Chapter 2

LITERATURE REVIEW

2.1. INTRODUCTION

This chapter provides a review of literature in five areas related to the present study: the evolution of distance education; the impact of technology on distance education; the transnational education model; requirements of computing education at a distance; and distance education effectiveness. The major section concerning the evolution of distance education (Section 2.2) discusses the history and transformation of distance education to create a framework for the sequence of events that have contributed to the distance education movements and shaped modern post-secondary distance education programs. Then, the next section (Section 2.3) explores the fundamental role that technology has played in the evolution and growth of distance education. Following on, the next section (Section 2.4) focuses on one type of distance education, which is the subject of this research study – transnational education. The next section (Section 2.5) describes the particular requirements of teaching computing programs in a transnational setting. Then, the following section (Section 2.6) links distance education with student satisfaction and effectiveness of distance education programs, especially in terms of post-secondary education. As this research study involved investigation of critical success factors in transnational education programs, the final section (Section 2.7) reviews in detail the factors that define effectiveness of distance education programs. It examines characteristics of distance education participants, technology, program design, and organisational support that contribute to program effectiveness.

2.2. EVOLUTION OF DISTANCE EDUCATION

Distance education is an increasingly common educational alternative as well as a key contributor to the newly competitive landscape in higher education. Once regarded as an experimental alternative outside the mainstream university

education, distance education has attained new levels of legitimacy and expansion and has grown into a higher education industry of its own (Merisotis & Phipps, 1999).

This trend is also reflected in transnational education. According to Jones (2002), the demand for transnational higher education grew by 26% between 1985 and 1992. By 1995, globally, there were 1.3 million higher education students; that number grew to 1.42 million in 1998, and nearly 1.7 million in 2001 (Marginson, 2004c; Wyatt, 2001). The growth is set to continue, particularly in South East Asia. It is estimated that the demand for transnational higher education in Asian countries (excluding China) will reach nearly 500,000 students by 2020 (GATE, 2000).

2.2.1. Origins of distance education

Although there is no universal consensus on the origin of distance education, most researchers trace its roots to the emergence of correspondence education in the mid-nineteenth century in Europe and the United States (Mood, 1995; Matthews, 1999; Peek, 2000; Phipps & Merisotis, 1999; Ponzurick, France & Logar, 2000; Sherry, 1996). It was the English educator Sir Isaac Pitman who foresaw a need to deliver instruction to a student population that was limitless in comparison to the traditional classroom, and reach out to students in various locations (Phillips, 1998; Matthews, 1999).

In the early years, distance education was dominated by individual entrepreneurs who worked alone; later, organised formal education institutions emerged, such as Sir Isaac Pitman Correspondence Colleges in Britain, and a school in Berlin to teach language by correspondence (Holmberg, 1995; Simonson, Smaldino, Albright & Zvacek, 2000). At the same time, universities in Great Britain, such as Oxford and Cambridge, began to develop extension services. This university extension movement included not only travelling lectures, but also a system of correspondence education (Holmberg, 1995; Mood, 1995; Watkins, 1991).

In the United States, the earliest instance of distance education dates back to 1728 when an advertisement in a Boston newspaper offered weekly shorthand lessons by mail (Gilbert, 2001; Mood, 1995). The first correspondence school, the Society to Encourage Studies at Home, was founded by Anna Ticknor in Boston in 1873 (Mood, 1995). The school offered courses in six disciplines: history, science, art, literature, French, and German (Mood, 1995); it presented educational opportunities to women to study at home; communication, teaching and learning all took place using printed material sent through mail (MacKenzie & Christensen, 1971).

While initially, distance learning was envisioned as

> a way to serve students who lacked access to a complete education, whether due to insufficient resources, geographic isolation, or physical disabilities, it evolved to become a viable way to supplement programs and support innovation, rather than being merely a better-than-nothing alternative to doing without. (Weinstein, 1997, p. 24)

Neal agrees, and adds that

> these courses were intended to provide vocational training to serve the demands of growing industrial economies, but the idea of learning on one's own proved so attractive that by the early twentieth century courses in every conceivable subject were offered by colleges, universities, and proprietary institutes. (Neal, 1999, p. 40)

While some scholars identify Pitman as the initiator of correspondence education (Phillips, 1998), other researchers recognise educator William Rainey Harper as the pioneer of modern correspondence teaching (Mackenzie & Christensen, 1971; Mood, 1995). Harper helped organise the Chautauqua College of Liberal Arts – the first institution to receive, in 1883, official recognition of correspondence education; from 1883 to 1891, the College was authorised to grant academic degrees to students who successfully completed work through correspondence education and summer workshops (Watkins, 1991). Harper's early efforts at providing alternatives to traditional education were ridiculed, yet he proved to be prophetic in his predictions about the future developments of correspondence learning, when he observed

the day is coming when the work done by correspondence will be greater in amount than that done in the classrooms of our academies and colleges; when the students who shall recite by correspondence will far outnumber those who make oral recitations. (Mackenzie & Christensen, 1971, p. 7)

2.2.2. Growth in distance education programs

Following on the distance education origins described in the previous section (Section 2.2.1) is the issue of its expansion. The number of distance education programs has increased steadily from the mid-nineteenth century. For nearly two hundred years, correspondence education was the primary means of distance education delivery, but in the late 1960s distance education reached a turning point with the introduction of a multimedia approach to its delivery; in addition to print, programs were also delivered through radio, television, audio, and video materials. Since mid 1990s, distance education programs have further transitioned into computer-based formats that enable the programs to be delivered fully or in part through the Internet (Matthews, 1999; Phillips, 1998).

The most dramatic growth of distance education programs has occurred from the 1980s until the present time (Matthews, 1999). By mid 1990s, nearly 25% of the colleges and universities in the United States offered degrees and certificates exclusively through distance education programs; the number grew to almost 58% five years later (Lewis, Farris & Alexander, 1997; Matthews, 1999). In 1969, the Open University was established in the United Kingdom. This institution had a tremendous impact on distance education because it used a multi-media approach to teaching. The British Open University pioneered distance education on a massive international scale and, together with other open universities, helped raise the profile of distance education; it brought distance teaching from the peripheries closer to the centre stage of higher education (Matthews, 1999).

In Australia, in the past few decades, post-secondary education has developed an increasingly international orientation as the government encouraged universities to export their courses and import students (Marginson, 2004a; Nelson, 2003;

Welch, 2002). As depicted in Table 2.2.2.a, the export of Australian education now constitutes Australia's third largest services export after tourism and transport, and is judged to be Australia's fastest growing export sector.

Table 2.2.2.a. Australian major exports of goods and services
2002-2003, 2003-2004. (AVCC, 2005, p. 12)

Major categories of Goods and Services	2002-03 ($m)	2003-04 ($m)
Crude materials, inedible, except fuels	21,466	20,739
Mineral fuels, lubricants and related materials	23,803	20,381
Food and live animals	18,399	18,158
Commodities and transactions not classified elsewhere (in the SITC)	13,117	13,700
Machinery and transport equipment	13,530	11,923
Manufactured goods classified chiefly by material	12,605	11,339
Tourism	9,434	10,212
Transportation services	7,467	7,564
Education services	4,896	5,622
Chemicals and related products, nes	5,093	5,288
Miscellaneous manufactured articles	4,413	4,267
Other business services	3,704	3,592
Miscellaneous business, professional & technical	3,170	2,985
Beverages and tobacco	2,725	2,694
Gross inward insurance premiums receivable	1,645	1,678
Computer and information services	1,091	1,128
Financial services	984	1,004

This dramatic growth in the export of Australian education is further illustrated by recent statistics showing that in the period from 1994 to 2001 the average annual growth of the onshore higher education sector was 12.8%, and the annual growth of the offshore higher education sector was 26.4% (Australian Education International, 2002). Marginson (2002) adds that Australia *has gone from a minor provider of foreign education to the third largest in the world in a decade*, and in Australia *nearly one student in five is a full-tuition-paying foreign student*.

The Australian Government's 2002 Ministerial Discussion Paper, *Higher Education at the Crossroads: An Overview Paper* (Nelson, 2002), noted that in 2000 there were 188,277 overseas students enrolled with Australian education and training providers; over 107,000 of these were undertaking higher education courses (58%). Of these higher education students, 67% of them were undertaking their courses onshore, while the other 33% were undertaking their course offshore; this proportion remained relatively unchanged in 2004, as evidenced by figures in Table 2.2.2.b.

Table 2.2.2.b. International students in Australia, by mode of study,
semester 2, 2004. (IDP Education Australia, 2004, p. 8)

	Full Degree	Study Abroad	Exchange	Other	Distance Online	Offshore on a Campus
Number	118,369	4,808	2,546	1,468	16,053	41,162
Growth[4]	11%	-2%	-10%	41%	-15%	1%
% of Total	64%	3%	1%	1%	9%	22%

In addition, a 2002 report by IDP Education Australia (2002) predicts that the demand for international education will increase four-fold from 1.8 million students in the year 2000 to 7.2 million students in 2025, and Hyam (2003) concludes that *by 2025 approximately half of all international students enrolled in Australian universities will be transnational* (p. 8).

The number of Australian universities involved in the provision of transnational education, as well as the extent of their involvement has also expanded considerably in recent years. Leask (2004) refers to this expansion as a transition from *cottage industry* to *core business*:

> Transnational education has grown rapidly from a 'cottage industry' (a few programs run for a few students by a few universities in a few locations) to 'core business' (an integral and important part of the program profiles of many Australian universities). (Leask, 2004, p. 144)

Coupled with this expansion of the transnational education 'business' has been an increase in the number of tertiary institutions in Australia who have started operating in transnational environments over recent years (Harman, 2004); currently, each of the thirty-eight universities in Australia is providing transnational education programs (Rizvi, 2004).

However, there has been a shift in perception of providing education for overseas students. The emphasis has moved from educational aid and promotion of international understanding (whereby selected students from developing countries were provided with opportunities to acquire skills and knowledge), to educational trade, with an emphasis on expanding access and, packaging and marketing higher education outside Australia (Brown & Dale, 1989, Leask, 2004; McBurnie &

Ziguras, 2003). Marginson (2004a) attributes this transition from *aide to trade* to the reduction of public funding for universities and to the change of policies governing Australian higher education (p. 4). De Vita & Case (2003, p. 384) further argue that transnational education in particular is a consequence of the marketisation of higher education and *the competitive rush for international students and their money*. This view is also supported by Feast & Bretag who, commenting on the increasing financial motivation of transnational education programs, concluded:

> Distasteful as it may be to the many educators working in transnational settings who are committed to genuine cross-cultural exchange, transnational education is a multi-million dollar 'business', motivated as much by profits as by teaching and learning objectives. (Feast & Bretag, 2005, p. 64)

Matthews (2002) confirms that view and reports that international education was worth in excess of $3 billion to the Australian economy in 2001 (p. 370).

2.2.3. Forces driving distance education

The issue of growth in distance and transnational education, and its reportedly increasing economic rationale, was described in the previous section (Section 2.2.2). This section presents an overview of forces that have contributed to the expansion of distance education.

One of the major contributors to the dramatic growth of distance education is technology. Advances in technology, including computer conferencing, interactive media, digital technologies, and the Internet are transforming the world into a borderless educational arena (Bates & de los Santos, 1997; Frantz & King, 2000). The new technologies significantly increase the reach of distance provision; they enable content to be current; they allow students to interact with instructors and with each other at any time; and, they open up a global market. The technologies not only offer new and better ways of communicating at a distance, but also have the potential to reduce the fixed costs of education (Cunningham et al., 2000; Taylor, 2001). Further elaboration on the effects of technology on distance education is provided in Section 2.2.4.

In addition to advances in technology, there are several other forces driving distance education including: the arrival of Information Age, changing demographics, changing work and social patterns, declining government funding for further education, and competition in the educational market.

The transition from Industrial Age to Information Age has brought about appreciation of intellectual capital, which is now regarded as a valuable commodity. GartnerGroup (as quoted in Cunningham et al., 2000, p. 21) predicted that *by 2003, intellectual capital delivered through the leverage of knowledge management and information management will be the primary way businesses measure their value*. In addition, Cunningham et al. (2000) pointed out that the arrival of the Information Age heralded a new conception of knowledge. While previously, knowledge was of importance to an educated elite, and was applicable to a limited range of professions, its present cachet is much broader; it applies to a wide workforce, and it encompasses a variety of skills.

> A different and wider conception of knowledge as performative not content-based underpins the notion of the knowledge economy and the Information Age. 'Thinking' skills, teaming capacity, and communication skills are considered forms of knowledge. (Cunningham et al., 2000, p. 21)

Moreover, in terms of educational purposes, the conception of knowledge has shifted away from critical enquiry and personal transformation towards learning experiences where knowledge utilisation is of greatest importance. Thus, knowledge workers represent a growing proportion of today's workforce, and the value of intellectual capital drives the demand for continuing education and emphasises a shortened lifespan of knowledge (King, 1999; Cunningham et al., 2000).

