

The performance of comedy by artificial intelligence agents

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Abstract

The PhD project is composed of two parts: a creative project (thirty-five per cent of the total research project); and an exegesis (sixty-five per cent). The creative project employs a pair of chat-bots, natural language processing artificial intelligence agents, to act as comedian and straight-man in a comedy performance based on a topic supplied by the user in a web-based interface. This is an interdisciplinary project that draws on the domains of humour theory, creativity theory, creative writing, and human-computer interaction theory to illuminate the practice of comedy scriptwriting process in a new-media environment.

Henri Bergson (1911) provides a fundamental theoretical proposition by outlining a “new law” of comedy, whereby “We laugh every time a person gives us the impression of being a thing” (1911, 58). Central to this proposition is the idea that there is an incongruity between the ‘human’ and the ‘non-human’. Incongruity, “reciprocal interference” (Bergson 1911, 96) occurs when the mechanical is “encrusted” (37) on the human and, crucial for this study, when the human is encrusted on the mechanical. Incongruity, with or without resolution, has been seen as a cornerstone concept in many humour theories (cf. Morreall 2009; Raskin 2008; Ritchie 2004). By employing artificial agents as comedy performers, this PhD explores the core research question of whether Bergson’s “new law” may be inverted: Will we laugh when a mechanical agent gives us the impression of being a person?

The Computers as Social Actors paradigm, as developed by Reeves and Nass (1996), argues that people respond to computers and other media in the same manner as they would respond to real people. The mechanical, artificial intelligence agents are employed in this creative project to probe the distinction between the human and the non-human. This is particularly important for, as Christian (2011) argues, engaging with artificial intelligence agents may be a path to better understanding what it means to be human in broad social and cultural terms.

A binding principle of this study is that theory informs practice and practice assesses theory. Berger describes the relationship, metaphorically, as two sides of the same coin (2013,

51), suggesting that theory and practice are indivisibly linked. However, Berger's metaphor fails to illuminate the individual roles that theory and practice play. Michael Polanyi pertinently describes theory as a map (1958, 4), and this study extends the metaphor to suggest practice is the journey which verifies the accuracy of the map. The creative project, where artificial intelligence agents operate as comedian and straight-man, is a probe capable of eliciting theoretical issues (Lapham 1994; McLuhan 1964). The research question is addressed through the development of the creative project and the methodology of Practitioner-Based Enquiry, specifically through the use of a Production Journal. The Production Journal, a web-log, is a primary method and source of data that illuminates the "process, product, praxis and practice" (Bourke and Neilsen 2004) of the creative project by recording the process of production and feedback from experts in the fields of humour theory, creativity theory, artificial intelligence research, and scriptwriting. The researcher retains a visible position within the process based on constructivist ontology and interpretivist epistemology (Meany and Clark 2012). The Production Journal for this project and the chat-bot interface can be found at <http://aimlhumour.blogspot.com.au/>.

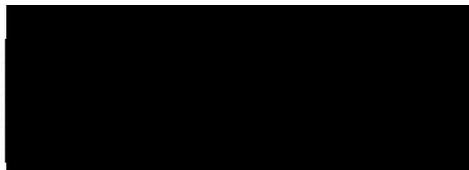
The resultant exegesis draws on data from the Production Journal to explore the research question. The project finds that people will laugh when a mechanical agent gives us the impression of being a person. Critically, this project breaks down the binary opposition between the human and the non-human to suggest that all humans are actors, but not all actors are human. In a comedy performance, all actors, structures or agents, operate in concert with a broad suite of technological, material, psychological, social, and cultural influences.

Declaration

Doctor of Philosophy Declaration (by performance / exhibition)

I, Michael M Meany, declare that the PhD exegesis entitled “The performance of comedy by artificial intelligence agents” is no more than 100,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This exegesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this exegesis is my own work.

Signature:



Date: 25 June 2014

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Professor Hugh Moore (one of the many personas of Mr Rodney Marks, comedian and raconteur) delivered a keynote address at the 2013 Australasian Humour Studies Network Colloquium in Newcastle. The presentation ranged across an eclectic mix of topics linking thinking patterns to humour, comedy, presentation, business, and systems. He grabbed the zeitgeist by the scruff of the neck and gave it such a shake until, incidentally, a facetious definition of my project fell out: “it’s a thinking system, based on systems thinking.” Only in comedy can an idea oscillate so quickly between parody and reality. This project did emerge from a system, and I would like to acknowledge some of the many who contributed to the project.

