b>
<b>Principal 1</b>	Sure, the classroom overcrowding affects the learning processes as well as creativity.	
<b>Principal 2</b>	Sure, it has an affect and doesn't give the student chance to be creative.	
<b>Principal 3</b>	Yes, it affects the standard of students' creativity.	
<b>Principal 4</b>	Yes, it gives less the opportunity for the student to show creativity.	
<b>Principal 5</b>	Yes, it lessens the chance of the appearance of creativity.	
<b>Principal 6</b>	Yes, in this case it would be hard for the teacher to discover student creativity.	
<b>Principal 7</b>	Yes, it lessens the opportunity for creativity to appear.	
<b>Principal 8</b>	Yes, it affects the development of students' creativity.	
<b>Principal 9</b>	Yes, it negatively affects on the level of students' creativity.	
<b>Principal 10</b>	Yes. If the classroom is overcrowded with students, the level of student creativity will decrease.	
<b>Principal 11</b>	Yes, it affects and decreases the opportunity for student creativity to appear.	
<b>Principal 12</b>	Yes, it decreases the opportunity for student creativity to appear.	

### Section three: Teachers

Semi structure interviews	Question 1 What does the 'creative thinking' mean in your opinions?		Question 2 To what extent does the school improve a student's creative thinking?		Question 3 Do you think that there is a relationship between creative thinking and reflective-impulsive dimension of the cognitive style? How?	
Participants	Language					
	English	Arabic	English	Arabic	English	Arabic
Teacher 1	High ability and the fast understanding.		This school pays attention to students and teachers attendance, but does n 't pay attention to creativity.		There is a relationship between creativity and reflective- impulsive style. This relationship is average.	
Teacher 2	Student's cleverness in creation in any field.		The school administration tried to develop the students' creativity theoretically only not practically.		There is a positive relationship between reflective style and creativity.	
Teacher 3	Presenting new ideas.		This school does n 't care about creativity		There is a strong relationship between reflection and creativity, a lesser relationship between impulsivity and creativity.	
Teacher 4	To present a new thing.		The school does not care with creative student.		There is a strong relationship between reflection and creativity.	
Teacher 5	To produce a new thing.		The first consideration in this school is to finish curricula not to develop creativity.		There is a strong relationship between reflection and creativity, while a weaker relationship exists with impulsivity.	
Teacher 6	Presents a new thing.		No school in rural areas helps to develop creative students. .		I think there is a strong relationship between creativity and impulsive style ( perhaps 75%).	
Teacher 7	Creation of new methods.		This school helps the creative students, but in low percentage (20%).		There is a strong relationship between impulsive style and creative thinking.	

Teacher 8	Create new ideas.		This school helps to develop the creativity of students to a level of 5%.		There is relationship between creativity and reflective style. To extent of, perhaps 65%.	
Teacher9	Create a new thing.		This school participates in developing the level of creativity, but in low percentages (10%).		The relationship between creativity and reflective style is high. Perhaps 70%.	
Teacher 10	Creation and developing an idea or a patent.		This school does n't work to develop the level of students' creativity.		The relationship between creative thinking and reflective style is high, perhaps 70%.	
Teacher 11	To go outside the familiar, distinguishing talent.		This school does not contribute in developing the level of students' creativity.		The relationship between creative thinking and reflective is high, perhaps 70%.	
Teacher 12	It means the appearance of abilities in any field.		This school works to develop the level of students' creativity, but to a low percentage (30%).		The relationship between creative thinking and impulsivity is low (20%), while it is high (80%) between creative thinking and reflection.	
Teacher 13	Creativity is the person's distinguishing ideas in cases that interest society.		This school does not work to improve the students' creativity.		There is a strong relationship between creative thinking and impulsive style, while it is weak with reflective.	
Teacher 14	Bring a new thing.		This school does not work to improve students' creativity.		There is strong relationship between creative thinking and impulsivity.	
Teacher 15	Present a new thing.		This school is more interested in official workings (such as students attendance) more than interested. in the creative students.		There is a strong relationship between creative thinking and reflection (70%).	
Teacher 16	Presenting a new ideas.		This school concentrates on creative thinking as a part of educational aims. The staff and school, there fore administration encourage the students' creativity.		The relationship between creative thinking and reflective style (70%) is more than impulsive style (30%).	

Teacher 17	To present new ideas.		This school has all facilities that teachers and students need; also the staff here encourages the creative students.		To be creative needs more reflection.	
Teacher 18	Finding a new idea.		This school works seriously to deal with the creative students. Therefore, many students in this school participated in the Robot competition in China this year (2008).		The relationship between impulsivity and creativity are low (35%) compared with reflection is high (65%).	
Teacher 19	To present a new thing.		The school works seriously to assist the creative students.		The relationship between creative thinking and impulsive style is weak (20%), but it is strong with reflective (80%).	
Teacher 20	Creating new ideas.		The school works seriously to improve students' creativity.		There is a strong relationship between creative thinking and reflective style (80%), while it is low with impulsivity (20%).	
Teacher 21	To present a new thing.		This school works to improve students' creativity.		The relationship between creative thinking and impulsive style is weak (25%), while it is strong with reflective (75%).	
Teacher 22	Creating a new idea.		This school works to develop the students' creativity.		The relationship between creative thinking and reflective style is high (90%). while it is weak with impulsivity (10%).	
Teacher 23	To present new ideas		This school helps to improve creative students. To, the extent of perhaps 70%.		The relationship between creative thinking and reflective style is good, to, the extent of perhaps 65%, while it is low with	

					impulsive style (35%).	
Teacher 24	Presenting new thoughts		This school provides students with all needs. Also, it is dealing the creative students.		The relationship between creative thinking and reflective style is good, to, the extent perhaps 70%, while it is low with impulsive style (30%).	
Teacher 25	Solving problems in new way.		This school works to improve creative students.		The relationship between creative thinking and reflective is high, to the of extent perhaps 80%. Whereas, low with impulsivity.	
Teacher 26	Discover new things		This school works seriously to develop students' creativity.		The relationship between creative thinking and reflective style is good, to the extent of perhaps 80%, while it is low with impulsive style, to the extent of perhaps 20%.	
Teacher 27	Solving problems in a new manner.		This school works to improve creative students.		The relationship between creative thinking and reflective style is good, to the extent of perhaps 80%, while it is low with impulsive style, to the extent of perhaps 20%.	
Teacher 28	To create a new thing.		This school works well to develop students' creativity.		The relationship between creativity and impulsive is weak, while it is strong with reflective style.	
Teacher 29	To solve problems in the best way.		The school here plays attention to improving the students' creativity.		The relationship between creativity and impulsive is weak, while it is strong with reflective style.	
Teacher 30	Presenting new and useful ideas.		The school is interested in improving creative students.		The relationship between creativity and impulsivity is weak (25%), while it is strong with reflective style (75%).	