The explosion of knowledge, one of the consequences of the Information Age, also promotes distance education. There is a proliferation of new information: *in the past, information doubled every ten years; now it doubles every four years* (Aslanian, 2001, p. 6). It is no longer possible to *know everything*, even about one specialised discipline, so the aim of education must be *learning to learn*

(Cunningham et al., 2000). Alvin Toffler, the American futurist, redefined the aim of education even further when declaring that: *The illiterate of the 21st century will not be those who can't read and write. They will be those who can't learn, unlearn, and relearn* (Howell, Williams & Lindsay, 2004). Therefore, education can no longer be regarded as preparation for work, but rather as a lifelong effort to ensure employability rather than employment (Meister, 1998). Phipps (1998) illustrates this point by making a reference to Davis and Botkin's book 'The Monster Under the Bed'. Phipps states that:

> In an agrarian economy, education for young people between 7 and 14 was sufficient to last 40 years of a working life. The industrial economy expanded the age range of students to between 5 and 22. In the information economy, the rapid pace of technological change requires education to be updated throughout our working lives. People have to increase their learning power to sustain their earning power. Lifelong learning is the norm that is augmenting school-age education. (Phipps, 1998)

Others, including Dunn (2000), and McIsaac (1998), also point out that *the changing nature of the workforce in the Information Age* will necessitate *a continuous cycle of retraining and retooling* (Dasher-Alston & Patton, 1998, p. 12). In addition, the span of the working life is likely to extend, as retirement will be delayed until late in life, according to the predictions of Cetron & Davies (2005). In view of these changing demands on the workforce, employees and employers alike increasingly regard adequate training as a valuable commodity; for employees *the opportunity for training is becoming one of the most desirable benefits any job can offer* (Cetron & Davies, 2005, p. 43); and, employers view *employee training as a good investment* (Cetron & Davies, 2005, p. 49). As a consequence, employees are reported to be making career choices based on the opportunities provided for learning; they consider iterative training is essential to their *marketability* (Fenn, 1999). This is said to be particularly true for professions with highly mobile workforces such as consulting and IT (Cunningham et al., 2000). Thus, some of the changes underpinning the growing demand for lifelong learning *will demand short accelerated programs, well-suited for online delivery, and portfolio credentials* (Howell et al., 2004); this, in turn, will drive the growing demand for distance education.

Changing demographics are also a driving force in distance education (Ben-Jacob, 1998; Jones, 2001). High school leavers now represent only one type of tertiary student. Another type, increasingly growing in importance, is composed of adult learners, referred to by Cunningham et al. (2000) as *earner-learner*, who have paid jobs and seek postsecondary qualifications to maintain and enhance their careers, and not simply to enter the job market. Jones (2001) agrees and states that,

> there are at least three typical global higher education student profiles: one is Asian as its dominant trait; another is over 23 years of age; and, the third holds an associate-equivalent or Bachelor's degree and either has been or is about to be "downsized" from a job. (Jones, 2001, p. 109)

Jones goes on to say that these student profiles share two characteristics: they currently study technology-related courses such as engineering, health care, or computing; and, they are paying for their education themselves. In addition, the importance of lifelong learning has shifted: it can no longer be regarded as a *discretionary personal investment;* it has become an *essential personal investment as people scramble to bolster their credentials in a volatile global work place* (Jones, 2001, p. 109). Lifelong learners represent a large and rapidly growing student body and demand relevant and accessible continuing professional development programs (Carnevale, 1999; Jones, 2001).

Changing work and social patterns have also had an impact. Firstly, there has been an increase in alternative work arrangements, including flexible time and work-at-home arrangements. At the same time, the focus on *lean manufacturing,* brought about by the industrial changes in recent years, requires that employees at all levels of an organisation become more flexible and multi-skilled (Holifield & Thomas, 1999); as a consequence, the new formula for productivity and cost effectiveness reads: *fewer people, better trained equals higher productivity and cost effectiveness* (Holifield & Thomas, 1999, p. 195). This has led to greater individual responsibility and thus increasing learner autonomy (Sherry, 1996). Because of the decreasing number of employees, and increasing demands on the ones that remain in the organisation, it has become increasingly difficult for the

employees to be released for training. This has sparked a trend to have educational programs delivered to companies, especially in global corporations. In Australia, the Coles Myer Institute, is an example of a corporate education model. Established in 2003, it is a partnership between Coles Myer and Deakin University. The Institute provides Coles Myer employees, located across the organisation's 2,000 plus sites throughout Australia, with integrated vocational and professional development courses, and pathways to higher education awards (Walker, 2005).

Secondly, another factor contributing to the expansion of distance education was the rising cost of living and tightening labour market: it has resulted in an increased number of two-income families. For many, sacrificing one income to return to studies is not an option. Lastly, there is an increasing need to balance academic endeavours with work and family commitments. Thus students with families and in the workforce demand programs that would fit their lifestyles; conventional time- and place-dependent education is not usually suitable for their work structure and lifestyle (Carnevale, 1999). Bates (2000) points out that such students will also particularly look for educational programs with *personally relevant content* that could be obtained through small specialised learning units:

> They will be more interested in small modules and short programs, in qualifications that can be built from small modules or courses, and in learning that can be done at home and fitted around work, family and social obligations. (Bates, 2000)

Declining funds also drive distance education opportunities. Governments are increasingly reluctant to fund growing demand for further education (Dudley, 1998), so institutions of higher education are driven towards *for profit education on a global scale* necessitated by *desperate need to improve income to compensate for the lack of public funding or budget cuts* (Gururajan, 2002). In Australia, foreign students have become crucial to the resource base of many Australian universities. International education provides more than 10% of the average revenues of Australian institutions (Marginson, 2002). Consequently, universities need to attract larger number of students to reduce cost of their programs. Universities expect that students will be attracted to distance education

programs, and that they will pay for the opportunity to study while not being restricted by location or time. However, while students are likely to look for this education at universities first, they will not hesitate to go to other providers if the university offerings do not meet their needs (Bates, 2000).

Competition is another driving force. The corporate world sees the potential in the educational market and challenges universities by providing alternative courses and training programs to meet the rapidly growing demand. Middlehurst (2003) identified the following categories of commercial provider and provision: corporate universities, private and for-profit providers, media and publishing businesses, and educational services and brokers.

Many corporations, especially large ones such as McDonalds, Ernst & Young, or Lufthansa, are developing corporate universities (Taylor & Paton, 2002); at present, there are more than 2000 of such initiatives worldwide (Middlehurst, 2003).

New private higher education institutions have also emerged recently on the distance education market as a result of a growing demand for foundation-level higher education (learner in the 18-25 age group), and for continuing and specialist education. These institutions usually provide specialised programs in business, engineering, information technology, and teacher training to the niche market of working adults (Middlehurst, 2003; Ryan, 2002). The University of Phoenix is one example of this type of provider.

In addition, there has been a growth in the activities of commercial companies supporting on-line infrastructure of universities including the Provincial Radio and TV Universities in China, or BBC's alliance with the Open University in the UK. Publishing companies such as Pearson and Thomson Learning, are also involved in supporting universities and other educational providers, and developing new initiatives. While universities supply learning, assessment, and

accreditation services, the publishers contribute their expertise in marketing, distribution, and content and electronic delivery systems (Middlehurst, 2003).

Finally, there has been huge growth in educational brokers over the recent years (Cunningham et al., 2000). The brokers, of whom Learnerdirect in the UK is an example, mediate between learners and companies and providers; they provide learners with access to study materials through conveniently located learning centers equipped with the latest technology. Corporations are also promoting distance education course design, and course management tools (Middlehurst, 2003). Middlehurst points at the growing influence of such corporations in the distance education market, and the growing reliance of universities on this new type of provider:

> Many corporate universities rely on contractors for the development of tools, templates and expertise not available in-house and some educational service companies will offer to set up and run the corporate university for you, providing enrolment systems and facilities management services. Increasingly, as traditional universities invest in large-scale networked learning to develop 'managed learning environments', they too are becoming dependent on commercial educational service providers. (Middlehurst, 2003, p. 31)

This marketing effort further increases competition and applies additional pressure on the non-profit university sector to provide distance education opportunities (Blumenstyk, 1999).

2.2.4. Effect of technology on distance education

As indicated in the previous section (Section 2.2.3), the recent acceleration in the growth of distance education was enabled by advancements in technology. However, technology played a significant role in the development of distance education prior to the emergence of the computer and high-speed network connections; earlier technologies including print, radio, television, and video also shaped distance education and contributed to its growth.

Over the years, changes in technology generated several significant milestones that affected the distance education market in terms of scale and delivery. Having examined the milestones, Sherron & Boettcher (1997) defined four generations of distance education technologies according to five characteristics: (1) media and technologies, (2) communication features, (3) student characteristics and goals, (4) educational philosophy and curriculum design, and (5) infrastructure. This definition was further adapted by Lewis, Snow, Farris & Levin (US Department of Education, 1999), wherein the four generations of technologies were described in terms of primary characteristics, timeframe, media, and communication features as summarised in Table 2.2.4.a. The distinguishing features of the generations include:

- the type of communication involved for instance, one-way, two-way, or multiple-way communication;
- the type of the communicated information for instance, voice, video, data; and the volume of information that can be communicated that is, type of communication channels;
- and, the speed of communication.

Table 2.2.4.a. Generations of distance education technologies.
(US Department of Education, 1999, p. 4)

	First Generation	Second Generation	Third Generation	Fourth Generation
Primary Feature	Predominantly one technology	Multiple technologies without computers	Multiple technologies including computers and computer networking	Multiple technologies including the beginning of high-bandwidth computer technologies
Timeframe	1850s to 1960	1960 to 1985	1985 to 1995	1995 to 2005 (est.)
Media	• Print (1890+) • Radio (1930s) • Television (1950s and 1960s)	• Audiocassettes • Television • Videocassettes • Fax • Print	• Electronic mail, chat sessions, and bulletin boards using computers and computer networks • Computer programs and resources packaged on disks, CDs, and the Internet • Audioconferencing • Seminar and large-room videoconferencing via terrestrial, satellite, cable, and phone technologies • Fax • Print	• Electronic mail, chat sessions, and bulletin boards using computers and computer networks plus high-bandwidth transmission for individualized, customized, and live video interactive learning experiences • Computer programs and resources packaged on disks, CDs, Internet • Audioconferencing • Desktop videoconferencing via terrestrial, satellite, cable, and phone technologies • Fax • Print
Communication Features	• Primarily one-way communication • Interaction between faculty and student by telephone and mail • Occasionally supplemented by onsite facilitators and student mentors	• Primarily one-way communication • Interaction between faculty and student by telephone, fax, and mail • Occasionally supplemented by face-to-face meetings	• Significant broadband communication from faculty to students via print, computer programs, and videoconferencing • Two-way interactive capabilities enabling asynchronous and synchronous communication between faculty and students and among students • Internet good for text, graphics, and video snippets	• Two-way interactive real-time capabilities of audio and video • Asynchronous and synchronous communication between faculty and students and among students • Full 30-frame-per-second digital video transmission with databases of content resources available via the Internet and World Wide Web • Lengthy digital video programming available on demand

The first generation includes the period between early to mid twentieth century when print, radio, and broadcast television prevailed. Those media involved one-way communication as information was passed from teachers to students; there was no interaction among students, and minimal interaction between students and teachers. In addition, the radio and television broadcasts were time-dependent (Sherron & Boettcher, 1997).

The advent of the VCR and cable television in the early 1960s heralded the beginning of the second generation. The milestone that distinguished the second generation from its predecessor was the removal of time dependency: the broadcast portion of a distance education program was no longer tied to predetermined times (Sherron & Boettcher, 1997). In addition, videocassettes with their stop and rewind options gave learners control over the learning material: lectures could be interrupted and reviewed (Gunawardena & McIsaac, 2005). However, this generation still afforded little interaction among students and between students and teachers.

The third generation arrived by the mid-1980s together with the personal computer and two-way videoconferencing. Two milestones separated this generation form the previous ones: one, the new technologies made it possible to communicate increasingly complex and large amounts of information to students; and two, they enabled interaction among students, and between students and teachers (US Department of Education, 1999).

This growth in technological advancements accelerated significantly during the 1990s with the use of computer-mediated learning technologies, for example two-way interactive video; two-way audio and Web-based asynchronous communication; and on-line or offline Internet Web-based instruction (Phipps & Merisotis, 1999; Ponzurick et al., 2000; Sherry, 1996; Setaro, 2000). It was also the beginning of the fourth generation. This generation signified yet another milestone namely, increased interactivity among students, between students and

teachers, and between students and content thanks to high-speed networks and more sophisticated software. Consequently, the amount and types of information that could be communicated has significantly increased, and the exchange of information took significantly less time (Sherron & Boettcher, 1997).

The current landscape of distance education includes a wide spectrum of technologies, spanning all generations. Although the technologies of the first generation have been surpassed by several other generations, they continue to play a considerable role in distance education. Firstly, radio and television are a viable option in developing countries such as India and China where the infrastructure to support more recent technologies has yet to be developed (Middlehurst, 2003); and, in developed countries, radio and television is used extensively by institutions such as the British Open University to deliver programs to a large number of learners (Gunawardena & McIsaac, 2005). Secondly, print *remains a very important support medium for electronically delivered distance education* (Gunawardena & McIsaac, 2005, p. 365).

Advancements in technology have enabled a change in the learning environment from a classroom-based, teacher-centered model to a student-centered, technology-based model (Doucette, 1994; Guskin, 1994; Sanchez, 1994). Romiszowski reinforced this point by stating that:

> … the costs of telecommunications are falling whereas the costs of educational space, staffing, and transport are rising, so that over time the economical equation will favor the increased use of telecommunication-based education (Romiszowski, 1993).

However, recent developments in interactive multimedia technologies such as automated response systems and interactive multimedia on-line, which allow for individualised and collaborative learning, obscure the distinction between distance and traditional education. These technologies enable the creation of virtual communities also in traditional settings. Consequently, all interactions with teachers, course content, learning activities, assessment, and support services are delivered on-line even for campus-based students (Taylor, 2001). The use of on-

line education technologies has been accompanied by the development of pedagogies to improve the merging of distance education and asynchronous learning (Cashion & Palmieri, 2002). To this end, instructional designers were employed to create online units, and tutors were employed to implement the learning programs.

Through international collaboration, students around the world can participate in cooperative learning activities sharing information through computer networks. In such cases, global classrooms may have participants from various countries interacting with each other at a distance. Many mediated educational activities allow students to participate in collaborative learning activities (Gunawardena & McIsaac, 2005). Hall (1995) even suggests that the descriptor *distance learning* is becoming less and less relevant with respect to distance programs and students. According to Hall, *connected learning* might be a more accurate descriptor, reflecting the impact that technology has had on distance education pedagogy. However, he urges a close examination of the *new relationships between pedagogies that the new technologies make feasible*.