To my supervisors, Dr Tom Clark (Victoria University) and Dr John Hannon (La Trobe University), I cannot adequately express my gratitude for your guidance and enthusiasm. Tom, I am grateful for your unwavering commitment and prodigious knowledge. I am particularly grateful for your astounding capacity to keep a balance between the minutiae and the goals of the project. Now, with hindsight, I can perceive your gentlest of touches on the tiller that guided the development of the project—as if it were all my idea (such is the hubris of the PhD student). To John, thank you for the depth of your engagement in the project, for suggesting new paths and new ideas. Your capacity to ask the ‘hard’ questions, to debate, and to reconfigure ideas contributed so much to the project. Thank you both for your generosity, for sharing your time, knowledge and passion.

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List of Publications

I hereby declare that the work embodied in this thesis generated the following publications.¹

Journal Articles (Refereed)

Meany, M. M., Clark, T., & Joseph, S. (Forthcoming—Publishing Contract Accepted 30/09/2013). Comedy and Artificial Intelligence: Do We Laugh When a Thing Gives the Impression of Being a Person? *The International Journal of New Media, Technology and the Arts*.

Meany, M. M., & Clark, T. (2013). Design dramaturgy: A case study in new media, humor and artificial intelligence. *Design Principles and Practices: An International Journal*, 6, 59–71.

Meany, M. M., & Clark, T. (2012). Chat-bot humour: A survey of methodological approaches for a creative new media project. *The International Journal of Technology, Knowledge and Society*, 8(1), 23–32.

Meany, M. M., & Clark, T. (2011). Scripting humour in conversational agents: Improvisation and emergence of humorous interchanges. *International Journal of the Arts in Society*, 5(5), 225–235.

Meany, M. M., & Clark, T. (2010). Humour theory and conversational agents: An application in the development of computer—based agents. *The International Journal of the Humanities*, 8(5), 129–140.

¹ Please see Appendix 1 for Abstracts of these publications. Also, see Appendix 3.1 on the accompanying CD for the full text of the published journal article.

Conference Papers (Refereed Abstracts)

- Meany, M. M. (2014). Comedy—a computationally intractable problem. In the 20th Colloquium on ‘Anything Goes’. Wellington, New Zealand: National Library, 13–15 February 2014: Australasian Humour Studies Network.
- Meany, M. M. (2013). Humour and creativity—Theoretical congruence. In The 19th AHSN Annual Colloquium on ‘Humour and Creativity’. Newcastle, NSW: University of Newcastle: 7–9 February 2013: Australasian Humour Studies Network.
- Meany, M. M. (2012). The vaudeville ‘Two-Act’ in a new media environment. In The 18th AHSN Annual Colloquium on “Varieties of Humour and Laughter” (11). Canberra, ACT: Australian National University: Australasian Humour Studies Network.
- Meany, M. M. (2011). Incongruity: Human—like machines and machine—like humans. In The 17th AHSN Annual Colloquium on ‘Time, Place and Humour’. Hobart, Tasmania: University of Tasmania: Australasian Humour Studies Network.
- Meany, M. M. (2010). Testing an inversion of Bergson’s ‘new law’ of humour. In Proceedings of the 10th International Summer School and Symposium on Humour and Laughter: Theory, Research and Application (33). Boldern–Mannedorf: 10th International Summer School and Symposium on Humour and Laughter: Theory, Research and Application.

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Chapter 1 — Introduction

The creative production component of this PhD project employs a pair of chat-bots, natural language processing artificial intelligence agents, to act in the roles of a comedian and straight-man in a comic performance based on a topic generated by the user of a web-based interface.² The project utilizes mechanical, artificial intelligence agents to probe the attributes and capabilities of human and the non-human actors. Henri Bergson (1911) in his essay titled *Le Rire, Essai sur la signification du comique* (*Laughter, an essay on the meaning of the comic*) provides a fundamental theoretical proposition exploring a “new law” of comedy, “We laugh every time a person gives us the impression of being a thing” (58). The very strict criterion of ‘every time’ is challenging as it invites negation of the law by finding one exception, however, it does suggest that comedy is a system. That is, comedy is a cultural form that follows certain fundamental ‘laws’: required forms, formats and formulas recognisable as comedy. Central to Bergson’s proposition is an incongruity between the “person” and the “thing”. Incongruity, with or without resolution, is a cornerstone concept of many humour theories (cf. Morreall 2009; Raskin 2008; Ritchie 2004). The practice of comedy is informed by this theoretical position that incongruity is in some manner core to the production of humour. The project engages with incongruity, or the “reciprocal interference” (Bergson 1911, 96), when the mechanical is encrusted on the human and when the human is encrusted on the mechanical. As such it assesses if Bergson’s “new law” will stand if it inverted: if we will laugh when a thing gives us the impression of being a person.