Semi structure interviews	Question 4 <b>Do you think that the impulsive student has a creative ability? Why?</b>		Question 5 <b>Do you think that the teacher’s methods may enhance a student’s creative thinking? If yes, to what extent?</b>		Question 6 <b>Do you agree that the cognitive style is essential for individuals? Why?</b>	
Participants	Language					
	English	Arabic	English	Arabic	English	Arabic
Teacher 1	Not always		Yes, Selection of appropriate teaching methods for students is the basis of education. It makes the student think and find information correctly. The diversification in teaching methods is very important.		Sure, it is important.	
Teacher2	Yes, the impulsive student can sometimes be creative.		Yes If the teacher used appropriate teaching methods for students, it would increase the level of student's creativity.		I think that it is not important.	
Teacher3	No, I don't think so.		Sure, if the teaching method is good, it may affect the improvement of students creativity. Diversity has a positive role in improving creativity for students.		Yes, it is important for the individual.	
Teacher4	I don’t think so.		Sure, if the teaching method is good, it will have a positive affect on creative students. Diversity in teaching methods has a positive role in improving creativity.		Yes, It is important for individuals.	
Teacher5	I don’t think so. The impulsive student makes quick decisions, so he is not creative.		The teaching method has an effect on improving the level of students creativity. Sure, diversity in teaching		Yes, cognitive styles are important for the individual.	

			methods has an effective role in improving creativity.			
Teacher 6	Yes, to a great extent.		Yes, and the diversity is important as well.		Sure, it is important. Students who use the cognitive style may change their thinking to the better way.	
Teacher 7	Yes, I don't know.		Yes, it helps and the diversity is important.		Sure, to a great extent perhaps 70%.	
Teacher 8	Yes, I think so.		Yes, it is important and diversity is very useful.		Very important	
Teacher 9	No, because creativity needs time to make decisions.		I think so, and diversity of methods helps to develop creativity.		I don't think so.	
Teacher 10	Yes, to the extent perhaps 70%.		Yes, the appropriate method has a role in improving the level of creative students.		Yes, it is important for students.	
Teacher 11	No, I don't think so		Yes, the appropriate method has an effect on improving the student's creativity.		Yes, it is important	
Teacher 12	I don't think so , because students who are impulsive haven't creative abilities.		Yes, and the diversity is useful especially for reflective students.		Yes, in order to use their abilities in the right way	
Teacher 13	Yes, I think so, because the impulsive student makes several attempts without any fear in order to reach the solution.		Sure, it has an effect to improve the student's creativity.		Yes, it is important.	
Teacher 14	No, because the impulsive student usually makes quick decisions.		Certainly, using the appropriate teaching method has an effect on the level of creative student.		Yes, it is very important .	
Teacher 15	I don't think so, because creativity needs a reflective style.		Yes, it is useful. To an extent of perhaps 60% . Also, diversity in teaching methods is important.		Yes, it is very important, because it helps the teacher to choose the best way for improving	



					creative students.	
Teacher 16	I don't think so, because the student who is impulsive makes quick decisions which rarely result in creative work.		Yes, teaching methods have an obvious role in developing and dealing the creative students.		Yes, because if the teacher know the cognitive style of the students, he can use Appropriate method of teaching for students.	
Teacher 17	I don't think so, because more impulsive student is less creative.		Certainly, this is obviously clear with creative students. Diversity in teaching methods is important.		Yes, if the teacher knows the cognitive style of students, he can use the suitable teaching method.	
Teacher 18	I don't think so, because creativity needs thinking before making decisions.		Yes, to a great extent and diversity in teaching methods helps to improve creative students.		Yes, if the teacher knows the student's cognitive style, he will be able to use the suitable teaching method.	
Teacher 19	No, because the impulsive student has a desire to get the solution without thinking, so he makes many mistakes.		Sure, teaching methods have a positive effect on improving the student's creativity and diversity has an effect as well.		Yes, it is important	
Teacher 20	No, because impulsive students don't think, so they makes many mistakes.		Sure, if the teaching methods are good it may affect the level of student's creativity.		Yes, it is important	
Teacher 21	Not always.		Yes, teaching methods help to develop the level of creative students.		Certainly, if the teacher know the cognitive styles of students, he will be able to use the most suitable teaching methods.	
Teacher 22	Rarely, because creativity needs thinking before decision making.		Yes, teaching methods can improve the level of creative students		Yes, if the student know his style, he can improve his level of creative thinking.	
Teacher 23	No, it is not a condition.		Teaching methods have a positive role in		Sure, it is important for	

			developing the creative students.		individuals.	
Teacher 24	No, because the impulsive student's ideas are always dispersed and their decisions are quick.		Sure, teaching methods are important in improving the level of creative students and diversity is important.		Yes, the knowledge of the cognitive style of students may help them to increase the level of their creativity.	
Teacher 25	No, the impulsive student can not be creative, because creativity needs reflection and thinking.		Yes, it helps to improve the creative students. Also, diversity in teaching methods is required to encourage the creative students.		Sure, to deal with individuals' mistakes.	
Teacher 26	I don't think so.		Yes, teaching methods have a role in developing the creative students and diversity is important to attract the students' attention.		Yes, it is important. When a student knows his cognitive style , this is may help him to be creative.	
Teacher 27	No, because the impulsive student loses many chances.		Yes, teaching methods are necessary in improving the students' creativity and diversity is important as well.		Yes, if the teacher knows the cognitive style of the student, he can use the most suitable method.	
Teacher 28	I don't think so.		Teaching methods have an effect on developing the creative students and diversity is necessary to attract the students' attention to the lesson.		Yes, it is important. If the teacher know the cognitive style of student, he can develop the student's abilities.	
Teacher 29	I don't think so.		Yes, if the teaching methods are good, it helps to improve the students' creativity.		Yes, it is important. If the student knows his character, he can improve his abilities.	
Teacher 30	No, because the impulsive student does not think about any problem due to his quick decisions, so he is not creative.		If the teaching methods are good, it may help to improve the creative students.		Yes, it is important. If the student knows his cognitive style, he can improve his abilities.	

Semi structure interviews	Question 7 <b>Do you think that the home environment may help to increase or decrease the level of students’ creative thinking?</b>		Question 8 <b>Do you think that the reflective students are normally creative thinkers?</b>		Question 9 <b>Do you think that students who make several errors and attempts are creative students?</b>	
Participants	Language					
	English	Arabic	English	Arabic	English	Arabic
Teacher 1	Yes, the family plays the main role in creativity level. Therefore, if the student is creative the family may encourage or discourage him		Yes, most of them are creative.		No, they can 't be creative.	
Teacher 2	Yes, it has the main role to encourage creative students.		Yes, but not always because the person who is reflective can not bring out his ideas due to the discouragement of those around him.		No, I don’t think he is a creative student.	
Teacher 3	Yes, family has a role in improving creativity of his children.		Yes, I do.		I don’t think they are creative.	
Teacher 4	Yes, family has a role in improving creativity whether positive or negative.		I think they are creative. To an extent of perhaps 87%.		I don’t expect that.	
Teacher 5	Yes, family has a role in improving creative thinking for children.		Yes, reflective students are creative in most cases.		I don’t think so, because student who make several mistakes can not be creative.	
Teacher 6	I expect that family has an effect of perhaps 50% while, school has an affect of 30% and the rest of percentage is the student (20%).		No, the impulsive students are creative.		I think they are not creative.	
Teacher 7	Yes, family has an important role, to an extent of perhaps 40% and 30% for school while, the rest of the percentage is with		Sometimes, to extent perhaps 75%.		May be creative but in other field.	