The changes in communications and information technology have necessitated various transformations in higher education institutions. Daryl Le Grew (1995) described a *paradigm shift* by comparing what learning was like in an industrial society and what it is now in an information society; the shifts included one from 'technology peripheral' to 'multimedia central', and another from 'local-focused' to 'global networking' (Table 2.2.4.b).

Table 2.2.4.b. Paradigm shift in education. (As presented in Mak, 1999.)

Industrial Society	Information Society
Technology peripheral	Multimedia central
Once-only education	Life-long learning
Fixed curriculum	Flexible/open curriculum
Institutional focus	Learner focus
Self-contained	Partnership
Local-focused	Global networking

Although technology is a central part of many distance education programs, it is important to remember that technology is just the method of conveying some content (Huch, 1999); technology is not the focus of the learning endeavour (Langford & Hardin, 1999). While distance education is evolving and changing so rapidly that no one can accurately predict its future,

> it is clear that the market for distance education will continue to expand in the next century. However, we should be aware of the limitations of distance education, especially in its electronic manifestations, and use it appropriately. (Neal, 1999, p. 43)

According to Weinstein,

> … the human touch cannot be delivered remotely. Distance learning technologies are intended to support an integrated program, not replace it. Balancing virtual and 'real' interaction will be one of the key educational challenges as we enter the 21st century… (Weinstein, 1997, p. 25)

In short, technology *cannot replace most human contact without significant quality losses* (Merisotis & Phipps, 1999, p. 17).

In brief, this section outlined the evolution of post-secondary distance education from its inception to the present; its progression from informal programs offered by individual providers to a well organised formal educational alternative; its purpose and characteristics; its expansion and internationalisation; and, the various forces that have shaped its growth. It highlighted the crucial role that advancements in technology have played in propelling the evolution of distance education; it also noted that technology has its limitations – it can facilitate, but not replace teaching.

2.3. DISTANCE EDUCATION MODELS

As outlined in the previous section (Section 2.2), distance education has evolved considerably from the inception of the first correspondence course to this day. The evolution involved the number and types of programs offered, the technology used in their delivery, as well as the number and types of providers offering such

programs. This section discusses various distance education models classified according to the above components: provider, program, and technology.

Current distance education programs represent a wide range of approaches. One end of the spectrum offers fully on-line programs relying on computer-based student contact and feedback; the other end offers technology-assisted programs with computer-delivered instruction, electronic mail communication between students and teachers, some centralised face-to-face class sessions, and weekend meetings of cluster groups. The programs have different scopes (from local to international), target a variety of audiences, are offered at various educational levels, and represent different settings (from classical universities operating at a distance to modern open and flexible institutions). Accordingly, distance education models are categorised from a number of perspectives.

2.3.1. Models based on organisational provider profile

Rumble (1986) and Holmberg (1995) identified three models determined by the organisational and administrative structures of distance education providers, sole responsibility, mixed mode, and consortium.

- Sole responsibility, of which Open University in the United Kingdom is an example, is a model where distance education is the special purpose and responsibility of the institution; all planning, funds, staff, and other resources are devoted to this purpose:

  > With the sole purpose being distance education, these institutions dedicate all their management structures to that end. All teaching and administrative activities and all funds are devoted exclusively to distance education. These institutions generally have no campus; instead, students use a system of local and regional study sites. Courses are usually designed by course teams. (GDNET, 2005)

- Mixed mode refers to institutions where both traditional and distance education occur, such as the Charles Sturt University, and Monash University in Australia. In mixed mode institutions, responsibility for organisation may rest with a single department within the institution, with the institution

responsible for administration; or, departments may be responsible for both organisation and administration of their own programs; or, a dedicated unit within the organisation may offer distance education in a variety of disciplines and be solely devoted to this purpose. Open Learning Institute at Charles Sturt University, and Distance Education Centre at Monash University in Australia are examples of dedicated units (Fraser & Deane, 1998).

- Consortium, refers to a group of institutions devoted to distance education. In this model two or more institutions share distance learning materials or functions. For instance, one institution is responsible for producing materials, another for tutor support, or accreditation. The institutions involved may be universities (traditional, single or dual mode) or university departments, government agencies, business partners, radio, TV or media production companies. Here, students may enrol at their own institution, use centrally developed learning materials, and transfer credits to their academic records (UNESCO, 2000; Verduin & Clark, 1991). Examples of consortia in three different countries include the National Technological University in the USA, NETTUNO and CUD in Italy, and the Open Learning Agency and Contact North/Contact Nord in Canada (UNESCO, 2000).

2.3.2. Models based on provider's attitude to distance education

Fraser & Deane (1998) categorised distance education models in terms of institutional attitudes to distance education. The first model recognises distance education as a mode in its own right. The learning experience is adaptable and learner-controlled. The second model regards distance education as a substitute for conventional education. In this model, students are treated as members of a class, there is a mandatory face-to-face component, and the learning experience is paced and controlled by the institution. In addition to these two models there are many variations that partly resemble either or both of them.

2.3.3. Models determined by delivery technology

Another perspective used in categorising distance education models is one based on technologies used to support the various components of the instructional process, and the placement of control over the pace and location of instruction. In some models, the teachers and institution have primary control, as is the case in a traditional classroom environment. In others, the control rests with the student. The models identified in this categorisation are: distributed classroom, independent learning, and open learning plus class (Leach & Walker, 2000).

- Distributed classroom is a model where interactive telecommunication technologies are used to extend a program based in one location to students in one or more other locations. The control over the pace and location of instruction rests with the teachers and the institution where the program is based.

- Independent learning, sometimes referred to as flexible learning, is a model where students learn when, how, what, and where they want (Van den Brande, 1992). They are provided with a variety of educational materials for a self-paced study, and access to teachers who provide guidance, and evaluate their work. Telephone, e-mail, computer conferencing and correspondence are used as a means of communication. The presence of two-way communication distinguishes independent learning from teach-yourself programmes (Keegan, 1996).

- Open learning plus class model involves the use of course material allowing students to study independently, combined with periodical use of interactive telecommunications technologies for group meetings among all enroled students.

Taylor (2001) categorised distance education operations in terms of generations determined by the supporting technologies; first, the Correspondence model based on print technology; second, the Multimedia Model based on print, audio and video technologies; third, the Telelearning Model, based on telecommunications technologies; fourth, the Flexible Learning Model based on the Internet; and fifth,

Intelligent Flexible Learning Model, a derivation of the fourth generation, capitalising further on the Internet and the Web. According to Taylor (2001), the difference between the fourth and fifth generations is in the way in which technology is used. The fifth generation extends the context of Internet-based delivery by incorporating the use of automated response systems and intelligent object databases; as a consequence tuition costs decrease and thereby stimulate economies of scale:

> A key consideration for the fifth generation is the use of automated response systems
> to reduce the variable cost of computer mediated communication (CMC) which in
> the fourth generation is quite resource intensive. (Taylor, 2000, p. 1)

Some of the characteristics of the various generations that are relevant to the quality of teaching and learning, as well as an indicator of institutional variable costs are summarised in Table 2.3.3.

Table 2.3.3. Five generations of distance education. (Taylor, 2001, p. 3)

Models of Distance Education and Associated Delivery Technologies	Characteristics of Delivery Technologies					
	Flexibility			Highly Refined Materials	Advanced Interactive Delivery	Institutional Variable Costs Approaching Zero
	Time	Place	Pace			
FIRST GENERATION The Correspondence Model						
• Print	Yes	Yes	Yes	Yes	No	No
SECOND GENERATION The Multimedia Model						
• Print	Yes	Yes	Yes	Yes	No	No
• Audiotape	Yes	Yes	Yes	Yes	No	No
• Videotape	Yes	Yes	Yes	Yes	No	No
• Computer-based learning (e.g. CML/CAL/IMM)	Yes	Yes	Yes	Yes	Yes	No
• Interactive video (disk and tape)	Yes	Yes	Yes	Yes	Yes	No
THIRD GENERATION The Telelearning Model						
• Audio tele-conferencing	No	No	No	No	Yes	No
• Video-conferencing	No	No	No	No	Yes	No
• Audiographic Communication	No	No	No	Yes	Yes	No
• Broadcast TV/Radio and audio-teleconferencing	No	No	No	Yes	Yes	No
FOURTH GENERATION The Flexible Learning Model						
• Interactive multimedia (IMM) online	Yes	Yes	Yes	Yes	Yes	Yes
• Internet-based access to WWW resources	Yes	Yes	Yes	Yes	Yes	Yes
• Computer-mediated communication	Yes	Yes	Yes	Yes	Yes	No
FIFTH GENERATION The Intelligent Flexible Learning Model						
• Interactive multimedia (IMM) online	Yes	Yes	Yes	Yes	Yes	Yes
• Internet-based access to WWW resources	Yes	Yes	Yes	Yes	Yes	Yes
• Computer-mediated communication, using automated response systems	Yes	Yes	Yes	Yes	Yes	Yes
• Campus portal access to institutional processes and resources	Yes	Yes	Yes	Yes	Yes	Yes

Related to Taylor's (2001) fourth and fifth generation models of distance education was Gallagher's (2001) categorisation of on-line education. Gallagher identified three types of on-line education, whereby the types – Web Supplemented, Web Dependent, and Fully On-line – varied with respect to their dependence on the Internet.

- Web supplemented – In this mode, online information is used to supplement traditional forms of delivery, and students' participation on-line is optional. Students can access online additional information about their programs and individual subjects; the information may include course descriptions and study guides, assessment details, reading lists, and on-line learning resources.
- Web dependent – While some traditional on-campus component is still present, in this mode, students must participate on-line in learning and communication. On-line learning involves interaction with study content; Internet is also used to communicate with staff and fellow students.
- Fully on-line – There is no traditional on-campus component in this mode and no face-to-face interaction. All interactions with study content, as well as staff and students is conducted on-line. In addition, learning activities, assessment, and support services are also delivered on-line.

Finder and Raleigh, as cited in (Meares, 2001), provided an alternative definition of the on-line models; they distinguish between four different levels based on the importance of the on-line component of a distance education program. The four levels are: informational, supplemental, essential, and fully on-line.

- Informational – the on-line component serves as an optional source of general program information, for example program outline or assignment description.
- Supplemental – the on-line component complements other forms of instruction, for example it contains lecture notes. Students are required to use the Web to complete part of their program. On-line learning materials usually include links to related secondary sources.
- Essential – the on-line unit forms an integral part of the program and students must use it to complete the program. Most learning materials are available on the Web; students use the Web to complete assignments.

- Fully On-line – the program does not include any face-to-face interaction and is delivered entirely on-line.

In conclusion, this section presented categorisations of distance education models according to the organisational and administrative structures of the providers; providers' attitudes towards distance education; and, supporting technologies.

2.4. TRANSNATIONAL MODEL OF DISTANCE EDUCATION

Following on the overview of the evolution of distance education and the associated discussion on different distance education models presented in the previous sections (Section 2.2 and 2.3), this section focuses on one particular type of distance education which is the subject of this research study – transnational education. The section reviews the definition of transnational education, its typology, factors determining demand and supply, attributes of typical transnational programs, and the importance of face-to-face interaction in those programs.

2.4.1. Transnational education – definition

The review of recent studies of transnational education revealed that there is no agreement about what to include in this category. Similarly, there is no agreement on the various sub-definitions that inform the subject. For the purpose of this research study, a working definition of transnational education produced by UNESCO and the Council of Europe for their Code of Practice in the Provision of Transnational Education was used (UNESCO & Council of Europe, 2001). This states that transnational education includes

> All types of higher education study programme, or sets of courses of study, or
> educational services (including those of distance education) in which the learners are
> located in a country different from the one where the awarding institution is based.
> Such programmes may belong to the educational system of a State different from the
> State in which it operates, or may operate independently of any national system.
> (UNESCO & Council of Europe, 2001)

This definition includes education that is provided by collaborative arrangements, such as franchising, twinning, joint degrees where study programs are provided by another partner, as well as non-collaborative arrangements such as branch campuses, offshore institutions, and corporate universities.

The Australian Department of Education Science and Training (DEST, 2005) provides a definition of *Australian Transnational Education*; this definition includes two additional requirements:

(1) that the transnational program be delivered and/or assessed by an accredited Australian provider; and

(2) that the delivery include a face-to-face component.

It further stresses that, in contrast to distance education provided in purely distance mode, transnational education includes a physical presence of instructors offshore, either directly by the Australian provider, or indirectly through a formal agreement with a local institution:

> Australian transnational education and training, also known as offshore or cross-border education and training, refers to the delivery and/or assessment of programs/courses by an accredited Australian provider in a country other than Australia, where delivery includes a face-to-face component. The education and/or training activity may lead to an Australian qualification or may be a non-award course, but in either case an accredited/approved/recognised Australian provider is associated with the education/training activity.
>
> As distinct from education and training provided in a purely distance mode, transnational education and training includes a physical presence of instructors offshore, either directly by the Australian provider, or indirectly through a formal agreement with a local institution/organisation. (DEST, 2005, p. 6)

2.4.2. Typology of transnational education

There are a great number of different relationships between different types of transnational education providers, delivery mechanisms, and programs/awards. Charting these types is a difficult task, as the constantly evolving, highly complex situation includes an array of partnerships, consortia, articulation agreements, modes of delivery, public, private, off-shore, for-profit and corporate elements.

Various models of teaching can also be found, ranging from full program delivery at an offshore campus, through a combined face-to-face and flexible delivery option, and e-learning (Allport, 2000; Goodfellow, Lea, Gonzalez & Mason, 2001).