The contributions of this project are two-fold. Firstly, this project investigates comedy performance between a pair of chat-bots. While there are several examples of chat-bots interacting online (Aimlinstructor 2011; Bart 2011; CCSL 2011), there is no rigorous

² The production journal for this creative project, and the link to the chat-bot performance, may be accessed at the blog site: <http://aimlhumour.blogspot.com.au/>.

examination of the chat-bot humour that occurs within these interactions. When humour does result in these interactions it is perceived as serendipity or freakish novelty rather than as a purposefully constructed and desired outcome. Secondly, this project questions the inherent assumption that there is a distinct division between the human and the non-human performance. The examination of the creative development process suggests that it is the interaction of agents and structures rather than their inherent properties that most affected the trajectory of the project. Agents and structures are all actors in a complex system. All actors, human and non-human, operate in concert within a broad suite of material, technological, psychological, social, and cultural assemblies suggesting the relationship between agency and structure may be described as a dynamic tension.

1.1 — Research Questions

This research project assesses, using a methodology built on the foundations of constructivism and interpretivism, the hypothesis that: Bergson's "new law", "We laugh every time a person gives us the impression of being a thing" (1911, 58), will stand if inverted. This thesis questions the criteria of "every time" and suggests the inversion of Bergson's "new law": "We laugh when a thing gives us the impression of being a person". To address this hypothesis, an assessment of the underlying assumptions of the binary opposition of 'person' and 'thing', or the human and non-human, is required. It also necessitates an investigation of the role of incongruity in humour theory, the reciprocal encrusting of the person on the thing and the thing on the person. The creative project also addresses this hypothesis through practice as it considers both the *making* and the *made*. The application of practice to examine theory itself requires a theorising of creative practice as both a process and as a research methodology. As such, the following research questions (RQs) provide a framework for addressing the hypothesis:

RQ1 — Is there an incongruity between the 'human' and 'non-human' agents employed in this project that can be used for comic effect?

The human and non-human agents of the creative project are actors in a system of agency. They operate within the simultaneously enabling and constraining structures of a known comedy form. This form, the “Two Act” (Cullen 2007; Page 1915), is a particular genre of comedy typically performed by two actors. The two ‘non-human’ performers in the project, named Atomic and Romeo, are chat-bots, small artificial intelligence agents. The success of the project is dependent on the perception of their humanity. This narrative conceit disturbs the human/non-human dichotomy drawing attention to the ambiguous and incongruent nature of the actors.

RQ2 — Does incongruity need to be resolved to generate humorous effect or do some forms of incongruity resist resolution?

The concept of incongruity, with or without resolution, has an entrenched position in humour theories, particularly in linguistics theories that employ script or frame oppositions (Raskin 1985). These theories also offer a sufficiently developed understanding of the semantic and lexical elements of verbal humour to allow for the computational construction and detection of humour (cf. Binsted *et al.* 2006; Kiddon and Brun 2011; Ritchie 2009). This project is, however, an example of the computational *performance* of comedy rather than the computational *construction* of humour. Individual lines of dialogue, individual gags and jokes, may exhibit the semantic elements predicted by linguistic theories of humour, but the comedy of the interaction is based on the unresolved human/non-human incongruity of the actors themselves. This suggests that this project is a comedy based on a resolution-resistant form of humour.

RQ3 — How do humour theories affect the writing and performance of comedy?

Many of the texts written by comedy professionals on the craft of comedy writing devote a chapter, or at least some space, to the consideration of humour theories (cf. Byrne 2002; Carr and Greaves 2007; Evans 2003; O'Shannon 2012; Page 1915; Schreiber 2003; Vorhaus 1994; Wolfe 2003). The positioning of humour theories in ‘how-to’ texts suggests that theory does inform practice. This project aims to critically examine the relationship between

theory and practice to offer an understanding of how theory is used in the construction of comedy.

RQ4 — If the comedy of this “Two-Act” is an emergent property of a creative process, how do the material, technological, psychological, social and cultural structures affect the trajectory of the project?

Ritchie states, “there is little doubt that the construction of humor is generally regarded as creative... and any general theory of creativity should have something to say about humor” (2009, 71). Humour theories tend to focus on product over process and on reception over construction. This project argues that creativity theory provides a framework for examining the creative process, the *making* of humour, whereas the majority of humour theory reductively concentrates on the properties and reception of the *made* text.

As a result, these research questions will structure the examination of the *making* and the *made*, of the process and product of the creative project. The purpose of the research is to offer an understanding of the creative practice of comedy writing. The exegesis is seen as “writing *about* writing, writing that is self-conscious, evaluative, critical... that asks questions about process, product, praxis, and practice... a work that can be drawn on by other writers who wish to understand, evaluate or interrogate their own writing practices” (Bourke and Neilsen 2004, Italics in original).