	the student.					
Teacher 8	Family has a more important role (80%) than school (20%).		May be creative in 80% of cases.		No, he is not creative.	
Teacher 9	Yes, family has an important role (60%) to encourage creative students, while the rest of percentage is with the school.		Some times		I don't think so.	
Teacher 10	I think family has an important role (80% affect) on the students' creativity. While society has an affect of 20% on students.		I don't think they are creative.		Yes, they may be creative.	
Teacher 11	I think the family is the origin in education. It has an affect (perhaps 70%) on the level of students' creativity.		I think they may be creative, to an extent of perhaps 70%.		I don't think so, because creative thinking needs reflection in making decisions.	
Teacher 12	Yes, family has an important role in encouraging the creative students, but in this school family has a lesser role, compared with urban schools.		I think they may be creative (70%).		I don't think so, because creativity needs reflection in making decisions.	
Teacher 13	Sure, the family has an effective role in improving creative thinking, to the extent perhaps 50% .		Yes, to the extent of 50%		I don't think so.	
Teacher 14	Yes, the educated family has an effective role in improving creative thinking for students, to the extent of 90%,.		Yes, in most cases they are creative.		I don't think so.	
Teacher 15	Of course, the educated family has an effective role in improving creative thinking for students, to the extent of 80%,.		Yes, usually the creative students are reflective.		I don't think so.	
Teacher 16	Yes, the educated family has an effective role in encouraging the creative students, to the extent of perhaps 65%.		Yes, usually the reflective students are creative, because they are reflective in making decisions.		Students who make several errors in the MFFT are not creative.	

Teacher 17	Yes, the educated family has an effective role in developing the creative students, to the extent of perhaps 90%.		Yes, they are creative in high percentages.		I think impulsive students are not creative.	
Teacher 18	Yes, the educated family has an effective role in developing the creative students.		Certainly, and in high percentages (80%).		They may be creative , but in low percentages.	
Teacher 19	Yes, the educated family has more effect on the level of students' creativity.		Yes, in most cases.		They may be creative, but in low percentages.	
Teacher 20	Yes, the educated family has more effect on the level of creative students, to the extent of perhaps 60%		Yes,		They are not creative, because creative students make few errors.	
Teacher 21	Yes, the educated family has more effect on the level of students' creativity.		yes		No, I don't think so.	
Teacher 22	Yes, the educated family has effective role in developing the students' creativity.		Yes, to the extent of 90%.		They are not creative.	
Teacher 23	The educated family has an effective role in encouraging creative students.		yes		I don't think so.	
Teacher 24	Yes, the educated family has more effect on creative students than the uneducated family.		Yes, the reflective students are usually creative.		I don't think so, because creativity needs reflection.	
Teacher 25	Yes, the educated family has a high role in regard to developing creative students.		Yes, to a great extent.		No, they are not creative.	
Teacher 26	Yes, the educated family has more effect than the uneducated family in regard to creative students.		Yes,		May be, but in low percentages.	
Teacher 27	Certainly, the educated family has a great role in encouraging the creative student.		Yes,		No, they are not creative, because creativity needs reflection.	

Teacher 28	Yes, the educated family has an effective role in developing the students' creativity.		Yes, I think so.		No, because creativity needs reflection.	
Teacher 29	Yes, the educated family has an important role in increasing the level of students creativity.		Yes,		No, in most cases.	
Teacher 30	Yes, the educated family has an important role in developing the creative students.		Yes,		No, they are not creative.	

Semi structure interviews	Question 10 D <b>Do you think that there is a relationship between a student’s creativity and their ability to make quick decisions?</b>		Question 11 <b>Do you think that the curriculum improves a student’s creativity?</b>		Question 12 <b>Do you think that motivation is important to improve a student’s creative thinking?</b>	
Participants	Language					
	English	Arabic	English	Arabic	English	Arabic
Teacher 1	The creative student doesn’t make quick decisions, because he thinks before making decision.		No, most educational facilities are restricted in this school.		Yes, it is necessary.	
Teacher 2	No, because creativity needs more reflection.		I don’t think so.		Yes, it is very important.	
Teacher 3	There is no relation, because creativity needs thinking and reflection.		Yes, but in small percentages.		Yes, it is important.	
Teacher 4	No, creativity needs more reflection before making decisions.		No. in this school facilities need updating.		Yes, it is important and without it there is no creativity.	
Teacher 5	No, because the student who make quick decision can not be creative.		No, because the curricula doesn't improve the level of student's creativity		Yes, it is very important.	
Teacher 6	No, the student who makes quick decisions		I think it has a little role.		Yes, it is important.	

	is not creative.					
Teacher 7	Yes, to the extent of perhaps 60%.		I think it doesn't help.		Yes, it is very important.	
Teacher 8	May be, but in low percentages.		It helps, but in low percentages.		Yes, it is important	
Teacher9	No, there is no relation.		It helps, but in low percentages.		Yes, it is important.	
Teacher 10	Yes, there is a relationship, to the extent perhaps of 70%.		It doesn't help to develop the students creativity.		Yes, it is important.	
Teacher 11	May be there is a relationship, but in low percentages because creativity needs reflection for making decisions.		May be, but in low percentages.		Yes,	
Teacher 12	There are may be a relationship but in low percentages, because creativity needs reflection for making decisions.		May be in low percentages.		Yes,	
Teacher 13	I think there is a relationship but in low percentages.		It doesn't improve the creativity of students.		Yes, it is very important.	
Teacher 14	I don't think so, because creativity needs reflection to make decisions.		Yes,		Certainly, it is necessary to improve the students' creativity.	
Teacher 15	I think the relationship between creativity and quick decisions is low.		No,		It is very strong.	
Teacher 16	May be there is a relationship but in low percentages.		Yes the Ministry of Education tries to improve the level of students' creativity.		Yes, it is very important.	
Teacher 17	I don't think so.		Yes, the curriculum tries to improve students' creativity.		Yes, it is important for improving the students' creativity.	
Teacher 18	I don't think so		I think the curriculum doesn't encourage the creative students.		Yes, it is very important.	
Teacher 19	No, because creativity needs reflective thinking.		The curricula of the Ministry of Education are not		Yes, it is very important (100%).	

			help for the creative students.			
Teacher 20	May be, but in low percentages.		It helps the creative students, to the extent perhaps of 40%.		Yes, it is important.	
Teacher 21	No, they can not be creative.		Yes, it improves the creative students.		Yes, it is important.	
Teacher 22	I don't think so.		Yes, it helps the creative students.		Yes, it is important in high percentages.	
Teacher 23	No, because creativity needs deep thinking before decision making.		Yes it helps.		Yes, it is very important.	
Teacher 24	I don't think so.		Yes, it plays a good role in improving creative students.		Yes, it is very important.	
Teacher 25	No, because creativity needs thinking and reflection as well.		Yes, it helps, but it needs guidance by teachers to improve the creative students.		Yes, it is important.	
Teacher 26	No		Yes, education tries to improve creativity.		Yes, it is very important.	
Teacher 27	No, because creativity needs reflection for making decisions.		Yes, it helps to improve the creative students.		Yes, it is very important.	
Teacher 28	I don't think so, because creativity needs reflection and thinking.		Yes, it helps creative students.		Yes, it is very important.	
Teacher 29	No, because creativity needs time to think before making decision.		Yes, to a great extent.		Yes, it is important.	
Teacher 30	No		Yes, it tries to improve the creative students.		Yes, it is important.	