Transnational education is constantly evolving. Wilson and Vlãsceanu (2000) distinguished between three inter-related perspectives of this evolution adding that,

> all these new developments in higher education share certain common characteristics and similarities, mainly in terms of the ways they cross the borders of national higher education systems. It is for this reason that they are usually identified by the generic phrase of transnational education. (Wilson & Vlãsceanu, 2000, p. 75)

The first perspective relates to the delivery mechanisms and arrangements including franchising, corporate universities, international institutions, distance learning, and virtual universities (Machado dos Santos, 2002). Wilson and Vlãsceanu (2000) noted:

> One form of development refers to a modality of delivering an educational programme (i.e. distance education), others to ways of establishing a programme/institution (i.e. franchising or twinning/branch campus), and others again to ways of offering primarily continuing education to certain new groups of students. There seems to be no limit to the proliferation of such modalities or arrangements, as long as the demand for higher education is still growing, and the possibilities for a global market continue to emerge. (Wilson & Vlãsceanu, 2000, p. 78)

The second perspective relates to the institutional and organisational arrangements that result from the adopted delivery mechanisms. This can be either: a new institution, a branch, or a franchised program or course of study offering an award within an existing institution or other organisation. The third perspective refers to the nature and quality of qualifications awarded through transnational education for example degrees, certificates, or study credits (Wilson & Vlãsceanu, 2002).

Following on Wilson & Vlãsceanu's (2002) categorisation of transnational programs according to their delivery mechanism, Adam (2001) and Vignoli (2004) have described the most common forms of such programs as follows:

1. **Franchising**: the process whereby a higher education institution (franchiser) from a certain country grants another institution (franchisee) in another country the right to provide the franchiser's programmes/qualifications in the franchisee's host country, irrespective of the students' provenance; in many cases, the franchisee only provides the first part of the educational programme, which can be recognised as partial credits towards a qualification at the franchiser's in the context of a *programme articulation*.

2. **Programme articulations**: inter-institutional arrangements whereby two or more institutions agree to define jointly a study programme in terms of study credits and credit transfer, so that students pursuing their studies in one institution have their credits recognised by the other in order to continue their studies (*twinning programmes, articulation agreements*, etc.). These may -or may not- lead to joint or double degrees.

3. **Branch campus**: a campus established by a higher education institution from one country in another country (host country) to offer its own educational programmes/qualifications, irrespective of the students' provenance; the arrangement is similar to franchising, but the franchisee is a campus of the franchiser.

4. **Off-shore institution**: an autonomous institution established in a host country but said to belong, in terms of its organisation and educational contents, to the education system of some other country, without (necessarily) having a campus in the mother country.

5. **Corporate universities**: they are usually parts of big transnational corporations and organise their own higher education institutions or study programmes offering qualifications that do not belong to any national system of higher education.

6. **International institutions**: institutions offering so-called *international* programmes/qualifications that are not part of a specific education system.

7. **Distance learning arrangements and virtual universities**, where the learner is provided with course material via post or Web-based solutions, and self administers the learning process at home; the only contact with the student is by remote means. (Vignoli, 2004, p. 2)

Bjarnason (2005) further qualified the various types of transnational education programs according to two scales. One scale indicated the extent of on-line reliance of a program and ranged from *wholly face-to-face* to *wholly on-line*; the other indicated the extent of institutional involvement in program development and delivery, ranging from *wholly in-house* to *majority outsource*. Figure 2.4.2.a presents placement of transnational programs according to the two scales.

Figure 2.4.2.a. Types of transnational provision.
(As presented in Bjarnason, 2005.)

In Australia, twinning programs represent the typical model of early transnational education. According to McBurnie & Pollock, twinning programs

> are similar to the concept of locally supported distance education programs, except that they are fully taught programs following the same syllabus and timetable as the relevant home campus program. Students have the same materials, lectures and examinations as their peers in the provider institution. The academic staff are usually locally engaged, but selected by the provider institution according to its usual criteria. (McBurnie & Pollock, 1998, p. 13)

Davis, Olsen & Böhm (IDP Education Australia, 2000) suggested a typology for Australian transnational education programs in which they separate the provider dimension from the student dimension. The provider dimension of the model spans a range where the increasing responsibility of the partner institution varies across academic teaching, assessment, and support; curriculum; provision of study

location; student support; financial administration; and, marketing and promotion. The student dimension includes various modes of delivery from fully face-to-face through supported distance and independent distance to fully online. The two-dimensional model is presented in Figure 2.4.2.b.
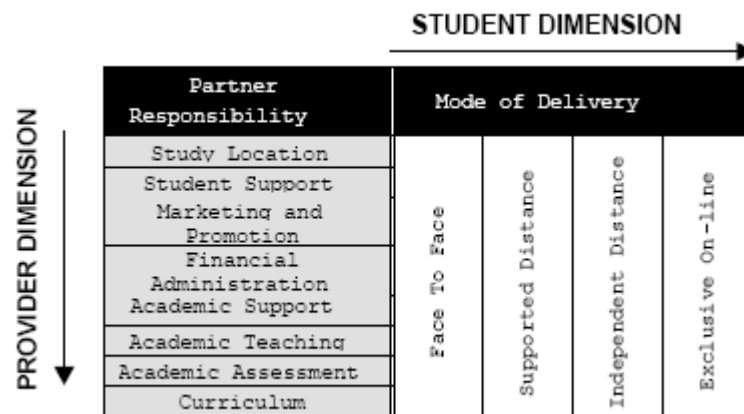

Figure 2.4.2.b. Two-dimensional model of offshore provision.
(As presented in IDP Education Australia, 2000, p. 41.)

According to Davis et al. (IDP Education Australia, 2000), this two-dimensional model offers several advantages. First, it gives the ability to examine transnational programs without having to draw distinction between the student perspective and the provider perspective. Second, it separates the characteristics that describe business models from those that describe teaching and learning models. And finally, it enables the examination of the relationship between the transnational program provider and its partner institution.

2.4.3. Factors determining the demand for and supply of transnational education

The changing nature of demand and supply in transnational tertiary education that has emerged since the late 1990s has been described as the 'business of borderless education' (Cunningham et al, 2000). The demand varies between countries, whereby countries with more rigid education systems tend to attract more transnational providers. Here it often acts as a significant access route to higher

education and the acquisition of internationally recognised qualifications (although not necessarily nationally recognised ones). According to Adam (2001), the main determinants of demand include: cost of the program; brand name of the provider and product; value-added from the program; reputation, quality and perceptions of the program; the national/international recognition of the program; the convenience and nature of delivery; and, the level of competition (dissatisfaction/failings of traditional education provision). These determinants can be further separated into *pull factors* that attract students to imported education and *push factors* that repel students from home provision.

According to Marginson (2004b) demand for *cross-border* tertiary education in Asia-Pacific is driven by three factors: (1) insufficient supply of places in local universities, (2) globalisation of work force, and (3) potential status and mobility associated with and acquisition of a foreign degree.

> Demand is driven by three factors. First, in many nations there are insufficient places in reputable degree-granting institutions at home. Second, there are expanding opportunities for globally mobile labour in fields such as business services, ICTs and scientific research. Education in the USA or another English-language nation provides favourable positioning in global labour markets. Third, graduates can use foreign degrees to secure status and mobility benefits. They enhance employment potential at home and abroad, and may open the way to migration to the nation of education or elsewhere. (Marginson, 2004b, p. 85)

Research reveals three main determinants of the supply of transnational education: costs of production of programs (that decrease with increasing scale); the nature of the national market; and, the existence of legal regulation and controls (Marginson, 2002). According to Knight (2004), much of the impetus for transnational education comes directly from the need to raise income by both traditional and *for profit* education providers – the former are increasingly seeking new ways to increase their funding. The supply of transnational education provision is also encouraged by the increasing technical ease of delivery through the use of the Internet and other technologies.

2.4.4. Typical transnational program – operational characteristics

According to the Confederation of European Union Rectors' Conferences (2001) report, transnational education in Europe is largely confined to business subjects (especially MBAs), information technology, computer science and the teaching of widely spoken languages, for example English, Spanish, German. A typical transnational program offered by Australian universities is also in the field of study of business, information technology, and education (IDP Education Australia, 2000; Schoorman, 2000; Welch, 2002). Recent statistics, presented in Table 2.4.4.a, suggest that in the past few years, health has emerged as a popular field of study for transnational students.

Table 2.4.4.a. Overseas students onshore and offshore by field of education, 2001-2003. (AVCC, 2005, p. 4)

	2001	2002	2003
On-Shore Students			
Agriculture, Environment and related studies	835	1,096	1,185
Architecture and Building	2,380	2,861	3,155
Creative Arts	4,497	6,683	7,738
Education	2,181	3,492	4,305
Engineering and Related Technologies	8,263	11,146	13,529
Food, Hospitality and Personal Services	20	19	11
Health	4,809	7,222	8,506
Information Technology	15,440	25,253	25,292
Management and Commerce	30,576	47,296	56,281
Natural and Physical Science	4,210	5,931	6,814
Society and Culture	7,313	9,200	14,121
Non-Award Courses and Mixed Field Programs	3,460	11,440	10,947
Total No. of On-Shore Overseas Students	83,992	131,639	151,884
Off-Shore Students			
Agriculture, Environment and related studies	21	54	50
Architecture and Building	419	659	792
Creative Arts	933	1,217	1,429
Education	625	1,133	1,251
Engineering and Related Technologies	782	2,442	3,265
Food, Hospitality and Personal Services	5	-	-
Health	3,753	4,670	4,322
Information Technology	3,655	5,983	6,631
Management and Commerce	16,251	34,306	37,199
Natural and Physical Science	386	656	791
Society and Culture	1,297	295	2,436
Non-Award Courses	139	2,004	347
Total No. of Off-Shore Overseas Students	28,266	53,419	58,513
Total Overseas Students (No.)	112,258	185,058	210,397

Davis et al. (IDP Education Australia, 2000), having conducted a survey of Australia's offshore programs, provide a list of further characteristics of a typical Australian transnational program. Such a program is offered in Hong Kong, Malaysia or Singapore; these countries host the largest number of Australian transnational programs, as evidenced in Table 2.4.4.b; they also provide the

largest number of transnational students, as evidenced in Table 2.4.4.c. Although, the overall offshore student numbers in the top three source countries declined in semester one, 2004 compared to semester two, 2003 (as shown in Table 2.4.4.c), together these markets account for 65% of students in Australian transnational programs; at the same time, there was a strong growth in emerging transnational markets, namely Vietnam, China, and Indonesia (IDP Education Australia, 2004).

Table 2.4.4.b. Current offshore programs of Australian universities
(by year of first intake), pre-2000 – 2003. (AVCC, 2005, p. 11)

	PRE - 2000	2000	2001	2002	2003	Total (a)
Country						
China	98	30	22	24	24	200
Hong Kong (SAR)	154	21	26	23	16	227
Indonesia	15	3	2	1	3	25
Malaysia	174	59	28	24	29	321
Singapore	194	43	30	58	53	375
Other	260	62	39	43	18	421
TOTAL	895	218	147	173	143	1569

Table 2.4.4.c. International students: top 5 markets by detailed
transnational mode. (IDP Education Australia, 2004, p. 12)

Rank	Distance Online	Number	Growth	Offshore on-Campus	Number	Growth
1	Malaysia	3,846	-29%	Singapore	10,986	3%
2	Singapore	2,952	-16%	Hong Kong	9,351	-17%
3	Hong Kong	1,952	-25%	Malaysia	8,126	17%
4	China	1,867	23%	China	5,472	18%
5	Canada	807	-15%	Vietnam	955	47%
	Total	**16,053**	**-15%**	**Total**	**41,162**	**1%**

A typical Australian transnational program involves full-time attendance and, in terms of delivery mode, relies on face-to-face teaching or supported distance education; involves a partner which is a private education institution or public education institution; and, awards an Australian qualification (IDP Education Australia, 2000). Recent statistics, presented in Table 2.4.4.c, confirm the prevalence of transnational programs that rely on face-to-face interaction and, with the exception of the Hong Kong market, their increasing growth; the figures also indicate a decline, with the exception of China, in the demand for online programs. Overall, in 2004 the number of distance online students declined by

15% on semester two, 2003, while there was a 1% growth in on-campus students (IDP Education Australian, 2004; refer also to Table 2.2.2.b in Section 2.2.2).

Davies et al. (IDP Education Australia, 2000) provides the following summary of typical transnational programs offered by Australian universities:

- Most of the programs (64%) were offered in Australia's key markets for international students, being Hong Kong, Singapore, and Malaysia,
- Highest enrolments in offshore programs were in Hong Kong, Malaysia, China, and Singapore,
- More than 25% of programs had commenced in the last year, thus indicating substantial expansion of Australia's offshore education provision,
- The awards for the programs were provided by the Australian university,
- Most of the partner organizations (55%) were private and public education institutions,
- Delivery of almost 80% of programs was classified as being face-to-face or supported distance. (IDP Education Australia, 2000, p. 45)

In terms of responsibility, the Australian university is responsible for curriculum, teaching assessment, and quality assurance, and allocates to the offshore partner responsibility for provision of study location, marketing, promotion and financial administration. Although, on the whole, the Australian university is responsible for the quality assurance of the program, partner institutions, overseas governments, and international organisations also participate in this responsibility (IDP Education Australia, 2000).

2.4.5. The importance of the face-to-face component

Although many universities view online learning as an economic alternative to face-to-face teaching (Davis & Meares, 2001), online learning cannot be regarded as a suitable alternative in transnational settings (Emil, 2001). This view is also supported by Tomasic who claims that:

> Electronic delivery of courses to off-shore destinations is unlikely to be seen as an acceptable substitute for face to face delivery, although greater use of electronic means to deliver parts of courses may be acceptable (Tomasic, 2002, p. 11).

Fully online provision of transnational programs raises many concerns regarding the learning experience, particularly about the extent of feedback and guidance that can be provided to students (Herrmann, Downie, & O'Connell, 2001; Knipe, 2002). Debowski (2003) agrees that fully online provision of offshore programs is generally perceived to be less effective than options including a face-to-face component. She emphasises the strong recognition of the value of (Australian) academics meeting and interacting with the offshore students population; such regular teaching input by these academics significantly enriches the transnational program (Debowski, 2003).

Another aspect of transnational education that benefits from face-to-face interactions is localisation of teaching. As Ziguras (2000) pointed out, the curriculum of a transnational program is usually standardised across several campuses, which may be located in different countries. While the curriculum is sometimes tailored to local conditions, the modifications are usually minimal; they may only involve assignment questions for example. In such circumstances, teachers, through face-to-face interaction, can play an important role contextualising and interpreting the content of study materials to make it useful for their students.