1.2 — Contributions to Knowledge

This research project has, to date, resulted in ten research publications (see page vii). The Higher Education Research Data Collection (HERDC) categorises five articles as (C1) Refereed Article in a Scholarly Journal (Department of Industry 2013), published in an array of journals with well-defined disciplinary foci including technology, new media, design, arts, and humanities. This testifies to the interdisciplinary nature of the research project. The remaining five research outputs are conference papers that were accepted after peer-review of a submitted abstract: (E3 — Abstracts of Papers). These conference papers, which have a

more defined disciplinary perspective, were primarily developed to test the research project's theoretical and methodological arguments to an audience of humour scholars. The first paper was presented at the International Society for Humor Studies (ISHS) sponsored International Summer School and Symposium on Humour and Laughter: Theory, Research and Application (2010). The remaining four of the papers were delivered at the annual colloquia of the Australasian Humour Studies Network (2011–2014).

Finally, this project has garnered two awards in Funniest Computer Ever (FCE) Competition. In 2012 the project won an outright third place in a field of nine entrants (Joseph 2012b). In 2013, in a larger field of twelve entrants, the project won equal third place (Joseph 2013). Several of the competitors are successful in other chat-bot and AI competitions, including the Loebner Prize (Loebner 2013). This result is particularly notable as judging is undertaken by a field of experts interested in both artificial intelligence and humour.

1.3 — The Creative Project Description

The creative project incorporates the development of online chat-bots, interacting as 'comedian' and 'straight man' duo (Cullen 2007; Page 1915). The actors perform a twenty-six line comedy sketch prompted by a topic initiated by a human user. The chat-bots project, Atomic Playboy and Radiation Romeo, can be accessed through the Production Journal blog site: <http://aimlhumour.blogspot.com.au/>.

A chat-bot (chatter-robot, talk-bot, or simply, bot) is a computer-based conversational agent that simulates natural language conversation. Typically, it provides a text-based interface into which the user enters a word, phrase or, more commonly, a question. The chat-bot then processes that input to create an appropriate response. Firstly, this creative investigation demonstrates two artificial intelligence agents interacting with each other, and secondly, the consequent interaction generating a comedy where the chat-bots perform the

roles of ‘comedian’ and ‘straight man’. This interaction offers the opportunity to examine the scriptwriting process in a remediated form.

Chat-bots programs, as examples of artificial intelligence, vary radically in programming complexity. For this project, the chat-bots are hosted on the proprietary Pandorabots server³, the commercial incarnation of the Loebner Prize-winning ALICE (Artificial Linguistic Internet Computer Entity) program developed by Dr Richard Wallace (Wallace 2008a). An ALICE based chat-bot involves two components: the pattern matching program, the ‘engine’ or ‘brain’; and, ‘knowledge’ and ‘personality’ stored in a text-based file format called AIML (Artificial Intelligence Markup Language). Individual character traits are developed in the AIML files that are subsequently used by ALICE engine. Here, the playwright/dramaturg fixes on the form of interaction and the format of the performance. Hence, the characters presented in this project are highly mediated: they are a function of human and non-human agency. The core of the non-human agency is the pattern matching program, the ‘engine’ or ‘brain’ of ALICE. Human agency is engaged in the development of the AIML file sets for each character. The development of AIML to be shared by two chat-bots is a distinct process from writing for a single chat-bot. An interface, developed in Adobe Flash using the Actionscript scripting language, allows the two chat-bots to talk to each other. The human user suggests a topic; this text input is captured by the interface and sent to Atomic for processing. The interface displays the input as Romeo initiative. Atomic’s output is then captured, displayed, and then sent to Romeo. This process is repeated to generate twenty-six lines of dialogue until the interface delivers a randomly selected set of sign-off lines to indicate the end of the performance. After multiple iterations based on the

³ The chat-bots are hosted on the Pandorabots server under the Shared Service subscription. Please note, the terms of the Updated Policy Guidelines for Free Community Server state that the “Use of automated scripts to make your pandorobot talk to itself or another bot or script” is proscribed (Pandorabots 2011). This project was developed with the agreement of the Pandorabots Inc management and their support is hereby acknowledged.

feedback of the users, the interface includes a 'heckle' feature that allows the user to jeer Atomic during the performance. A suite of timer functions regulates the delivery of the lines allowing the user sufficient reading time. The timer functions 'humanise' the delivery by slowing it to a more human-like performance pace rather than the light-speed of machine interaction.

1.4 — Operational Definitions

1.4.1 — Creativity

McIntyre (2012) encapsulates the view of creativity as a system that allows for the emergence of creative products including humour.

Creativity is an activity where some process or product, one that is considered to be unique or valuable in at least one social setting, comes about from a set of antecedent conditions through the located actions of a creative agent. Each factor belong to a system in operation and creativity emerges from that system in operation (204).

As this exegesis is an exploration of the creative activity of comedy script writing it is important to see the creative process as a function of a system involving the scriptwriter, a domain of codes and conventions, and an audience located in a social setting. Each of these elements bears on the trajectory of the project.