Semi structure interviews	Question 13 Do you believe creative thinking is important?		Question 14 Which teaching methods do you think may help to improve a student’s creative thinking?		Question 15 Do you think the age of a student is important for creative thinking? Explain?		Question 16 In your opinion, what is the age at which creativity appears in students?	
Participants	Language							
	English	Arabic	English	Arabic	English	Arabic	English	Arabic
Teacher 1	Yes, it is important and we need it in all fields.		I think the best method is to let the students think before giving them the correct answer.		Yes,		From 10 to 16 years.	
Teacher 2	Yes, it is important.		I think the discussion method.		Yes.		From 15 to 20 years.	
Teacher 3	Yes, it is very important.		Discussion.		Yes, it is important.		From 13 to 18 years.	
Teacher 4	Sure, it important.		I think each class has a different method.		It is necessary.		From 13 to 17 years.	
Teacher 5	Yes, it is very important.		I think discussion.		Yes, it is		From 14 to 19 years.	
Teacher 6	It is important.		Scientific training		There is no age for creativity.		From 6 to 15 years.	
Teacher 7	It is important.		Debate		Yes		From 5 to 18 years.	
Teacher 8	Yes, it is important in all fields.		Cooperative learning.		Yes,		From 13 to 17 years.	
Teacher9	Yes, it is important.		I think experimental methods.		Yes,		From 7 to 18 years.	
Teacher 10	Yes, it is important.		Group methods (Cooperative learning).		Yes		From 13 to 25 years.	
Teacher 11	Yes, we need it.		Practical lessons) experimental methods).		Not necessary.		From 2 years to old age.	
Teacher 12	Yes, we need it in all fields.		Practical		Not necessary		from two years to endless.	

Teacher 13	Yes, it is very important.		Yes, it is important.		Yes,		From 14 to 20 years.	
Teacher 14	Sure, it is important.		Cooperative learning.		Yes		From 6 to endless.	
Teacher 15	It is important.		Every lesson has own teaching method.		Yes.		From 6 years to old age.	
Teacher 16	Yes, it is important.		I use several methods with my students.		Yes		From 12 to 18 years.	
Teacher 17	Yes it is important.		Cooperative learning and critical thinking.		Yes		From 12 to 16 years.	
Teacher 18	Yes, it is very important.		Discussion and cooperative learning.		Yes		From 10 to 15 years.	
Teacher 19	Yes, it is important and we need it in all fields.		Every lesson has a different teaching method.		Yes,		From 7 years to old age.	
Teacher 20	Yes, it is important.		Experimental methods.		Yes		From 16 years to endless.	
Teacher 21	Yes, it is important and we need it in many fields.		Discussion.		Yes		From 7 to 15 years.	
Teacher 22	Yes, it is important.		Cooperative learning.		Yes		From 12 to 18 years.	
Teacher 23	Yes, we need it in all fields.		I use several methods.		Yes, it is important.		From 12 to 35 years.	
Teacher 24	Yes, it is important and we need it in all fields.		Cooperative learning.		Yes, it is important.		From 4 to 20 years.	
Teacher 25	Yes, and we need it in all fields.		Searching the information from the library.		No, I don't think so.		From 5 years to old age.	
Teacher 26	Yes, it is important and we need it in many fields.		Discussion.		Yes		From 17 years.	

Teacher 27	Yes, it is important and we need it in all fields.		The debate method.		No.		From 10 years to old age.	
Teacher 28	Yes, we need it in all fields.		I think cooperative learning.		No.		From 16 to 40 years.	
Teacher 29	Yes it is important.		Cooperative learning.		No.		From 12 to 18 years.	
Teacher 30	Yes, it is important and we need it in all fields.		Cooperative learning.		Yes, creativity spans a period of time a man's life.		From 15 to 20 years.	

**Appendix G:**

Letter to the Director of the Educational Department in Makkah area

(Arabic version)

## بسم الله الرحمن الرحيم

المحترم

المكرم مدير عام التربية والتعليم بمكة المكرمة

أفيد سعادتكم باني احد الطلاب السعوديين لمرحلة الدكتوراه (في التربية) في جامعة فكتوريا باستراليا حيث إن عنوان بحثي : دراسة مقارنة بين القرية والمدينة في الأسلوب المعرفي (التروي / والاندفاع) والتفكير الابتكاري لطلاب الصف الأول الثانوي .

موضوع الدراسة:

إن الهدف من هذه الدراسة أولا اختبار طلاب القرية والمدينة في التفكير الابتكاري ومعرفة أسلوبهم المعرفي (التروي/والاندفاع) وذلك باستخدام كلا من اختبار تورانس للتفكير الابتكاري واختبار تزاوج الإشكال المألوفة لحمدى الفرماوي. عينة هذه الدراسة هم طلاب الصف الأول الثانوي. الهدف الثاني من الدراسة هو معرفة آراء التربويين فيما يتعلق بالتفكير الابتكاري والأسلوب المعرفي (التروي/والاندفاع). عينة هذه الدراسة هم (المدرسين، المدراء، المشرفين).

لذا أمل من سعادتكم إعطائي إذن للقيام بإجراء الاختبارات على طلاب الصف الأول الثانوي بمدارس مكة وضواحيها وذلك كجزء متطلب من دراسة الدكتوراه أيضا إجراء مقابلات مع بعض المدرسين والمدراء لمعرفة آرائهم حول الإبداع عند الطلاب وأساليبهم المعرفية .

ملاحظة: مرفق مع هذه الرسالة خطة البحث

ولكم خالص التحية والاحترام

الطالب الباحث

طارق عبدالعالي السلمي

[tareq444@gmail.com](mailto:tareq444@gmail.com)

Tel. +61383076613

Mobile. +61423310427

٢٠١٩ / ٢ / ١٤٤٩ هـ

**Appendix H:**  
**Translation of appendix G**

**Dear Director of the Educational Department in Makkah**

**I am Saudi student at Victoria University in Australia; currently I am studying Ph. D in Educational field. My title project is: " A comparison of 'cognitive style (reflective – impulsive)' and 'creative thinking' in a select sample of Grade 10 male students in rural and urban Saudi Arabia."**

**Project explanation:**

**The aim of this study is to examine the creative thinking scores of rural and urban students and determine whether these students can be categorized as reflective or impulsive using the Torrance Test of Creative Thinking (TTCT) and Matching Familiar Figure Test (MFFT). In addition, the opinions of individuals within the educational field (teachers, principals, supervisors), regarding creative thinking in relation to urban and rural students, will be incorporated into this research. The first study will involve grade 10 students as participants. The second involves individuals currently working in the Saudi education system.**

**Therefore, I hope that you give me permission to conduct tests on students at Grade 10 level in Makkah rural and urban secondary schools as part of the requirement study for a doctorate. Also, I would like to conduct interviews with teachers and principals to find out their opinions regarding students' creativity.**

**Note. I attached my proposal with this letter.**

**Kind regards**

**Student researcher**

**Tareq AL Silami**

**tareq444@gmail.com**

**Tel. +61383076613**

**Mobile. +61423310427**

**Signed**

**Appendix I:**  
**Approval of Victoria University Human Ethics committee for  
collecting the data.**



# MEMO

TO	Dr Tony Watt School of Education Footscray Park Campus	DATE	6/5/2008
<hr/>			
FROM	Professor Michael Polonsky Chair Victoria University Human Research Ethics Committee		
<hr/>			
SUBJECT	Ethics Application – HRETH 08/45		
T			

Dear Dr Watt

Thank you for submitting this application for ethical approval of the project:

**HRETH 08/45** A comparison of 'cognitive style (reflective - impulsive)' and 'creative thinking' in a select sample of Grade 10 male students in rural and urban Saudi Arabia

The proposed research project has been accepted and deemed to meet the requirements of the National Health and Medical Research Council (NHMRC) 'National Statement on Ethical Conduct in Human Research (2007)' by the Victoria University Human Research Ethics Committee. Approval has been granted from 5 May 2008 to 4 May 2009.