> Face-to-face teachers are able to introduce a significant degree of local interpretation for imported educational materials. Being in close contact with students, they are in a position to know how much local contextualisation these materials may require, and can achieve a balance in the use of various types of material according to students' level, interests, language skills, and so on. (Ziguras, 2000, p. 33)

> The relationship between students and face-to-face teachers is crucial in making foreign materials relevant to students. (Ziguras, 2000, p. 33)

The importance of the face-to-face communication and the need for localisation of transnational programs was also raised by Evans & Tregenza (2002). They examined a range of transnational programs offered in Hong Kong by Australian universities in collaboration with Hong Kong partner institutions. They commented on provision of face-to-face tuition in those programs concluding that

Hong Kong students seek and expect such contact. They also pointed out that both the Australian instructors as well as Hong Kong tutors agreed *that the Australian courses need to be adapted to suit the needs of Hong Kong students*; to this end, Australian instructors would localise study materials, and face-to-face Hong Kong tutors would put those materials in relevant context. However, the extent of course localisation was limited by the existing regulatory framework (Evans & Tregenza, 2002). It should be noted that under Hong Kong legislation, all award granting programs offered by transnational (non-local) institutions must be registered; the registration criteria include the following condition:

> In the case of a course leading to the award of non-local higher academic qualification, the course must be offered by a recognised institution and is itself recognized by its home country as being of a comparable standard to a similar course operated by the institution in the home country. (Hong Kong Government, 1996, Section 10, p. A666)

Although some advanced technologies, such as streaming media technologies are very capable of supporting voice and video and afford the possibility to emulate face-to-face interaction, they may be out of reach for many distance learners. For example, videoconferencing for learning over the Internet requires more bandwidth that is usually available to a regular Internet subscriber (Hentea, Shea & Pennington, 2003).

The availability of technology is not the only prohibitive factor; there are also aspects of curriculum and teaching that are difficult to emulate through technology. For instance, *demonstration of theoretical knowledge in Internet classes is below that of traditional classes* (Marold & Haga, 2004, p. 16). Having measured online students' ability to apply programming theory, Marold & Haga concluded that the Internet did not lend itself to the deployment of subjects that involved problem solving and higher analytical reasoning, such as advanced computing subjects – the online students in their study performed significantly worse than their counterparts in a traditional classroom. Discussing the results, the authors identified several factors that determined poorer performance of online learners in their study including: inadequate instructional methods, technology

differences, and differences in group interaction. With respect to instructional methods, they pointed out that

> instruction in the online environment is still in its infancy and faculty, as instructors and course designers, have not yet developed the most effective methods for delivering some type of content in this context. (Marold & Haga, 2004, p. 17)

On the subject of technology, Marold & Haga highlighted the fact that face-to-face interaction created opportunities that let

> Classroom instructors emphasize important content and encourage application of that content in ways that are not even apparent to the instructor – often through subtle changes in voice or body language that are simply instinctive for effective instructors. (Marold & Haga, 2004, p. 17)

They went on to say that application of theory in particular, might be effectively illustrated in the classroom through the choice of suitable examples or through answers to students' questions; technology could not easily emulate this kind of interaction. Moreover, *simple repetition can be effective in a classroom, but it is difficult to implement online* (Marold & Haga, 2004, p. 17). The authors also suggested that group interaction in a classroom setting could be an important contributor to the learning process. However, this kind of interaction is difficult to emulate in the online environment even through thoughtful use of online forums, chat sessions, and email; *the cohesiveness and satisfaction of class discovery is not duplicated online* (Marold & Haga, 2004, p. 17).

Related to the importance of direct group interaction is the community aspect of face-to-face contact (Chen, 1997). Chen found that dialogue not only allows students to assess their learning, but also to develop a sense of community with other students; this sense of community can alleviate the problem of isolation often reported by distance students. Kirkup & Jones (1996) agree and state that *students need dialogue with their teachers and with other students in order to consolidate and check on their own learning* (p. 278). Moreover, they list the inability to offer dialogue in the way that conventional face-to-face education does as one of three most significant weaknesses of distance education; the inflexibility of content and study method, and the isolation and individualisation of the student are cited as the remaining two weaknesses.

It should also be noted that even universal access to computers by offshore students is not a safe assumption. For example, Singh and Han (2004) while working at Jilin University in China, found that many of their academic colleagues and students had limited access to a personal desktop computer, the Internet, and email; they had to pay for timed access to their email accounts and for downloading attachments; and, they did not have access to high-speed data networks. For those users, their offline education could be supplemented, but not replaced, by ever-advancing online technologies (Singh & Han, 2004).

In China the limited equipment and infrastructure for transnational online education in many institutions is only one factor that reduces its viability; one other important factor is *the strict legislation of central government regarding online education services provided by foreign countries* (Huang, 2003, p. 203).

In addition, students who have to rely solely on online learning may have reduced opportunity to develop a broad range of learning skills, which may be possible under the guidance of a teacher *in situ*. However, this problem may be alleviated if teachers involved in the delivery of an online program are well trained in conveying such skills through good program design (Oliver, 2000).

Research studies have indicated the importance of face-to-face interaction (Marold & Haga, 2003), and demonstrated that quality in education can be achieved by incorporating computer technology and face-to-face interaction (Kiser, 2002). Marold's study of performance and achievement between online students and classroom students found that achievement tended to be higher in the Web students. However, performance on projects and homework submissions was found to be higher in classroom students; especially in programming classes, online students with an average ability level had more difficulty applying the theory of programming problems than classroom students (Marold, Larsen, & Moreno, 2000).

Kiser (2002) reported on a two-year study by Thomson Learning. Launched in 1999, the study compared the results of three sets of adult learners: the first – the *blended* group – were taught to use Microsoft Excel with a mix of online and face-to-face instruction; the second group took an online course; the third group – the control group – received no training. The study report concluded that the blended group performed tasks 30% more accurately than the online-only group. The blended group and online group both performed better than the control group with no training in accuracy, by 159% and 99% respectively. In addition, the blended group performed tasks 41% faster than the online group.

A recent meta-study aimed at identifying factors that affect the effectiveness of distance education has led to some important data-driven conclusions including the importance of face-to-face communication, live human instructors, and the right mixture of human involvement and technology (Zhao, Lei, Yan, Lai & Tan, 2005). Zhao et al. suggested that programs combining face-to-face component and technology mediated distance component resulted in the most positive outcomes.

Given the importance of face-to-face interaction, successful distance education programs are increasingly moving towards a new model known as *blended* or *hybrid* distance learning. The hybrid model adds a human touch to distance learning by using facilitators or mentors and promoting various types of interactions between students, instructors, and resource centers (Hentea et al., 2003; Riffee, 2003; Zhao et al., 2005). Some of the successful distance education programs which blend the traditional distance learning model with face-to-face teaching sessions include the programs at Purdue University West Lafayette, Indiana University, and Penn State University (Hentea et al., 2003). Riffee (2003) supports the hybrid approach maintaining that media alone cannot offer students guidance and personal engagement. Consequently, he regards face-to-face interaction as a necessary ingredient of successful distance education:

I am fortunate to be associated with distance education programs that are very successful from the point of view of learning outcomes and that have been academically successful. It is my opinion that much of that success comes from using a hybrid model of distance education that involves the electronic delivery of content coupled with face-to-face contact by a faculty facilitator or mentor. (Riffee, 2003, p. 10)

Ziguras (2002) pointed out the importance of face-to-face interaction in transnational programs and decreasing interest in such programs if provided fully online; recent statistics, presented in Table 2.4.4.c in Section 2.4.4, confirm the declining interest in online programs. Having examined various modes of transnational program delivery in Australia and elsewhere, Ziguras suggested that the future of transnational programs belongs to programs that include face-to-face interaction facilitated largely by an offshore partner of the educational provider; he uses the term *joint delivery* to describe such programs.

Evidence internationally shows that fully on-line delivery is proving unpopular except in small niche programmes, due to the lack of face-to-face contact, an unwillingness on the part of students to pay high fees and significant start-up costs. Branch campuses are faced with problems of scale and expose the provider to considerable financial risk through capital investment offshore. Perhaps the best approach, both in terms of mode of delivery and financial risk, is seen to be "joint delivery" with local, established partners, using on-line delivery in some form (for enrolment and general information for example). This approach still requires an on-going commitment to building quality partnerships, and rigorous internal approvals. (Ziguras, 2002)

In brief, this section discussed various aspects of one particular model of distance education, which is the subject of this research study, namely transnational education. The section reviewed the definition of transnational education, its typology, growth, factors influencing the demand for and supply of transnational education, characteristics of typical programs, as well as the role of face-to-face interaction in those programs.

2.5. SPECIAL REQUIREMENTS OF COMPUTING EDUCATION AT A DISTANCE

The previous section (Section 2.4) focused on the transnational type of distance education. The section presented an overview of transnational education including its typology and operational characteristics. This section continues on by outlining the particular demands of computing education offered at a distance.

In addition to the standard problems of distance education the aspects of each individual field of study introduce unique problems. In the field of computing, two aspects present a unique challenge: the ever-changing nature of computing, and the need for students to have access to appropriate computing resources.

Change is one of the defining characteristics of computing. As a consequence, the production and design of up-to-date distance education material results in high costs (Murgatroyd & Woudstra, 1990). Investing considerable resources in developing subject material that must change every time it is offered may not be economically viable. This is especially true in advanced computing subjects where there is a small student population (Jones, 1996).

The study of computing includes three essential paradigms: theory, abstraction and design (Denning et al., 1989). In addition, the study of computing necessitates substantial hands-on practical experience. To learn the abstraction and design paradigms and to gain practical computing experience, students must have access to appropriate computing resources, and this need presents one of the biggest challenges to offering distance education programs in computing.

The study of computing, particularly at an advanced level, involves problem solving skills, critical thinking skills, and application of theory. Research has found that computing subjects requiring and aiming to develop these advanced skills were not sufficiently effective when offered at a distance (Marold & Haga, 2004; Terry, 2001). Marold & Haga (2004) conducted a study comparing three

offerings – two online and one classroom – of a programming subject in Visual Basic. The results of this study showed a significant difference in the means of student projects and tests that required application of theory learned – online students scored significantly lower; they also performed significantly worse in theory portions of exams and in projects. The results indicated that online distance *students are having trouble applying concepts of programming that they are attempting to learn* (Marold & Haga, 2004, p. 16). The authors concluded that, while more research was needed, the design and delivery of online problem solving subjects needed careful attention.

Students in traditional computing programs have access to on-campus computer laboratories; however, this is not a universally appropriate solution for distance education students. Holmberg & Bakshi (1982), and Kember (1982) discuss the issue and offer models for institutions to follow in meeting this 'practical' requirement, for instance residential schools, or local centers. Xenos et al. (2002) report that more recently the standard approach has been to require distance computing students to secure their own computing access. This generally results in computing students facing greater expense in order to purchase appropriate hardware, software, training and support (Xenos et al., 2002).

The growing availability of personal computers at home means that most students are able to gain access to a computer. However, problems may occur with some advanced subjects that require capabilities and performance not available on personal computers. For instance, some systems may need to contain both the domain knowledge and behaviour embedded through programming, others may require access to high speed Internet connections; those types of requirements cannot be easily met by individual distance learners (Hentea et al., 2003). At some institutions, residential schools provide access to these resources; other institutions do not use residential schools. Some institutions address this problem by supporting several computer platforms available to students; others specify a standard computing platform and design all subjects for that platform. Designing a subject for multiple platforms introduces additional problems and requires a

considerably higher investment of resources than designing for a single platform. Achieving consensus from a group of academics on a single suitable computing platform may also be difficult (Jones, 1996).

The availability of software presents another difficulty. With on-campus computing laboratories it is possible to organise site licences for required software. Obtaining similar site licences that allow the supply of software to distance students is rare. This results in distance students having to purchase the necessary software, thus further adding to the costs of the distance program.

Lastly, there is the issue of support. According to Jones (1996), distance computing students demonstrate varying levels of computing expertise. While some students will have years of experience in the computing industry, others will be familiar with only basic computer functions. Novice computing users about to study computing by distance education will face two challenges: first, they must become familiar with the operation of distance education and how best to fit study into their existing life style; and, second, they must obtain, install, configure, and learn how to use a computer. These novice students require additional assistance from the lecturers of first year subjects and technical support staff (Jones, 1996). However, a more recent study by Xenos, Pierrakeas, & Pintelas (2002) does not share Jones's concerns regarding novice students, concluding that the majority of students who choose to study computing by distance are already familiar with this field, and either own a computer or use a computer and e-mail.

To summarise, this section highlighted the unique demands of computing by distance education: firstly, the requirement to update study material in a rapidly changing discipline; secondly, the need to teach subjects involving theory, higher analytical reasoning, and problem solving; and finally, the requirement to accommodate hardware and software needs of the students.

2.6. EFFECTIVENESS OF DISTANCE EDUCATION/TRANSNATIONAL EDUCATION PROGRAMS

Following on the discussion of transnational education presented in Section 2.4, and the overview of the particular demands of computing education offered in transnational mode discussed in Section 2.5, this section focuses on the issue of effectiveness of transnational education programs. The section reviews the definition of effectiveness in transnational context, as well as determinants, and measures of program effectiveness.

2.6.1. Effectiveness of transnational programs – definition and perspectives

A distance education program is perceived to be effective if it fulfills the needs of its participants to such an extent that they would be happy to enrol in another similarly designed program (Merisotis & Phipps, 1999). The needs of the learners represent individually and socially defined goals that can be achieved in a variety of ways and relate to a number of learning outcomes. Although the ultimate objective of a program is to enable the learners to achieve their goals, the assessment of its effectiveness invariably involves evaluation of factors at two levels of operation: the individual level and the system level. At the individual level, the learning experience, the practical relevance of acquired skills, and satisfaction with the learning experience are evaluated. At the system level, the evaluation includes the functional, managerial and instructional aspects (Chute et al., 1999).