1.4.2 — Humour and Comedy

Working definitions are fundamental to position the current project within the domain of humour studies and to situate the creative project within the genre of comedy. Towards this end, the Oxford English Dictionary defines humour as:

7a. That quality of action, speech, or writing, which excites amusement; oddity, jocularly, facetiousness, comicality, fun.

7b. The faculty of perceiving what is ludicrous or amusing, or of expressing it

in speech, writing, or other composition; jocose imagination or treatment of a subject (2013c).

Whereas the same dictionary defines comedy as:

1. A stage-play of a light and amusing character, with a happy conclusion to its plot.
- 2a. That branch of the drama which adopts a humorous or familiar style, and depicts laughable characters and incidents (2013a).

The Macquarie Dictionary defines humour in a similar fashion ("humour" 2009, 818), but its definition of comedy makes explicit that the concept that comedy, as a genre of drama, is demarcated as “that branch of the drama which concerns itself with this form of composition” ("comedy" 2009, 345). A comedy is a composition; a purposefully constructed medium that utilizes recognizable forms and features.

By comparing these definitions, a distinction between humour and comedy is offered. Humour is the ability to perceive or express the intentional or unintentional comic elements of life. Comedy is an intentionally structured cultural product that employs particular forms and conventions to create the affect of amusement in an audience. This distinction will be further developed in the Literature Review.

1.4.3 — Chat-bots and Artificial Intelligence

A chat-bot (chatter-robot, talk-bot, or simply, bot) is a computer-based conversational agent that simulates natural language conversation, usually through a text-based interface. In this project, the chat-bots, small artificial intelligence agents in this project, are employed as comedy performers. The details of the chat-bots' processes and construction are discussed in the Artificial Intelligence section of the Literature Review.

Artificial intelligence, as an academic discipline, offers “the scientific understanding of the mechanisms underlying thought and intelligent behavior [sic] and their embodiment in machines” (AAAI 2012). It is “a scientific school whose objectives include: learning and

simulating the processes of human cognitive activity; based on the knowledge obtained, development of devices eventually performing different intellectual activities without a human and instead of a human” (Antonov 2011, 1).

1.4.4 — Scriptwriting and Dramaturgy

The terms ‘playwright’ and ‘scriptwriter’ are synonymous to this project, even if the industries related to screen and stage would traditionally separate the terms. The playwright/scriptwriter is the person who crafts a play/script by welding together the textual, thematic, and dramatic elements. In this project, the definition of scriptwriter is largely synonymous with the term computer programmer. The scriptwriter, in this sense, is the person who ‘glues’ together the various technical components that allow the performance to be witnessed by an audience. In this creative project, the researcher adopts both roles, melding the textual, thematic, and dramatic elements with the programmatic production elements to present the characters and performance to an audience. This combination of roles is best understood as an example of ‘dramaturgy’. Cardullo’s definition of dramaturgy suggests it is a method used in the analysis of a play. Dramaturgy “today denotes the multi-faceted study of a given play: its author, content, style, and interpretive possibilities, together with its historical, theatrical, and intellectual background” (1995, 3). It is an exegetical approach to designing experiences-synthetic, artificial, theatrical experiences. The etymological roots of playwright and dramaturg are both concerned with “making” and “working.” For the purposes of this project, dramaturgy has contributed to the *making* of the creative project and to the exegetical examination of the *made* creative project.

1.5 — Structure of the Exegesis

1.5.1 — Literature Review

The Literature Review, presented in Chapter 2, provides an overview of the knowledge domains directly contributing to the development and production of this PhD project. It is

divided into four sections: Creativity Theory, Humour Theory, Artificial Intelligence, and Scriptwriting and Dramaturgy. Each section provides a brief historical overview of the domain followed by a discussion of its theoretical implications in relation to the project. The creative project may be assessed from the point of view of each of these individual domains. While it may be seen as an exercise in scriptwriting or computer programming or as an application of humour theory alone, these individual approaches inadequately describe the creative process. The primary purpose of Chapter 2 is to argue that the creative project exists at the intersection of these domains.

1.5.1.1 — *Creativity Theory*

One of the key elements of this study is the exploration of the creative process of comedy scriptwriting. Mihaly Csikszentmihalyi's systems model of creativity, which includes the individual, the field and domain in a system of circular causality, is a model of confluence in which creativity "can be observed only at the intersection where individuals, domains, and fields interact" (1999, 314). The individual creator brings their intention and agency together with personal history and capabilities to the model. The development of *habitus* (Bourdieu 1990), described as "domain acquisition" by Csikszentmihalyi (1999), is the internalisation of the forms and conventions of a domain. The idea that the process of creativity involves both the internalising and forgetting of history is crucial to the understanding of the effect of theory on practice. The structures proposed by theory, in this case the structures of comedy and scriptwriting are not simply replicated by practice, rather, these structures find new expression in the creative product. All of this activity occurs within a social sphere of influence. Csikszentmihalyi's field, is that group "entitled to make decisions as to what should or should not be included in the domain" (1999, 315). By extension, the audience also operates as a member of the field. For this reason, this project employs a methodology that actively seeks input from the field in the development process. The methodological implications of this approach and the details of the methods are further explored in the Chapter 3 — Methodology.