Please note that the Human Research Ethics Committee must be informed of the following: any changes to the approved research protocol, project timelines, any serious or unexpected adverse effects on participants, and unforeseen events that may effect continued ethical acceptability of the project. In these unlikely events, researchers must immediately cease all data collection until the Committee has approved the changes.

Continued approval of this research project by the Victoria University Human Research Ethics Committee (VUHREC) is conditional upon the provision of a report within 12 months of the above approval date (by **5 May 2009**) or upon the completion of the project (if earlier). A report proforma may be downloaded from the VUHREC web site at: <http://research.vu.edu.au/hrec.php>

If you have any queries, please do not hesitate to contact me on 9919 4625.

On behalf of the Committee, I wish you all the best for the conduct of the project

**Professor Michael Polonsky**  
Chair  
Victoria University Human Research Ethics Committee

**Appendix J:**

**Memo to the secondary schools in Makkah area**

**(Arabic version)**

بسم الله الرحمن الرحيم



المملكة العربية السعودية

وزارة التربية والتعليم

الإدارة العامة للتربية والتعليم (بنين) بمنطقة مكة المكرمة  
وحدة التخطيط والتطوير التربوي

الرقم: ٢٥/٥/٤٨٤  
التاريخ: ٨٧/٤/١٤٢٩ هـ  
المشروعات:

الموضوع / الموافقة على إجراء دراسة

### تعميم لبعض المدارس الثانوية الحكومية

حفظه الله

المكرم / مدير مدرسة

السلام عليكم ورحمة الله وبركاته ..... وبعد

فبناءً على خطاب عميد كلية المعلمين بمكة ذي الرقم بدون وتاريخ ١٦/٤/١٤٢٨ هـ بشأن طالب الدراسات العليا / طارق بن عبد العالي السلمي والذي يعد رسالة للحصول على درجة الدكتوراه بعنوان ((دراسة مقارنة للأساليب المعرفية (التروي والاندفاع) والتفكير الابتكاري لطلاب الصف الأول الثانوي بمدارس مدينة مكة المكرمة وقراها))

وحيث إن الدراسة تتطلب ما يلي :

١. تطبيق مقياس التروي والاندفاع على طلاب الصف الأول الثانوي
  ٢. تطبيق مقياس تورانس للتفكير الابتكاري على طلاب الصف الأول الثانوي.
  ٣. إجراء مقابلات معكم ومع بعض المعلمين .
- ولقناعتنا بأهمية الدراسة . لذا لا مانع من تسهيل مهمة الباحث وتمكينه من تطبيق أدوات بحثه خدمة للبحث العلمي .

وتقبلوا تحياتي ، ، ، ،

٤١٧

٩ مدير عام

التربية والتعليم (بنين) بمنطقة مكة المكرمة

بكر بن إبراهيم بن مسعود

ص / للاتصالات الإدارية

ص / للتخطيط والتطوير التربوي

ص / للباحث

**Appendix K:**  
**Translation of appendix J**

**Number:** 930/6/25  
**Date:** 6/3/2008  
**Subject:** research

**Kingdom of Saudi Arabia**  
**Ministry of Education**  
**The Educational department**  
**in Makkah area**

.....

**Memo to the secondary schools**

Dear Principals of the secondary schools in rural and urban Makkah area, at the request of the student researcher, (Tareq A AL Silami) his intention is to conduct tests on students at Grade 10 level in Makkah rural and urban secondary schools as part of the requirement study for a doctorate in Australia. Also, he would like to conduct interviews with teachers and principals. Therefore, we hope that you will co-operate fully with the student researcher and facilitate the collection of information.

Kind regards

The Director of the Educational Department in Makkah

**Bakor I Basfar**

**Signed**

Copy / to my office

Copy/ Department of the Education Development

Copy / student researcher

**Appendix L:**

**Memo to the supervisors in the Educational Department in Makkah**

**(Arabic version)**

بسم الله الرحمن الرحيم



الجمهورية العربية السورية

وزارة التربية والتعليم

الإدارة العامة للتربية والتعليم (بنين) بمنطقة مكة المكرمة  
وحدة التخطيط والتطوير التربوي

الرقم: ٢٥/١٧٧  
التاريخ: ١٤/١٢/١٤٢٢ هـ  
المشروعات:

الموضوع / الموافقة على إجراء دراسة

حفظه الله

المكرم المشرف التربوي

السلام عليكم ورحمة الله وبركاته ..... وبعد

فبناءً على خطاب عميد كلية المعلمين بمكة ذي الرقم بدون وتاريخ ١٦/٤/١٤٢٨ هـ بشأن طالب الدراسات العليا / طارق بن عبد العالي السلمي والذي يعد رسالة للحصول على درجة الدكتوراه بعنوان: ((دراسة مقارنة للأساليب المعرفية (التروي والاندفاع) والتفكير الابتكاري لطلاب الصف الأول الثانوي بمدارس مدينة مكة المكرمة وقراها))

وحيث إن الدراسة تتطلب إجراء مقابلة مع بعض المشرفين التربويين، ولكونكم ممن يستفاد منهم ومن أرائهم في هذه الدراسة، لذا نأمل التعاون مع الباحث والسماح له بإجراء المقابلة وتسهيل مهمته خدمة للبحث العلمي.

وتقبلوا تحياتي ،،،،

مدير التخطيط والتطوير التربوي



د. صالح بن عطيه الغامدي

١٦/١٢/٢٠٢٢

١٦/١٢/٢٠٢٢

**Appendix M:****Translation of appendix L:**



**Number:** 930/6/25  
**Date:** 6/3/2008  
**Subject:** research

**Kingdom of Saudi Arabia  
Ministry of Education  
the educational department  
In Makkah area**

.....

Dear supervisors in the Educational Department of Makkah, at the request of the student researcher, (Tareq A AL Silami) his intention is to conduct interviews with some educational supervisors as part of the requirement study for a doctorate in Australia. Therefore, we hope that you will co-operate fully with the student researcher and facilitate the collection of information.

Kind regards

**The head of the Educational Supervision (male)**

**Dr. Saleh A. AL Gamed**

**Singed**

**Appendix N:****Information and consent forms for participants****(students)**



**VICTORIA  
UNIVERSITY**

**A NEW  
SCHOOL OF  
THOUGHT**

## **INFORMATION TO PARTICIPANTS INVOLVED IN RESEARCH**

**Information to participants (students): A comparison of 'cognitive style (reflective – impulsive)' and 'creative thinking' in a select sample of Grade 10 male students in rural and urban Saudi Arabia.**

We would like to invite you to participate in a research project.

### **Project explanation**

The aim of the project is to investigate the creative thinking skills of students who live in rural and in urban areas.

### **What will I have to do?**

We will be using two simple tests to do this and we think you will enjoy the activities. Normally each test takes about thirty minutes to complete and we'll be working with you individually. You'll be asked for example to pick some differences between pictures. Everything will be explained to you very clearly before you commence each of the tests.

### **What will I gain from participating?**

We will be combining all the responses from all students because we are looking at the differences between students in rural and in urban areas. We are interested in the responses of groups, not in individual responses.