Students perceive a distance education program to be effective if they pass examinations, feel that the content of the program is relevant to their needs, have an opportunity to network with other students, feel part of the class and connected to teachers, have opportunities for participation, receive support when needed, experience few technical problems, and feel comfortable with the technology (Neal, 1999; Simonson et al., 2000; Stein, 1998).

Teachers perceive a program to be effective if students are motivated, complete assessment tasks and participate in discussion, use the technology to communicate, pass examinations and few students drop out from the program. Teachers also perceive the program to be effective if the program content meets the students' needs, and if the institution provides financial, personnel and technical support.

From the perspective of distance education program developers, effective programs are designed to meet diverse needs of students (Keast, 1997; Knott, 1992; Thompson, 1998). Students in distance education programs represent a wide variety of backgrounds, experiences and needs which make it impossible to identify the *typical* distance student (Charp, 1997). Therefore, an effective distance education program has to cater for varied student profiles. The effectiveness of a program can be further enhanced if developers understand and apply learning theories to its development and delivery (Pallof & Pratt, 1999; Trilling & Hood, 1999).

From an educational perspective, an effective distance education program should support the universal principles for good practice in education. It should encourage and maximise contacts between students and teachers, develop relationships and promote collaboration among students, incorporate active learning, give rich and rapid feedback to students, stress time-on-task, set high standards for students' performance, and respect individual differences and allow students opportunities for learning that acknowledge those differences (Chickering & Ehrmann, 1996; Chickering & Gamson, 1987; McLoughlin, Oliver & Wood 1999).

2.6.2. Determinants of program effectiveness

The growth of distance education has necessitated responses regarding two issues: pedagogical changes facilitated and imposed by advances in distance education technologies; and, the effectiveness of distance education (Nasseh, 1997).

According to Nasseh (1997), questions concerning effectiveness of distance education relate to learner characteristics and needs, course effectiveness, course outcomes, instructional design, and comparisons with traditional mode of study.

Phipps & Merisotis (2000), following a review of program quality measures used by leading distance education institutions, identified seven categories considered essential to ensuring excellence in distance education, especially Internet-based. The categories include: institutional support, course development, teaching/learning, course structure, student support, staff support, and evaluation and assessment.

The amount of interaction in a program appears to be an important element of its effectiveness. Interaction can be defined as *an interplay and exchange in which individuals and groups influence each other* (Rovai & Barnum, 2003, p. 59). Moore (1990) points to the content of the interaction between teacher and student and the quality of the communication system facilitating this interaction as determinants of successful distance education. Morgan & McKenzie (2003) and Palloff & Pratt (1999) also stress the critical importance of interaction between participants in the distance education environment and regard it as one of the determinants of effectiveness. Carefully designed and well conducted, interaction has the potential to turn a distance education program, particularly a Web-based one, to an educational experience:

> A well-delivered course provides multiple means by which students and the instructor can interact, including e-mail, discussion boards, and careful use of synchronous discussion. The effective use of the means by which interactivity is enhanced deepens the learning experience and creates a more satisfying outcome for everyone. Content can be creatively delivered through facilitation of effective, Internet research, and companion Websites both on and outside of the course site. When content is delivered in multiple ways, it also addresses different student learning styles and creates an interesting course overall. But it is the interaction and connections made in the course that students will remember as the keys to learning in an online course. (Palloff & Pratt, 2001, p. 153)

According to Gallagher & McCormick (1999), research on distance education effectiveness has focused on four domains:

    (1) student attitude and satisfaction regarding delivery of coursework;

    (2) interactions of students and instructors during delivery of coursework;

    (3) student outcomes in distance education coursework; and

    (4) instructor satisfaction with delivery and coursework

In addition, Spooner et al. (1999) have analysed many studies based on comparative features such as cognitive factors including the amount of learning, academic performance, achievement, and examination and assignment grades; and other factors, including student satisfaction, comfort, convenience, and communication with instructor, interaction and collaboration between students, independence, and perceptions of effectiveness. Recent studies have focused on specific characteristics in distance education including student satisfaction (Allen, Bourhis, Burrell, & Mabry, 2002); instructional features affecting student achievement (Machtmes & Asher, 2000); and education technologies in learning (Cavanaugh, 2001).

Since distance education is a fusion of education and technology to deliver instructions effectively to students at a distance, the key to an effective distance education program is the effectiveness of the individual components and the flexibility of the interface between them. Some educators argue that the lack of interaction, student-to-student and student-to-teacher, is one of the biggest challenges. Studies show however, that when distance education techniques are used properly, non-traditional interaction can be as effective as the conventional face-to-face interaction (Bernt & Bugbee, 1993; Howell & Jayaratna, 2000).

2.6.3. Measures of program effectiveness

A major concern about distance education continues to be its quality compared to traditional classroom education – *Although students may like the flexibility offered by distance learning, there continues to be concern about the quality of those programs* (Sonner, 1999, p. 243). This concern has spurred extensive research into

the factors that could measure the quality of these programs. In many cases, 'broad' measures of the effectiveness of distance education have been examined such as: academic performance, satisfaction, attitudes, and evaluation of instruction.

Effectiveness of distance education programs is often measured by the programs' outcomes. Research into the learning outcomes of students in distance education has found that they are very similar to those within the traditional classroom (Fox, 1998; Sonner, 1999). Although student achievement is one common measure of a distance education program's success, it is not the most descriptive one. Additional models of distance education effectiveness that have been suggested include the Flashlight Project, and studies on learner traits and media variables that is, Aptitude-Treatment Interaction (ATI) studies (Holmberg, 1995; Keegan, 1996; Thorpe, 1988, as cited in Lockee, Burton, & Cross, 1999).

The Flashlight Project helps educators study and evaluate educational uses of technology. It was initiated in 1992 by the Teaching, Learning and Technology affiliate of the American Association for Higher Education. The project involved the development of a suite of evaluation tools, including validated survey items, interview questions, and cost analysis methods, that educational institutions could use to study and steer their own uses of technology. One of the tools enables monitoring the usefulness of technology in distance education programs and its impact on learning outcomes; for example, the student's ability to apply what was learned in the academic program. Another tool helps investigators design models of how programs use money, space and time. All of these efforts are directed toward gathering information about the interaction of staff and students in the digital classroom (Ehrmann, 2005). The Flashlight Project is cited as an outstanding example of a model for effective distance education evaluation (Lockee et al., 1999).

The Aptitude-Treatment Interaction research approach is based on the assumption that instructional environment and learning characteristics can interact in ways

that affect learning outcomes. It relies on the concept that some instructional strategies are more or less effective for particular individuals depending upon their specific abilities. As a theoretical framework, ATI suggests that optimal learning results when the instruction is exactly matched to the aptitudes of the learner. The assumption is that those with less of a specific ability are qualitatively and quantitatively different and not just slower, and this difference may be dealt with if different methods are used to support learning. The aim of this approach is to develop instructions that do not fit the average person but fit groups of students with particular aptitude patterns. This way, adaptive learning environments and instruction can be created that identify and address aggregate types or segmented populations of learners, resulting in *mass customisation* (Sigala, 2004).

One other model of evaluation of distance education effectiveness involves assessment of cognitive and motivational characteristics of learners enrolled in Web-based instruction (Lockee et al., 1999). Recent meta-analysis studies have focused on specific characteristics in distance education: student satisfaction (Allen et al., 2002); instructional features affecting learner achievement (Machtmes & Asher, 2000); and education technologies (Cavanaugh, 2001).

In brief, this section introduced the issue of effectiveness of transnational education programs. It discussed the definition of program effectiveness and its determinants; it also outlined methods by which to measure program effectiveness.

2.7. FACTORS CONTRIBUTING TO PROGRAM EFFECTIVENESS

Following on the overview of effectiveness of transnational education programs presented in Section 2.6, this section examines the particular factors that contribute to program effectiveness including: the attributes of students and staff involved in the programs; program design and evaluation; technology; and, organisational support.

While the research into distance education has focused largely on student achievement and student satisfaction, the outcomes can determine only 'if' a program was successful, but do not determine 'why' it was successful. According to the literature, it is more important to know why a program was successful than that it met its objectives (Dhanarajan, 1999). Merisotis & Phipps (1999) support this view adding that little attention has been given to the various aspects determining the distance education context. This section attempts to fill that void by examining the various aspects of the distance education milieu with a focus on effectiveness.

2.7.1. Attributes of students

Although it is difficult to summarise the characteristics of all distance learners, literature points out to self-discipline, motivation, and ability to balance multiple roles as determinants of success. In addition, since most distance education programs are student-centered, students have to be able to assume responsibility for the learning process if they are to successfully complete such programs (Saba, 2000). Granger & Benke (1998) characterise a successful distance learner as goal-oriented. Chyung, Winiecki & Fenner (1998) identify the ability of distance learners to adapt to a new mode of learning as one of the characteristics determining success.

Since the majority of distance education students are adults in full time employment, their educational aspirations must usually compete with work, family, and social lives. Therefore, to succeed, they have to balance their studies with family and career demands (Garland, 1993; Granger & Benke, 1998; Morgan & Tam, 1999). Employment in a field where career advances can be readily *achieved through academic upgrading in a distance education environment* also contributes to successful learning (Ross & Powell, 1990, p. 10). Bajtelsmit (1998) emphasised the influence of the external environment, especially the student's family and job, as well as distance learning skills as factors influencing distant student's success and retention (Ross & Powell, 1990). In addition to balancing

education, career and family responsibilities, Saba (2000) asserted that time management skills are a contributing factor in the success of the distance student.

Kember (1995) developed a two-track model of student persistence in distance education programs, which includes variables grouped under the following headings: student entry characteristics; social integration; external attribution; academic integration, and academic incompatibility (Kember, 1995, p. 64). Kember maintains that the students' previous experiences direct them toward one of two possible pathways in a distance education program. Those with a favourable background in terms of expectations, motivation, and previous experiences, tend to follow the positive track integrating well socially and academically with the institution, program, and instructor. On the other hand, students lacking the favourable background take a negative track where they have difficulties achieving social and academic integration, which affects their achievement in the program. Hence, students on the positive track have a much higher chance of satisfactory achievement in the program.

Cornell & Martin (1997) listed three factors as predictors of student success in distance education: intention to complete the course, early submission of work, and completion of other distance education courses. Billings (1988) also found that students who made the most progress were those who had the intention of completing the program in a specific period of time, submitted their assessment tasks relatively early, had a supportive family, had high goals for completing the program, and had good prerequisite knowledge. However, he singled out the student's intention to complete as the most important factor, which suggests the importance of motivation over other factors. Visser (1998), and Kember (1999) agreed, claiming that motivation is recognised as a facet of students' approach to learning and is the key not only to student progress but also retention in the program.

Another aspect that affects students' success in distance education programs is their attitude towards the technology involved (Christensen, Anakwe & Kessler,

2001; Irons, Jung & Keel, 2002; Valentine, 2002). The research shows that comfort with technology being used in a distance education program is a major factor in determining student satisfaction and success. Fahy & Archer (1999) have found students' prior experience with technology, confidence in the use of technology, and belief that technology would *work effectively for them* to be major predictors of whether a student would choose to participate and succeed in distance learning. Fahy & Archer further suggested that it was not only a matter of having access to, and being familiar with, computers but rather the students' real or perceived lack of skills, *confidence or experience necessary to become truly comfortable with technology as an instrument for learning* (Fahy & Archer, 1999, p. 18). Lim (2001) also found that students' confidence in their ability to use technology and learn new computing skills were linked with the students' positive expectations of success, which then improved performance.

While some student competencies are specific to the technologies used in the program, other competencies, also associated with successfully completing a distance education program, are not related to technology; these include: self-confidence, a commitment to success, preparedness and self-direction (Burge, 1994, p. 34); being focused, having good time management skills and the ability to work independently and as group members, as well as *strong self-motivation, self-discipline, and assertiveness* (Hardy & Boaz, 1997, p. 42); being risk-taking, creative problem solvers (Brown, 1998); having the confidence to follow directions and to ask for assistance when necessary, tolerance for delays in receiving a response from the instructor, time to work on the course, and good comprehension skills (Bernt & Bugbee, 1993).

2.7.2. Attributes of staff involved in the programs

The roles of the instructors, designers, managers and support staff involved in distance education program are crucial. While their roles are just as important in traditional education, distance education presents additional challenges brought upon by the shift of place and time. The literature identifies numerous attributes of

distance education staff as critical to the effectiveness of distance education programs. Although these attributes can be separated into three categories of instructor, designer, and manager, many of these attributes overlap across categories.

2.7.2.1. Attributes of instructor

Distance students require a significant amount of information prior to and at the beginning of a program. The focus of distance student recruitment, while ensuring students meet admission and program requirements, also includes ensuring students understand and are equipped to meet the requirements of the program delivery. This focus on recruitment includes advertising both the program and the student competencies necessary to complete the program (Fahy & Archer, 1999).

Research suggests that the effectiveness of distance learning is based on the instructor's preparation, appreciation of the needs of the students, and understanding of the target population (Omoregie, 1997). Meeting the needs of distance learners requires organised, thoughtful strategies to ensure learners have the skills they need to successfully complete a distance education course.

The first step in identifying distance education student needs is to know who the students are, *what's available to them,…their needs and limitations…* in relation to the program (Granger & Benke, 1998, pp. 127-128). Parker (1997) suggests that students entering a distance education context require a change in skills from *simple information processing to autonomous self-motivated learning* and a change in their ability to *interact with the technology* (Parker, 1997, p. 7). The skills of a self-directed learner may or may not be already developed by the student, and need to be addressed directly, with specific instructional strategies. Technological competencies of the students can be assessed during the recruitment process. Information about the students' interests in online instruction, prior experience with the Internet, and technical skills can be obtained upon enrolment to help instructors identify possible student needs for support.