1.5.1.2 — *Humour Theory*

The development of a comedy performance by conversational agents is grounded in a theory of humour that encompasses the interaction of human and non-human actors exercising creative agency within a confluence model of creativity. The Literature Review will, after evaluating the current theoretical landscape, present an argument for the theory that best achieves this objective.

Attardo (1994), following Raskin's 'tripartite classification' (1985, 30-40), offers a mapping of theories under the three broad headings: Incongruity (including Contrast and Incongruity/Resolution theories); Hostility (including Aggression, Superiority, Triumph, Derision, and Disparagement theories); and, Release (including Sublimation, Liberation, and Economy theories) (47). This organisation of theories works towards providing a clear overview of the domain of humour studies. The seeming range and diversity of humour theory is, in part, a function of terminological chaos. Even when comedy is defined as a genre as there is little agreement as to the necessary elements of the form. Bentley (2012) qualifies this as, "in the teeth of logicians and lexicographers one is content to read comedies without knowing exactly what comedy is" (190). The Humour Theory section of the Literature Review offers an overview of the domain with the goal of clarifying the theoretical positions and abstracting a theoretical position that can usefully inform the development of the creative project. Further, the Humour Theory section argues that there is an absence of theoretical understanding of the practice and production of comedy.

1.5.1.3 — *Artificial Intelligence*

Natural language processing is a long-standing subdivision of artificial intelligence (AI) research that has its roots in the seminal work of Alan Turing and the ongoing iterations of the Turing Test for artificial intelligence (Loebner 2013; Turing 1950). The chat-bots employed in this project can be considered as artificial intelligence agents only in so far as they engage in natural language processing. Their simple ability to deliver dialogue is the

necessary constituent and not their ability to convince an audience of their ‘intelligence’. The domain of artificial intelligence research has witnessed two opposing views of the intention and possibility of artificial intelligence research. The first intention, to undertake AI research as means of better understanding human capabilities, is categorised as *weak AI*. The second intention, which discusses the drive to replicate human capabilities or to replace human agency is termed *strong AI* (Chalmers 1992, 26). The growth of the *weak AI* approach has seen it provide unique insights into the areas of humour (Binsted *et al.* 2006; Ritchie 2004) and creativity (Boden 1994, 2004). Brian Christian suggests engaging with AI agents may be a path to better understanding what it means to be human in broad social and cultural terms (2011). Using AI in this manner may, to some degree, ameliorate the perceived binary opposition of the human and the mechanical as proposed by Bergson (1911).

This section also offers a description of the artificial intelligence engine used in the development of the creative project. The characteristics and capabilities of this engine simultaneously represent a form of agency and a structure that both enables and constrains the actions of the human producer and of the chat-bots.

1.5.1.4 — *Scriptwriting and Dramaturgy*

In this project, scriptwriting carries two interrelated meanings as delineated in the operational definitions above. The tools and techniques of comedy scriptwriting, and more generally of dramatic scriptwriting, are explored in this section of the Literature Review. The dialogue scripting for the chat-bot characters involves the use of a markup language akin to Hyper Text Markup Language (HTML) called Artificial Intelligence Markup Language (AIML). This markup language both stores and deploys the knowledge and personality of the chat-bot. The second definition of scriptwriting refers to the writing and implementation of a computer interface using a scripting language and the development of dialogue in the mark-up language that the chat-bots can use (AIML). The interface developed for this project uses Adobe’s scripting language called Actionscript. In this project, the Actionscript interface ‘glues’ together the two chat-bots; it collects the user’s textual input, directs it to

one of the chat-bot characters, gathers the response and send it to the other chat-bot character, and so on for a given number of interactions. Crucially, it is the Actionscript interface that controls the duration and timing of the performance.

In this project, dramaturgy is employed in this project as an exegetical methodology. As a tool for examining habitual responses, dramaturgy offers a technique for acquiring new perspectives for the playwright. Playwrights, dramaturgs and designers require awareness of the technical and mechanical necessities of their projects. To adequately attend to this range of responsibilities it is useful to consider a division of labour. The playwright/dramaturg is responsible for what is presented (the characters, plots, dialogue, etc.) allowing a designer/dramaturg, albeit the same person, to take care of how the action will be staged. This section of the Literature Review explores the interrelated nature of these roles.