### **How will the information I give be used?**

The researchers will use the information as data for his thesis

### **What are the potential risks of participating in this project?**

There is the small risk of distress for students who may become anxious when completing the tests. The student researcher will deal with participants who have concerns. Firstly, he will ask participants who have concerns to stop the performance of the test until the demise of concern to the test. Secondly, the student researcher will explain to the participants that to ensure confidentiality no names will be used in any

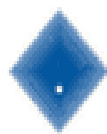
reports or the thesis produced from these tests. In addition, all participants will be given code numbers rather than names in all stages of the study. In addition, there is no degree of success or failure in the performance of these tests. Also, any participant will be informed that he can stop participating in the project at any time if he feel anxious or uncertain or simply don't want to continue.

**Who is conducting the study?**

This study is being conducted by the student researcher Tareq AL Silami from the School of Education at Victoria University.

We hope you do want to be involved and look forward to working with you in this way.

Any queries about your participation in this project may be directed to the Principal supervisor Dr. Anthony Watt (+613 99197579) and student researcher Tareq AL Silami: (+96655504104). If you have any queries or complaints about the way you have been treated, you may contact the secretary, Victoria University Human Research Ethics Committee, Victoria University, PO Box 14428, Melbourne, vic,8001 phone (03) 99194710.


**VICTORIA  
UNIVERSITY**
**A NEW  
SCHOOL OF  
THOUGHT**

## CONSENT FORM FOR PARENTS

### Information for parents

We would like to invite your child to participate in a project entitled 'A comparison of 'cognitive style (reflective – impulsive)' and 'creative thinking' in a select sample of Grade 10 male students in rural and urban Saudi Arabia. This project is being conducted by a student researcher from school of Education at Victoria University.

The project focuses on rural and urban students in regards to creative thinking and reflective-impulsive style. The scores for these tests will be compared in order to learn more about the differences between groups of rural and urban students regarding the relationship between reflective-impulsive style and creative thinking. In addition, the findings will be used to encourage the Ministry of Education to continue to consider the needs of rural students, because it is an area of the Saudi education system that requires significant development in order to better meet the creativity needs of rural students

### Consent

I understand that these tests: Torrance Test of Creative Thinking (TTCT) and Matching Familiar Figure Test (MFFT) are a part of the data collection for the research project A comparison of 'cognitive style (reflective – impulsive)' and 'creative thinking' in a select sample of Grade 10 male students in rural and urban Saudi Arabia and I have read and understood the information to parents provided before giving consent for my child to complete the tests.

I understand that participating in the research is voluntary. I understand that all information provided about my child will be confidential, and I give permission for my child to complete the tests for this project

### Certification by subject

I, .....  
Of.....

I certify that I give permission for my child to participate in the research project A comparison of 'cognitive style (reflective – impulsive)' and 'creative thinking' in a select sample of Grade 10 male students in rural and urban Saudi Arabia. This will be conducted by the student researcher (Tareq AL Silami).

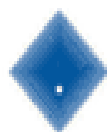
Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Any queries about your participation in this project may be directed to the Principal supervisor Dr. Anthony Watt (+613 99197579) and student researcher Tareq AL Silami: (+966555504104). If you have any queries or complaints about the way you have been treated, you may contact the secretary, Victoria University Human Research Ethics Committee, Victoria University, PO Box 14428, Melbourne, vic,3001 phone (03) 99194710.

## **Appendix O:**

### **Information and consent forms for participants**

**(Teachers, principals, and supervisors)**



**VICTORIA  
UNIVERSITY**

**A NEW  
SCHOOL OF  
THOUGHT**

## **INFORMATION TO PARTICIPANTS INVOLVED IN RESEARCH**

**Information to participants (Teachers, Principals, Supervisors): A comparison of 'cognitive style (reflective – impulsive)' and 'creative thinking' in a select sample of Grade 10 male students in rural and urban Saudi Arabia.**

We would like to invite you to participate in a research project entitled a comparison of 'cognitive style (reflective – impulsive)' and 'creative thinking' in a select sample of Grade 10 male students in rural and urban Saudi Arabia.

### **Project explanation**

The aim of this study is to examine the creative thinking scores of rural and urban students and determine whether these students can be categorized as reflective or impulsive using the TTCT and MFFT. In addition, the opinions of individuals within the educational field (teachers, principals, supervisors), regarding creative thinking in relation to urban and rural students, will be incorporated into this research. The first study will involve grade 10 students as participants. The second involves individuals currently working in the Saudi education system.

### **What will I have to do?**

The researcher will conduct an interview with you at a location of your choice. The interview will take approximately 15-30 minutes and will be audio-recorded and then transcribed. You will be given a transcript of the recording to further comment on if you wish.

### **What will I gain from participating?**

There will be little if any direct benefit to you from in participation in this study. The information will be used to learn more about the differences between groups of rural and urban students regarding the relationship between reflective-impulsive style and creative thinking. In addition, to encourage the Ministry of Education to focus on the needs of rural students, because it is an area of the Saudi education system that requires significant development in order to better the creativity needs of rural students. The study also hopes to stimulate the Saudi Ministry of Education to further develop training for teachers (before they start teaching), in order to increase their knowledge in fostering creativity in students.

### **How will the information I give be used?**

The researchers will use the information as data for his thesis.

### **What are the potential risks of participating in this project?**

Participants (teachers, principals, supervisors) involved in the interviews may feel concerned that negative statements they might detail in relation to their working conditions could be indirectly identified to them because of the small size of several of the work places. The student researcher will explain to all participants that all participation in the interview will not affect their work. These interviews do not assess their performance. The sole purpose of the interview is research. In addition to be more confidential no names will be used in any reports or the thesis produced from these interviews. In addition, all participants will be given code numbers rather than names in all stages of the study. If any participant feels concerned, the student researcher will stop and will continue the interview later. Also, all participants will be informed that participation is completely voluntary, that they are free to withdraw at any time, and that non- participation will not in any way affect their position in their schools.

### **How will this project be conducted?**

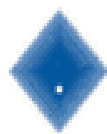
In this project, the researcher will compare and examine the reflective-impulsive style and creative thinking attributes of male students from rural and urban settings in Saudi Arabia: - In study one, male students from rural and urban areas will complete the TTCT so that any differences in creative thinking can be examined. The scores of the students on the TTCT will be compared on the basis of their categorization as impulsive or reflective according to their scores on the MFFT. The study will utilize quantitative methods. The statistical technique that I will use is the multiple analyses of variance (MANOVA). In study two, the author will interview individuals who work in the educational field (teachers, principals and supervisors) in both rural and urban areas regarding creative thinking and RI style. This study adopts a qualitative approach. The data transcribed from the interviews of people who work in the educational field will be analysed using a text analysis procedure.

### **Who is conducting the study?**

This study is being conducted by the student researcher Tareq AL Silami from School of Education at Victoria University.

Any queries about your participation in this project may be directed to the Principal supervisor Dr. Anthony Watt (+613 99197579) and student researcher Tareq AL Silami: (+966555504104). If you have any queries or complaints about the way you have been treated, you may contact the secretary, Victoria University Human Research Ethics Committee, Victoria University, PO Box 14428, Melbourne, vic,3001 phone (03) 99194710.





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## **CONSENT FORM FOR PARTICIPANTS INVOLVED IN RESEARCH**

### **Information for participants (Teachers, Principals, supervisors)**

We would like to invite you to participate in a project entitled 'A comparison of 'cognitive style (reflective – impulsive)' and 'creative thinking' in a select sample of Grade 10 male students in rural and urban Saudi Arabia. This project is being conducted by a student researcher from the School of Education at Victoria University.