Instructors must have technological skills and confidence to use all of the various electronic media to be effective in a distance education program. Instructors must also change the manner in which they deliver information. When the traditional lecture mode does not work well, other modes of delivery such as multimedia presentations might be more successful (Weber, 1996). Wolcott (1996) (cited in Carter, 2001) found in a study of adult distance learning that

> to effectively bridge the gaps between classroom and distance teaching, faculty need to look at the distance teaching from the students' point of view (Carter, 2001, p. 249).

According to the literature, instructors who teach in distance education programs are perceived as effective if they encourage three types of communication and interaction: firstly, communication and interaction between instructors and students; secondly, among students; and, thirdly, through instructional materials (Moore & Kearsley, 2005). Effective instructors listen and respond to students' needs; they seek feedback from students and incorporate this feedback in the design and delivery of instruction. These instructors enable collaborative learning; they are regarded not merely as presenters of knowledge but rather as its suppliers, and they encourage students to regard each other as information resources. Other attributes of effective distance education instructors include: clear communication of program objectives and requirements to students; use of technology as a tool and not a replacement for teaching; and, willingness to listen to students' suggestions. These instructors are student-centered, sensitive to their anxieties, and are willing to participate in students' experiences (Carr, 2000; Moore & Kearsley, 2005; Roblyer & Wiencke, 2003). Stark & Warne (1999) concur that distance learners expect distance teachers to be interested in the learners as individuals and provide reassurance, support, advice and motivation.

Instructor experience with distance education and good teaching skills are important factors to the effectiveness of a program (Carr, 2000). Carr investigated student satisfaction with the instructors' teaching ability and concluded that many instructors in distance education programs lack teaching experience. As a

consequence, students faced with poor quality teaching can become discouraged and frustrated with the programs. Carr reported that students cited inexperienced teachers as one of the reasons for withdrawing from distance education programs. According to Wilkes & Burnham (1991), students who report dissatisfaction with the distance education program because of poor quality teaching are negatively impacted. Students expect the instructor to provide support and guidance, and when they experience unsatisfactory teaching, their success may be put at risk.

Palloff & Pratt (1999) identified the characteristics of effective distance education instructors through the roles of an online instructor. They identified four types of roles: pedagogical, social, managerial, and technical. It is important to note that these roles are applicable to many types of distance education and not only to online education. The pedagogical role sees the instructor as a facilitator of the program providing guidance and motivation to students. Therefore, it is essential that the instructor should provide constructive feedback on assignments and projects, and respond to student emails and postings online. The social role of the instructor serves to promote socialisation in the program (mainly communication within the program) including: communication between instructors and students, communication between students, chat room discussions, and collaborative group projects. Students in distance education programs often feel isolated and instructor's attention to the student's social needs becomes vital. The managerial role of a distance education instructor is one of a decision maker and enforcer and includes establishing program objectives, policies, syllabi, and deadlines (Palloff & Pratt, 1999). Additional responsibilities involve timely marking of assignments and examinations, as well as determining final results for program units. The technical role requires the instructor to be familiar with the technology used in the delivery of the program. Familiarity with the technology is required so that the instructor can assist students experiencing technical difficulties with the multimedia used in the delivery of the program.

It is important for the instructors to develop a sense of community, achieve maximum participation, and engage students in the process (Hiltz & Wellman,

1997). The idea of learning as a collaborative process is very important to distance education students. According to Palloff and Pratt,

> collaborative learning processes assists students to achieve deeper levels of knowledge generation through the creation of shared goals, shared exploration, and a shared process of meaning making. (Palloff & Pratt, 2000, p. 6)

It is up to the instructor to be aware of this in the distance learning environment and to encourage collaborative learning and a sense of community among the students.

2.7.2.2. Attributes of designer

Distance educators also participate in the design of distance education programs. Effective designers have the ability to create tasks and activities that promote interaction and socialisation among students and, while planning those tasks and activities, take into consideration the profiles and learning styles of the students. According to literature, effective designers use reflective enquiry on their own teaching and, during the design process, keep two questions in mind: firstly, whether a particular approach will work; and, secondly, how it could be improved, taking into consideration the learning task, teaching material and strategies, as well as technology involved. These designers regard technology as a tool to create and support learning communities for students; and, when designing learning materials, they also take into consideration past experiences of students (Buchanan, 2000; Palloff & Pratt, 2000; Ragan, 1999; Willis, 1995.)

Since new technologies have enabled new ways of communication and teaching, distance educators need to adjust their roles accordingly. Consequently, the role of the distance educator is changing from a 'sage on stage' to an enabler and guide. The literature points out that, as a result of this change, it is important for distance educators to keep upgrading their skills in three areas: developing interaction, developing instructional materials, and applying technologies (Schauer, Rockwell, Fritz, & Marx, 1998). At the same time, support for staff development is increasingly regarded as an integral part of the changing distance education environment (Granger & Benke, 1998). The growth of this environment has

necessitated educators not only with competence in their subject area, but also with interest and skills in technology; educators with such skills can take advantage of additional technology-enabled teaching methods and thereby provide effective distance education experiences for students (Schweb, Kelley, & Orr 1998).

2.7.2.3. Attributes of manager

In addition to their roles as instructors and designers, distance educators play the role of managers. According to the literature, attributes of effective distance educators as managers include timely distribution of learning materials and timely feedback to students on assignments and projects. Effective managers also ensure that the required classroom equipment is available and operational, and are prepared for potential problems with technology. In addition, they are knowledgeable about the academic resources available to students (Palloff & Pratt, 1999).

2.7.3. Program design

A number of research studies have examined the relationship between student perceptions and program characteristics. St.Pierre & Olson (1991) (as cited in Moore & Kearsley, 2005) identified several factors as contributors to student satisfaction and success in distance education programs including: a good study guide, relevant course content, the opportunity to apply knowledge, prompt return of assignments, and conversations with instructors. In addition, Egan, Sebastian & Welch (1991) established that distant learners benefit significantly from a well-designed syllabus and presentation outlines. On the other hand, Hara & Kling (1999) reported on factors having the most negative impact on student progression and satisfaction including: unclear instructions for assignments, lack of timely feedback on assignments and projects, and technical problems. Thus the characteristics associated with program design essentially revolve around two factors – instruction and interaction.

2.7.3.1. Instruction

The literature identifies quality of instruction as a factor that affects student success in distance education programs (Frew & Webber, 1995; Inman & Kerwin, 1999). Quality of instruction includes the timely provision of teaching materials, quality of the program, quality of teaching, and the performance of the instructors.

The quality of instruction influences the quality of student learning. Learning tasks can be designed using a range of methods to achieve valid learning objectives; the assessment system associated with those tasks influences the extent to which students will pursue those desirable learning outcomes. Therefore, it is critical to ensure that assessment tasks are integrated with learning objectives (Freeman & Capper, 1999).

With respect to transnational programs, there is an increasing expectation that offshore teaching will encompass both face-to-face and electronic guidance through the curriculum; this kind of support helps students gain a stable, richer, and more encompassing learning experience. As a consequence of this expectation, teachers involved in transnational programs need to become proficient in the area of e-learning to be able to develop electronic resources and support, online tutorials and other forms of technology-supported guidance (Debowski, 2003).

Graphic design is considered an important and powerful tool for instructional design in distance learning (Ouyang & Fu, 1996). However, not all graphics automatically enhance distance learning. According to Rieber (as cited in Ouyang & Fu, 1996), the effectiveness of instructional graphics largely depends on the nature of the learning task and the profile of the learner; to be effective, graphics should be matched with the instructional objectives. Rieber identified five instructional applications of graphics: cosmetic, motivation, attention-gaining, presentation, and practice. While the first two instructional applications aim to

enhance the affective appeal of a lesson, the latter three endeavour to directly enhance the cognitive abilities of students to learn from study materials. Consequently, the primary purpose for designing graphics should be to aid, enhance, or support distance education.

Relevance of subject matter and the way in which it is communicated are critical to the success of distance education programs. Simon (1994) claims that *human beings are at their best when they interact with the real world and draw lessons from the bumps and bruises they hit* (p. 74). Capper (1999) also notes that research-based evidence emphasises more explicit links between theory and real-life application. She also stresses the importance of providing students with a detailed and realistic description of what they can expect from the distance learning program. This is particularly important to adult learners. Dhanarajan & Timmers (1992) support this claim and add that students prefer programs that are *suitable*, in terms of content and administrative support, for a particular locale; students also prefer study materials that have local applications. However, as pointed out in Section 2.4.5, localisation of programs may be limited by regulatory restrictions.

Related to a particular locale is also the issue of pedagogy that underpins a particular style of instruction; for instance, the pedagogy which supports western style instruction can be very different to that encountered in Asian educational settings (McLoughlin, 2001; Pincas, 2001). Therefore, when developing instruction, it is important to recognise the pedagogical differences between locales and allow for reflective and synergistic learning; classroom interaction may also need to be developed in a different way (Debowski, 2003; Phillips, 1997; Ziguras, 2000).

2.7.3.2. Interaction

Although interaction is a multifaceted concept and can be described to mean different things in a variety of contexts, it is recognised as an important

characteristic in instructional design, social context, and success of distance education (Beard & Harper, 2002, Dzakiria 2003). According to Daniel and Marquis, interaction occurs when

> the student is in two-way contact with another person(s) in such a way as to elicit from them reactions and responses which are specific to their own requests and contributions. (Daniel & Marquis, 1983, p. 32)

Interaction underpins the seven principles of good practice in education as established by Chickering & Gamson (1987). These practices include: encouraging contact students and teachers; developing responsiveness and cooperation; engaging in active learning; providing prompt feedback; promoting time on task approach; communicating high expectations; and respecting diversity.

Several aspects of communication have been described in the literature including communication, collaboration, and active learning (Kenny, 2002). The social aspect has also been emphasised (Beard & Harper, 2002; Wagner, 1994). In addition, Web-based interaction has been defined as synchronous (with no time delay) or asynchronous (communication with a delay that allows participants to respond at a later time from when the message is sent) (Smith & Dillon, 1999).

In his definition of interaction Moore (1989) also included the interaction between the learner and the content of the subject of the study, that is learner-content interaction; his typology included three types of interaction: learner-content, learner-instructor, and learner-learner. Moore conceptualised the learner-instructor interaction as interaction both between the learner and the instructional designer, as well as the learner and the teacher. He argued that learner - instructor interaction, *regarded as essential by many educators, and as highly desirable by many learners*, plays a vital role in motivating students to learn, and maintaining and enhancing their interest in subject matter. In addition, he observed that distance learners benefit most from interacting often and in different ways:

> The frequency and intensity of the teacher's influence on learners when there is learner-teacher interaction is much greater than when there is only learner-content interaction. (Moore, 1989)

With respect to learner-learner interaction, Moore (1989) pointed at the importance of peer interaction for distance learners, particularly at the stage of application and evaluation of new content. He also suggested that, particularly for younger learners, *the teaching task of stimulation and motivation will be assisted by peer-group interaction* (Moore, 1989); however, he did not regard this aspect of learner-learner interaction as vital for most adult and advanced learners, as they tend to be self-motivated.

Norman (1998) agreed that interaction in the educational environment occurred along student-teacher, student-student, and student-content lines. He then commented that new technologies enabled designers to take these interactions to new levels.

Hillman, Willis & Gunawardena (1994) highlighted the importance of one more type of interaction, particularly important in online learning: the learner-interface interaction. This interaction occurs between the learner and the technology necessary for online education; a successful online learner must be able to use competently not only the Internet software, but also the basic equipment such as a mouse, keyboard, and printer. Hillman et al. (1994) point out that this may be one of the most challenging types of interaction since it is not required in the traditional classroom.

Jonassen (1985) contended that interactivity requires two-way communication by way of feedback. Clark and Craig (1992) also agreed that provision of student feedback is an integral part of any definition of interactivity.

Effective interaction and feedback is important in meeting individual learner's needs and in providing a forum for suggesting program improvements. More importantly, continuous interaction provides room for learning. Justifying the importance of interaction in distance education, Summers (1991) stated that

without interaction teaching would be reduced to *passing on content as if it were dogmatic truth*; he maintained that collaboration between teacher and student, both participating in the role of knowledge acquisition, was needed to enable learners to eventually become independent thinkers. Parker (1999) supported this view, announcing that interaction was an *essential* part of the academic process.

Having investigated the effects of different types of interaction (academic, collaborative, and social) on learning achievement and satisfaction, Jung, Choi, Lim, and Leem (2002) concluded that social interaction with instructors and collaborative interaction with fellow students have significant effects on learning and satisfaction with the program. They also noted that small group activities increased learning motivation. These findings were also supported by Swan (2001) and Hong (2002) who found that student satisfaction and perceived learning correlated with higher perceived levels of interaction with instructors, and fellow students. According to McIsaac, Blocher, Mahes & Vrasidas (1999), students require both structured and informal opportunities to interact with their peers to be satisfied with their program.

Morgan & McKenzie (2003) reported that regular interaction between instructors and students kept the students motivated and on task and prompted them to maintain their study as a high priority among competing obligations; it also contributed to strengthening the students' bond with the university. In addition, the authors highlighted the importance of human support for distance learners as a factor in improving completion rates. Completion rates in distance education tend to be low (Tait & Mills, 2001) and, although affected by many different factors, a weak relationship between student and university plays a major role in student's decision to quit (Garland, 1993; Morgan & Tam, 1999).