1.5.2 — Methodology and Methods

1.5.2.1 — *Ontological and Epistemological Issues*

This creative project and exegesis are trans-disciplinary in nature. Individual disciplines tend to favour, either explicitly or implicitly, particular methodological approaches. For this reason the methodology section presents a robust defence of the selected methodological approach. To achieve this, a survey of methodological approaches used in social science, information and communication technology (ICT), drama and scriptwriting, creativity theory, humour theory, and interactive design is employed. Social science accounts of research practice are sourced from Grix (2004), Bryman (2008), Blaikie (1993), Crotty (1998), Robson (2002), Marsh and Furlong (2002), as well as Miller and Brewer (2003). Stahl (2008) provides an account of research in information science, as Becker and Niehaves do for information systems research (2007). Research in the creative arts, particularly creative writing, has been described by Barrett (2010), Bourke and Neilsen (2004), Dallow (2003), and Candy (2006). A synthesis of these accounts, chosen for the diversity of approaches they represent, suggests these disciplines share two particular attributes. Firstly,

these disciplines all operate at a nexus of theory and practice, and secondly, these disciplines are themselves multi-disciplinary or trans-disciplinary in nature.

In *The Sciences of the Artificial*, Simon (1969, 5-6) calls for the development of sciences to specifically examine the world of designed objects. His work argues that the methods of natural sciences, largely based on positivist ontology, are not appropriate for dealing with the complexity of designed, synthesized objects or for describing the intentional processes of design. The creative project stands as an example of a designed, synthesized experience that meets all of Simon's four indicia of the artificial (Simon 1969, 5-6). This has important consequences for the selection of an appropriate ontological and epistemological basis for the research. In turn, this guides the selection of precise methods for data collection.

By integrating human and non-human agency inside a system of interlocking structures, the creative project will assess whether Bergson's law of comedy remains true when it is inverted—that is, it will assess whether we laugh when a thing gives the appearance of being human. This chapter argues that to answer this question, the researcher holds a visible position inside the research process, a position based on the constructivist ontology, deploying an interpretivist epistemology. These two pillars suggest a Practitioner-Based Enquiry (PBE) methodology (Murray and Lawrence 2000).

1.5.2.2 — *Theoretical Perspective*

The purpose of this section is to emphasize the key theoretical concepts that either informed the scriptwriting process (in both meanings of the term) or that have allowed the process to be critically examined. The first of these is the recognition that the creative activity itself is the object of examination and research (Boden 2004; McIntyre 2012; Sawyer 2006). Second is a discussion of the role of incongruity and resolution in humour (Morreall 2009; Raskin 2008; Ritchie 2004), focussing on an argument that suggests some incongruities resist resolution (Rose 2011). Finally, the Computers As Social Actors (CASA) paradigm is explored. As conceived through the logic of *The Media Equation – How people treat*

computers, television, and new media like real people and places (Reeves and Nass 1996), the CASA paradigm suggests an audience will accept computers as fully developed characters in a drama as “it is belief, not disbelief, that is automatic” (Reeves and Nass, 27). These theoretical positions are employed in the creative project in a way that allows critical examination of these positions.

1.5.2.3 — *Practitioner-Based Enquiry and Dramaturgy*

Practitioner-Based Enquiry (PBE) involves a self-reflective examination of the practitioner’s activity and the processes of that activity. The researcher’s intention is aimed at “the acquisition of intellectual autonomy, improved judgment making and enhanced technical competence” (Murray and Lawrence 2000, 10) in creative practice. Creative practitioners “enquire into their own practices to produce assessable reports and artefacts [sic]” (Murray and Lawrence 2000, 10). The concept of “assessable reports and artefacts” indicates the need to distinguish between knowledge and belief. Within methodologies like PBE, data collection methods include “extracts of natural language, such as verbatim transcripts of interview material and extracts from texts, discourse, personal documents, field notebooks and the like” (Miller and Brewer 2003, 239). For this project, a Production Journal is maintained as a public blog (<http://www.aimlhumour.blogspot.com.au/>). As a public document it is a connection to the field of practitioners and academics that offers direct feedback on the construction of the project. The PBE methodology provides an opportunity to understand the individual’s role in the creative process, its iterative and recursive nature, and an understanding of the power of reflecting on action. Both elements are best described from inside the process. Further, the insights gained through reflection are used to generate change in the individual’s creative process that will, in turn, influence the associated production.

This section argues that dramaturgy, as an exegetical research methodology (Meany and Clark 2013), can be employed as a structuring device for the analysis of the Production Journal. The practice of dramaturgy is codified in the dramaturg’s protocol as, “a five-part

pre-production study of a play - developed for a play's production" (Katz 1995, 13). The protocol is produced as a book or production folder containing: an historical, cultural, and social background of the play; biographical information concerning the playwright, plus an assessment of its place in the author's *oeuvre*; a critical and production history of the play; a critical analysis of the play, including the dramaturg's suggestions; and a comprehensive bibliography of materials on the play (Katz 1995, 13-14). The dramaturg's protocol situates the work in its conceptual stages, which is a crucial step in the creative process. It locates the work within broad social and cultural structures, examines the work in terms of the forms and format of a dramatic genre, and links the production to a field of experts and an audience. As a result, dramaturgy is employed as an exegetical tool.