The project focuses on rural and urban students in regards to creative thinking and reflective-impulsive style. The scores from two tests will be compared in order to learn more about the differences between groups of rural and urban students regarding the relationship between reflective-impulsive style and creative thinking. In addition, a set of interviews will be conducted so that opinions of individuals within the educational field (teachers, principals, supervisors), regarding creative thinking in relation to urban and rural students, can be incorporated into this research. Finally, the findings will be used to encourage the Ministry of Education to continue to consider the needs of rural students, because it is an area of the Saudi education system that requires significant development in order to better meet the creativity needs of rural students.

### **Consent**

I understand that I will be involved in interview as a part of the data collection for this research project "A comparison of 'cognitive style (reflective – impulsive)' and 'creative thinking' in a select sample of Grade 10 male students in rural and urban Saudi Arabia" and I have read and understood the information to parents provided and I have read and understood the information to participants provided prior to this interview.

I understand that participating in this interview is voluntary. I understand that all information provided will be confidential. I agree to take part in the interview.

### **Certification by subject**

I, .....  
Of.....

Certify that I am voluntarily giving my consent to participate in the research project A comparison of 'cognitive style (reflective – impulsive)' and 'creative thinking' in a select sample of Grade 10 male students in rural and urban Saudi Arabia. This will be conducted by the student researcher (Tareq AL Silami).

Signed:

Date:

Any queries about your participation in this project may be directed to the Principal supervisor Dr. Anthony Watt (+613 99197579) and student researcher Tareq AL Silami: (+966555504104). If you have any queries or complaints about the way you have been treated, you may contact the secretary, Victoria University Human Research Ethics Committee, Victoria University, PO Box 14428, Melbourne, vic,8001 phone (03) 99194710.

**Appendix P:**  
**Data collection processes**

# Data collection processes

**A Comparison of Creative Thinking and Reflective-Impulsive Style in Grade 10  
Male Students from Rural and Urban Saudi Arabia**

**By**

**Tareq AL Silami**

**Note:** the total time that is required to conduct both tests (TTCT and MFFT) in study one is 270 hours, which means each test (TTCT or MFFT) required 135 hours. For study two the total time that is required to conduct the interviews is 47 hours.

**Section 1**  
**The tests prior to data collection**

**Table 1.1 the pre-test prior to data collection (from 5/4/08 to 9/4/08).**

Schools	No. of students who will finish the TTCT during week days															Total	
	Sat 5/4			Sun 6/4			Mon 7/4			Tue 8/4			Wed 9/4				
	Time			Time			Time			Time			Time				
	8-9	9-10	10-11	8-9	9-10	10-11	8-9	9-10	10-11	8-9	9-10	10-11	8-9	9-10	10-11		
School A (Rural)	6 by V1			6 by V1			1										26
	6 by V2			6 by V2			1										
School B (Urban)									1	6 by V1			6 by V1			25	
										6 by V2			6 by V2				
Total	12			12			2			12			12			51	

Key words

V1= Volunteer 1

V2= Volunteer 2

**Table 1.2 the pre-test prior to data collection (from 5/4/08 to 9/4/08).**

Schools	No. of students who will finish the MFFT during week days															Total	
	Sat 5/4			Sun 6/4			Mon 7/4			Tue 8/4			Wed 9/4				
	Time			Time			Time			Time			Time				
	11-12	12-1	1-2	11-12	12-1	1-2	11-12	12-1	1-2	11-12	12-1	1-2	11-12	12-1	1-2		
School A (Rural)	6 by V1			6 by V1			1										26
	6 by V2			6 by V2			1										
School B (Urban)										1	6 by V1			6 by V1			25
											6 by V2			6 by V2			
Total	12			12			2			12			12			51	

Key words

V1= Volunteer 1

V2= Volunteer 2

**Table 1.3 the post-test after data collection (from 26/4/08 to 30/4/08)**

Schools	No. of students who will finish the TTCT during week days															Total	
	Sat 26/4			Sun 27/4			Mon 28/4			Tue 29/4			Wed 30/4				
	Time			Time			Time			Time			Time				
	8-9	9-10	10-11	8-9	9-10	10-11	8-9	9-10	10-11	8-9	9-10	10-11	8-9	9-10	10-11		
School A (Rural)	6 by (V1)			6 by (V1)			1										26
	6 by (V2)			6 by (V2)			1										
School B (Urban)									1	6 by (V1)			6 by (V1)			25	
										6 by (V2)			6 by (V2)				
Total	12			12			2			12			12			51	

**Table 1.4 the post-test after data collection (from 26/4/08 to 30/4/08).**

Schools	No. of students who will finish the MFFT during week days															Total	
	Sat 26/4			Sun 27/4			Mon 28/4			Tue 29/4			Wed 30/4				
	Time			Time			Time			Time			Time				
	11-12	12-1	1-2	11-12	12-1	1-2	11-12	12-1	1-2	11-12	12-1	1-2	11-12	12-1	1-2		
School A (Rural)	6 by (V1)			6 by (V1)			1										26
	6 by (V2)			6 by (V2)			1										
School B (Urban)										1	6 by (V1)			6 by (V1)			25
											6 by (V2)			6 by (V2)			
Total	12			12			2			12			12			51	

## **Section 2**

### **The data collection stage**

#### **The first week (10/5 to 14/5/08) of data collection (TTCT and MFFT)**

Table 2.1 clarify how many students will finish the TTCT during the first week

Schools	No. of students who will finish the TTCT during week days										Total
	Sat 10/5		Sun 11/5		Mon 12/5		Tue 13/5		Wed 14/5		
	Time		Time		Time		Time		Time		
	8-9	9-10	8-9	9-10	8-9	9-10	8-9	9-10	8-9	9-10	
School 1 (Rural)	3 by (R )		3 by (R )		3 by (R )		3 by (R )		2		
	3 by (V1)		3 by (V1)		3 by (V1)		3 by (V1)		1		
	3 by (V2)		3 by (V2)		3 by (V2)		3 by (V2)		1		
Total											40

Key words:

R = Researcher

V1 = Volunteer1

V2 = Volunteer 2

Table 2.2 clarify how many students will finish the MFFT during the first week

Schools	No. of students who will finish the TTCT during week days										Total
	Sat 10/5		Sun 11/5		Mon 12/5		Tue 13/5		Wed 14/5		
	Time		Time		Time		Time		Time		
	10-11	11-12	10-11	11-12	10-11	11-12	10-11	11-12	10-11	11-12	
School 1 (Rural)	3 by (R )		3 by (R )		3 by (R )		3 by (R )		2		
	3 by (V1)		3 by (V1)		3 by (V1)		3 by (V1)		1		
	3 by (V2)		3 by (V2)		3 by (V2)		3 by (V2)		1		
Total											40

#### **The second week (17/5 - 21/5/08) of data collection (TTCT and MFFT)**

Table 2.3 clarify how many students will finish the TTCT during the first week

Schools	No. of students who will finish the TTCT during week days										Total
	Sat 17/5		Sun 18/5		Mon 19/5		Tue 20/5		Wed 21/5		
	Time		Time		Time		Time		Time		
	8-9	9-10	8-9	9-10	8-9	9-10	8-9	9-10	8-9	9-10	
School 2 (Rural)	3 by (R )		3 by (R )		3 by (R )		3 by (R )		2		
	3 by (V1)		3 by (V1)		3 by (V1)		3 by (V1)		1		
	3 by (V2)		3 by (V2)		3 by (V2)		3 by (V2)		1		
Total											40