In spite of their independence, distance learners still seek the face-to-face interaction with their instructors. Both students and instructors have identified inadequate interaction as one of the biggest frustrations in a distance education program. Keegan (1996) believes that distance learning should strive to recreate

the teacher-learner model as an interactive experience. This is substantiated by Sherry when she says:

> The most important factor for successful distance learning is a caring, concerned teacher who is confident, experienced, at ease with the equipment, uses the media creatively, and maintains a high level of interactivity with the students. (Sherry 1996, p. 346)

As supported by many studies, effective distance education is said to revolve around learner-centered teaching styles that decrease psychological distance and increase student participation in the teaching-learning process (Moore & Kearsley, 2005; Verduin & Clark, 1991). Wolcott (1996) suggested *one solution to bridging the psychological distance is to adopt a learner-centered approach to distance teaching* (p. 25). The development of learner-centered skills in course planning, delivery, and evaluation are believed to be essential to effective distance instruction (Belanger & Jordan, 2000; Duffy & Kirkley, 2004; Verduin & Clark, 1991). Effective distance teaching is believed to revolve around a learner-centered system of instruction (Beaudoin, 1990; Dillon & Walsh, 1992) *that demonstrates a bias for direct learner involvement and participation throughout the process* (Ostendorf, 1997, as cited in Dupin-Bryant, 2004, p. 3). Learner-centered distance instructors encourage students to take responsibility for their own learning and focus on facilitation of learning rather than diffusion of information (Duffy & Kirkley, 2004; Granger & Bowman, 2003). The principles of learner-centered distance teaching promote the collaborative, learner-centered teaching styles proclaimed in adult education literature as the most effective way to teach adults (Gibson, 2003; Verduin & Clark, 1991).

Student participation has been singled out by Moore & Kearsley (2005) as one of the most important elements of distance education program design. Regardless of the particular model of a distance education program, students need to be given a chance to ask or answer questions and, in most subjects, need an opportunity to express opinions.

In most distance education programs, students have to submit assignments for evaluation. Prompt meaningful feedback on assignments is very important to students. Most students prefer feedback to be immediate, and they find lack of feedback frustrating. The provision of feedback plays another important role in that it allows instructors to increase students' sense of participation in the program (Carr, 2000; Moore & Kearsley, 2005). Gibbs and Simpson (2004) further observed that in distance education feedback on assignments plays an important dual role: firstly, as the main instrument for teaching; and secondly, as the main means of interaction between student and instructor. Threlkeld & Brzoska (1994) identified one more aspect of the role of timely feedback: it is a critical component of learner support.

2.7.4. The role of technology

Palloff & Pratt (2000) made a point that *technology does not teach students; effective teachers do* (p. 4). They went on to say that the issue is not technology itself, but how it is used in the design and delivery of courses. This view was supported by Macdonald who, in his plenary address at the 11th General Conference: Universities as Gateway to the Future, declared that pedagogy must remain pre-eminent in any educational program:

> Educational technology is a significant supplement, but it does not replace the human element and the qualitative role of the teacher. In all our programmes, there must be a human presence at the end of the line. (Macdonald, 2000)

Advancement in technology does not, in itself, lead to effective distance education. The best distance education practices depend on creative, well-informed instructors (Greenberg, 1998). Bates (1995) suggests that newer technologies are not inherently better than old ones and many of the lessons learned from the application of older technologies will still apply to any newer technology. He again advocates that instructors should draw on their experience and adapt that experience to the new environment of distance learning. The instructors must be trained *not only to use technology, but also to shift the way in which they organise and deliver material* (Palloff & Pratt, 2000, p. 3).

According to Ragan (1999), the process of media selection and application should be guided by three considerations: first, an analysis of the role that the instructional media and supporting tools should play in achieving the learning goals; second, an understanding of the impact of the use of technology; and third, careful consideration of the characteristics of the distance learner. Consequently, the choice of technology should be based upon its ability to support the goals of the learning program, and it should reflect its accessibility to learners; a distance education program should use technology that is appropriate for the widest range of students within that program, is useful, and is easy to use.

The implementation and utilisation of current and emerging technologies offers many potential advantages in achieving educational goals and instructional objectives: it can provide ready access to a vast store of the latest information; it can facilitate communication between students, and students and instructors; and, it can increase student motivation and self-esteem (Hamza & Alhalabi, 1999; Kirkwood 1998; Moore & Kearsley, 2005). However, the advantages to be gained from introducing new technologies into distance education depend on the ability and willingness of the students to use them. Therefore, an assessment of educational needs should be conducted, and potential consequences in the classroom considered, prior to the deployment of those technologies (Hamza & Alhalabi, 1999; Ragan, 1999). Hamza & Alhalabi (1999) also point out the relationship between technology and the culture of an institution. They maintain that, *because technology is a tool, it should never determine how and when the institution's culture should adapt to its existence*. Therefore, the technologies should be aligned with the institution's culture.

Olesinski (1995) highlights the role that technical staff play in distance learning. They not only support the technical delivery of distance programs, but may also indirectly influence the learning environment by *orientating participants to the technology, and reducing the anxiety of the participants* (including the instructor), and by *advising the instructor on instructional techniques* (p. 3). Olesinski found

that instructors who were given inadequate orientation to the equipment could not operate it until they had hands-on experience. He pointed out the difference between instructors who could adapt their teaching styles to the technology, and those who could not. Those who adapted were superior in conducting the classes. According to Olesinski, not only do the instructors need to adapt to the educational environment, but they must also adapt to technical staff who can help in the delivery of the educational program. Much of the outcome depends on the attitude of the instructor.

Equipment and hardware malfunctions can be a great detriment to the effectiveness of distance learning. When a problem occurs in a class, everything comes to a standstill and the learning environment is interrupted. Even if an overhead projector goes out during an instructor's presentation, an alternate way of delivering that information may not easily be found. Carter (2001) found that unanticipated technical problems shortened class time and discussion, and that such interruptions negatively affected the overall quality of presentations. Equipment failure can be frustrating for all involved in distance learning. For the instructors, it means that even the best preparation for a class will be lost; for the technician, the frustration and inability to keep the class running smoothly may affect the instructor's view of their competency, causing tension; and, for the student, the inability to feel that progress is being made can hinder the learning process. To counter the adverse effect of equipment malfunction, it has been recommended that alternative modes of delivery be supported in a distance education program, especially one that relies on an *electronic classroom* (Ragan, 1999; Weber, 1996).

2.7.5. The role of program evaluation

Evaluation of a program is important; collecting feedback information from the students sends a message to the students that the instructors and the institution are concerned about their learning, and it also provides the instructor with information useful both for assisting individual students and for making program adjustments.

Early evaluation of the program is said to be especially helpful. Chyung et al. (1998) found that satisfaction during the first or second subject of the program was the major factor that decided whether distance learners continued with their program of studies.

Evaluations of program materials and the supporting system are essential in the ongoing process of program monitoring and improvement. Such evaluations reflect students' acceptability of the study materials and the mode of study, and inform the offering institution broadly whether it is meeting students' expectations (Yuen, Timmers, & Chau, 1993).

For successful learning to occur, it is vital to determine what works and what needs to be improved. Evaluation leads to revision of instruction, and revision of instruction helps to achieve the goal of helping students learn (Heinich, Molenda, Russell, & Smaldino, 1996). Eclectic models of evaluation have been advocated by Woodley & Kirkwood (1986), and Sweeney (1995) as most applicable to distance education program evaluation; they recommend the use of both qualitative and quantitative procedures.

One of the crucial inputs in the design and evaluation of distance programs is student feedback. Student feedback assists in identifying the strengths and shortcomings of a curriculum or program and lets the students contribute to the planning and development of their studies (Pratt, 1994; Race, 1994). Moreover, feedback can highlight discrepancies between institutional assumptions and the forms of knowledge, learning styles, aspirations, needs, and values that students bring to the educational context.

Assessment of student satisfaction has been identified as yet another factor contributing to the overall success of a distance education program. Since student satisfaction relates to students' contentedness with several components of a program, it can be used as a measure of its effectiveness (Biner, Dean, & Mellinger, 1994). Biner et al. (1994) argue that high levels of student satisfaction

are important because they may contribute to lower program attrition and how much students learn within a distance education program. They conducted two studies to identify major dimensions of learner satisfaction; they identified the following seven dimensions: instructor/instruction, technology, program management, personnel, promptness of material delivery, support services, and out-of-class communication with the instructor. Tallman (1994) agreed that student support services were significantly related to satisfaction, while Gunawardena & Zittle (1997) underlined the role of social presence as a significant contributor to student satisfaction. Interaction was found to be a significant predictor in determining student satisfaction although perceived interaction was found to be as important in predicting satisfaction as actual interaction (Fulford & Zhang, 1993). As student satisfaction can be a measure of program effectiveness, gathering data about student satisfaction with distance education programs may assist in evaluating, planning, and provision of educational services. According to Mazelan, Green, Brannigan, and Tormey:

> Higher education managers who can clearly identify and subsequently measure client-centered quality will be able to capitalize on student-based information to support their claims for resources. (Mazelan et al., 1993, p. 77)

2.7.6. The role of organisational support in the programs

Student support is an important issue associated with the delivery of distance education programs. Student support, while including instructor support of the student related to the course content, also includes support directed to the student's need to access resources traditionally located on campus, such as libraries, registration, and technological assistance in order to access and use web-supported or web-based courses. These support networks are usually in place for the on-campus students. For the distance learner, these support networks are only accessible in a limited way, unless specific measures have been developed to include distance learners. Identifying distance student needs, supporting them through orientations and other support services, understanding the unique communication needs of the distance learner and identifying basic student competencies are all part of providing reasonable levels of distance student

support. Khoo & Idrus stated that learners without support are most liable to delay their completion of a programme or drop out altogether. They further say that *without necessary student support services, a distance education programme will not succeed*. (Khoo & Idrus, 2004, p. 1)

Access to library materials has been identified as a key component of distance education (Cavanaugh, 2001; Tait & Mills, 2001). Dillon & Gunawardena (1995) found that access to the institution's library, training on obtaining information through library resources, as well as local library support were significant factors in the successful completion of distance courses. An evaluation of learner support conducted by Dillon, Gunawardena, & Parker in 1992 (cited in Threlkeld & Brzoska, 1994, p. 57) concluded that *library resources are very important to distance students, as the majority of them indicated that success in the course required access to library materials*. In addition, McElhinney & Nasseh (1999) stressed the importance of introducing students to the technology used in the program and giving examples of how it can be best used.

Thorpe (2003) defined student support in a distance education program as *all those elements capable of responding to a known learner or group*. The definition included three key elements: identity, that is the ability to deal with the needs of identifiable individuals; interaction, the ability to be responsive to student needs; and, time/duration, the ability to maintain contact throughout the duration of the program.

Several authors have suggested that student induction and orientation programs are important to introduce students to the institution, the distance learning context, and program requirements. Support for distance learners is needed most at the beginning of the student's involvement with a program when many of the barriers students face need to be overcome including: obtaining information about the program, admission and registration requirements, obtaining study materials, determining workloads and deadlines, and becoming familiar with the

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technological requirements and instructor expectations (Gibson, 1998, Granger & Benke, 1998, Hardy & Boaz, 1997).

Distance learners may have varying degrees of the necessary skills to successfully complete a distance education program. Granger & Benke suggested ways to decrease the barriers for successful distance learners by keeping administrative processes *simple, convenient, and automatic* by making *both self-help strategies and direct assistance available to aid learners in solving problems as they are encountered*, by providing *back-up materials and systems*, and by continually learning from experiences as an organisation (Granger & Benke, 1998, p. 134).

Peters (1998) pointed out that in addition to providing curriculum and in-text support, helping students deal with administrative or personal problems related to their studies should not be seen as *something that is on the periphery of the learning and teaching process* (p. 62). Simpson (2000) agreed with this view stating further that students want to know that the program providers care and show commitment; this includes supportive local staff, a dedicated program coordinator, and quick response to queries and complaints. He went on to say that the better the support, the better students perform and the more satisfied they are in the program; they are also more likely to show understanding and continue with the program when, inevitably, mistakes are made (Simpson, 2000).

Shin (2003) found that the view that a student holds about the institution offering the program has a significant effect on performance and satisfaction; the view is shaped by the quality of institutional support including student services, availability of resources, and technical support. To this end, the program coordinator plays a significant dual role: focusing on customer service and quality control. Referring to transnational programs in particular, Debowski (2003) pointed out that, as the key contact for both students and offshore partners, the coordinator needs to be able to respond quickly and effectively to queries, problems and complaints.

Reputation of the offering institution and quality of the program are important to transnational students, particularly in Asia where reputation is a major selling point to potential students (Debowski, 2003). Program providers must therefore ensure that the reputation of the institution remains intact, and that the standards of the transnational program parallel those required of students in similar programs offered at home (Biggs, 2001; Van Damme, 2001). To ensure high quality of transnational programs, universities need to develop a range of strategies to build and maintain these standards; first, they need to clearly formulate and communicate the underlying curriculum philosophy and practices; second, they need to provide learning opportunities that can be adapted to the need of offshore students, while still reflecting the overall standards established by the providing university; thirdly, assessments need to be moderated to uphold standards; and, lastly, learning materials need to be regularly updated to maintain their relevance and accuracy in a fast changing educational context (Biggs, 2001; Debowski, 2003).

2.8. CONCLUSION

Distance education programs have evolved considerably from the inception of the first correspondence courses in 1840 to the many types of present distance delivery modalities. The rapid expansion of distance education offerings is providing students with more options; good quality programs will be demanded. This great increase in the number of distance education programs, students, and providers has prompted researchers to investigate the effectiveness of such programs.

The characteristics of effective distance education programs to be used in this research study emerged from the comprehensive review of literature. Numerous studies have determined the attributes of effective distance education through the attributes of its components including: students, instructors, program design, technologies, and organisational support. Literature sources dealing with predictors of successful distance students revealed that those students experienced

satisfactory levels of communication with the instructors and good quality teaching.

Research related to students' perceptions has focused on identifying factors related to satisfaction, attitudes, and perceived learning and interaction. Factors affecting satisfaction are often considered to be organisational and involve the learning environment, program management, and support services: they are identifiable factors that relate to distance students' perceptions about the effectiveness of their learning experiences.

Knowledge of the characteristics of effective distance education programs may assist students, staff, and institutions in making informed decisions regarding such programs; students will be better informed when deciding to enroll; staff, when working on design and development; institutions when considering deployment of distance education programs. Development of a model for effective distance programs to provide a framework upon which decisions about such programs could be made has been the motivation for this research study.

Chapter 3 discusses the approach used to develop and validate a model for effective distance education programs.