Table 2.4 clarify how many students will finish the MFFT during the first week

Schools	No. of students who will finish the TTCT during week days										Total
	Sat 17/5		Sun 18/5		Mon 19/5		Tue 20/5		Wed 21/5		
	Time		Time		Time		Time		Time		
	10-11	11-12	10-11	11-12	10-11	11-12	10-11	11-12	10-11	11-12	
School 2 (Rural)	3 by (R )		3 by (R )		3 by (R )		3 by (R )		2		
	3 by (V1)		3 by (V1)		3 by (V1)		3 by (V1)		1		
	3 by (V2)		3 by (V2)		3 by (V2)		3 by (V2)		1		
Total											40

**The third week (24/5 - 28/5/08) of data collection (TTCT and MFFT)**

Table 2.5 clarify how many students will finish the TTCT during the first week

Schools	No. of students who will finish the TTCT during week days										Total
	Sat 24/5		Sun 25/5		Mon 26/5		Tue 27/5		Wed 28/5		
	Time		Time		Time		Time		Time		
	8-9	9-10	8-9	9-10	8-9	9-10	8-9	9-10	8-9	9-10	
School 3 (Rural)	3 by (R )		3 by (R )		3 by (R )		3 by (R )		2		
	3 by (V1)		3 by (V1)		3 by (V1)		3 by (V1)		1		
	3 by (V2)		3 by (V2)		3 by (V2)		3 by (V2)		1		
Total											40

Table 2.6 clarify how many students will finish the MFFT during the first week

Schools	No. of students who will finish the TTCT during week days										Total
	Sat 24/5		Sun 25/5		Mon 26/5		Tue 27/5		Wed 28/5		
	Time		Time		Time		Time		Time		
	10-11	11-12	10-11	11-12	10-11	11-12	10-11	11-12	10-11	11-12	
School 3 (Rural)	3 by (R )		3 by (R )		3 by (R )		3 by (R )		2		
	3 by (V1)		3 by (V1)		3 by (V1)		3 by (V1)		1		
	3 by (V2)		3 by (V2)		3 by (V2)		3 by (V2)		1		
Total											40



**The fourth week (31/5 - 4/6/08) of data collection (TTCT and MFFT)**

Table 2.7 clarify how many students will finish the TTCT during the first week

Schools	No. of students who will finish the TTCT during week days										Total
	Sat 31/5		Sun 1/6		Mon 2/6		Tue 3/6		Wed 4/6		
	Time		Time		Time		Time		Time		
	8-9	9-10	8-9	9-10	8-9	9-10	8-9	9-10	8-9	9-10	
School 4 (Urban)	3 by (R )		3 by (R )		3 by (R )		3 by (R )		2		
	3 by (V1)		3 by (V1)		3 by (V1)		3 by (V1)		1		
	3 by (V2)		3 by (V2)		3 by (V2)		3 by (V2)		1		
Total											40

Table 2.8 clarify how many students will finish the MFFT during the first week

Schools	No. of students who will finish the TTCT during week days										Total
	Sat 31/5		Sun 1/6		Mon 2/6		Tue 3/6		Wed 4/6		
	Time		Time		Time		Time		Time		
	10-11	11-12	10-11	11-12	10-11	11-12	10-11	11-12	10-11	11-12	
School 4 (Urban)	3 by (R )		3 by (R )		3 by (R )		3 by (R )		2		
	3 by (V1)		3 by (V1)		3 by (V1)		3 by (V1)		1		
	3 by (V2)		3 by (V2)		3 by (V2)		3 by (V2)		1		
Total											40

**The fifth week (7/6-11/6/08) of data collection (TTCT and MFFT)**

Table 2.9 clarify how many students will finish the TTCT during the first week

Schools	No. of students who will finish the TTCT during week days										Total
	Sat 7/6		Sun 8/6		Mon 9/6		Tue 10/6		Wed 11/6		
	Time		Time		Time		Time		Time		
	8-9	9-10	8-9	9-10	8-9	9-10	8-9	9-10	8-9	9-10	
School 5 (Urban)	3 by (R )		3 by (R )		3 by (R )		3 by (R )		2		
	3 by (V1)		3 by (V1)		3 by (V1)		3 by (V1)		1		
	3 by (V2)		3 by (V2)		3 by (V2)		3 by (V2)		1		
Total											40

Table 2.10 clarify how many students will finish the MFFT during the first week

Schools	No. of students who will finish the TTCT during week days										Total
	Sat 7/6		Sun 8/6		Mon 9/6		Tue 10/6		Wed 11/6		
	Time		Time		Time		Time		Time		
	10-11	11-12	10-11	11-12	10-11	11-12	10-11	11-12	10-11	11-12	
School 5 (Urban)	3 by (R )		3 by (R )		3 by (R )		3 by (R )		2		
	3 by (V1)		3 by (V1)		3 by (V1)		3 by (V1)		1		
	3 by (V2)		3 by (V2)		3 by (V2)		3 by (V2)		1		
Total											40

**The sixth week (14/6- 18/6) of data collection (TTCT and MFFT)**

Table 2.11 clarify how many students will finish the TTCT during the first week

Schools	No. of students who will finish the TTCT during week days										Total
	Sat 14/6		Sun 15/6		Mon 16/6		Tue 17/6		Wed 18/6		
	Time		Time		Time		Time		Time		
	8-9	9-10	8-9	9-10	8-9	9-10	8-9	9-10	8-9	9-10	
School 6 (Urban)	3 by (R )		3 by (R )		3 by (R )		3 by (R )		2		
	3 by (V1)		3 by (V1)		3 by (V1)		3 by (V1)		1		
	3 by (V2)		3 by (V2)		3 by (V2)		3 by (V2)		1		
Total											40

Table 2.12 clarify how many students will finish the MFFT during the first week

Schools	No. of students who will finish the TTCT during week days										Total
	Sat 14/6		Sun 15/6		Mon 16/6		Tue 17/6		Wed 18/6		
	Time		Time		Time		Time		Time		
	10-11	11-12	10-11	11-12	10-11	11-12	10-11	11-12	10-11	11-12	
School 6 (Urban)	3 by (R )		3 by (R )		3 by (R )		3 by (R )		2		
	3 by (V1)		3 by (V1)		3 by (V1)		3 by (V1)		1		
	3 by (V2)		3 by (V2)		3 by (V2)		3 by (V2)		1		
Total											40



Table 2.14 clarify the teachers' interviews

[illegible]

**The third week (12/7-16/7/08) of data collection (Principal Interviews)**

Table 2.15 clarify the Principals' interviews

Schools	Principals	Weekdays														
		Sat 12/7			Sun 13/7			Mon 14/7			Tue 15/7			Wed 16/7		
		Time			Time			Time			Time			Time		
		8-9	10-11	12-1	8-9	10-11	12-1	8-9	10-11	12-1	8-9	10-11	12-1	8-9	10-11	12-1
School 1	1	<u>R</u>														
	2		<u>R</u>													
School 2	3			<u>R</u>												
	4				<u>R</u>											
School 3	5					<u>R</u>										
	6						<u>R</u>									
School 4	7							<u>R</u>								
	8								<u>R</u>							
School 5	9									<u>R</u>						
	10										<u>R</u>					
School 6	11											<u>R</u>				
	12												<u>R</u>			

R = Researcher