1.5.3 - Analysis

The Analysis Chapter draws on data captured in the Production Journal including posts and comments from members of the field with the goal of offering an understanding of the relationships between the intra-related actors of the project:

The notion of *intra-action* (in contrast to the usual "interaction," which presumes the prior existence of independent entities/relata) represents a profound conceptual shift. It is through specific agential intra-actions that the boundaries and properties of the "components" of phenomena become determinate and that particular embodied concepts become meaningful (Barad 2003, 815 italics in original).

This use of the dramaturgical protocol encourages the producer to simultaneously maintain intimate contact with the project and to develop a critical distance, "to resist restaging of stories about autonomous human actors and discrete technical objects" (Suchman 2007, 284). During the development process, the producer is reflecting in his actions and, by maintaining a record, he can examine his/her process, with documented hindsight—reflection on action (Schön 1983, 55). These reflections are primarily concerned with the

intra-actions of the suite of actors and “[a]ny distinction of humans and technologies is analytical only, and done with the recognition that these entities necessarily entail each other in practice” (Orlikowski and Scott 2008, 456).

Further, the Analysis Chapter employs a metamodern perspective to explore the binary opposition of incongruity and resolution:

According to the Greek-English Lexicon the prefix ‘meta’ refers to such notions as ‘with’, ‘between’, and ‘beyond’. We will use these connotations of ‘meta’ in a similar, yet not indiscriminate fashion. For we contend that metamodernism should be situated epistemologically with (post) modernism, ontologically between (post) modernism, and historically beyond (post) modernism (Vermeulen and van den Akker 2010, par. 4).

The creative process is an emergent phenomenon that cannot be divorced from a larger cultural system. Creative products emerge from creative processes and contribute to a broader culture. This statement is ontologically and epistemologically rooted in an understanding of culture that has moved beyond post-modernism. The crucial feature of metamodernism is the concept of oscillation. The cultural products of our metamodern times are typified by their ability to incorporate aspects of both modernism and post-modernism in a manner that can transcend both.

1.5.4 - Conclusion

The primary hypothesis of this project is that Bergson’s “new law” will stand if it is inverted. In other words, we will laugh when a thing gives us the impression of being a person. This hypothesis will be addressed in relation to the four research questions, which determine fundamental issues in understanding of the human/non-human dichotomy, the interpretation of the role of incongruity in the comedy, and the conception of the relationship between theory and practice.

Chapter 2 — Literature Review

2.1 — Introduction

The Literature Review describes the relationship between four primary knowledge domains: Humour Theory, Creativity Theory, Artificial Intelligence, and Scriptwriting. The primary purpose of the chapter is to argue that the creative project exists at the intersection of these domains and, positioned in such manner, to illuminate the contribution of each of the domains.

To examine the creative activity of an individual working inside the domains of comedy script writing and artificial intelligence requires an ontological framework that accepts:

- Creativity and humour are based on processes that are open to investigation as opposed to being inspirational, divine, or romantic processes (cf. Csikszentmihalyi 1999; McIntyre 2012; Sawyer 2006);
- Creativity, humour and the natural language performance of artificial intelligence that have a social dimension (that there is some kind of agreement or social contract between the producer/performer and a larger audience)—(cf. Binsted *et al.* 2006; Boden 2004; Carr and Greaves 2007) and,
- The creative humorous work expressed by the artificial intelligence is based on a pre-existing domain of cultural codes, as the performance is a remediation of an existing cultural form—(cf. Bolter and Grusin 1999; Cullen 2007; Page 1915).

The Humour Theory section provides an overview of the range and diversity of humour studies as well as defining the distinction between general theories of humour and the more specific theories of comedy. From this distinction, an argument is presented that supports the application of the inverted form of Bergson's "new law" as an appropriate theoretical underpinning for this creative project.

The Creativity Theory section provides an historical overview of the field, addressing some of the myths of creativity, in particular, the conflation of the terms artistic and creative. By tracking the development of creativity studies from its roots in classical texts through to the dominance of psychological approaches to more systemic, confluence models, this chapter addresses the argument that creativity occurs at the intersection of psychological, social and cultural elements.

The Artificial Intelligence (AI) section will provide a description of the works that fundamentally changed our understanding of intelligence and communication: Claude Shannon (1948, 1951), George Zipf (1949), and, Alan Turing (1950). This section will concentrate on four key publications that not only contributed to the academic development of artificial intelligence at the time but also continue to affect the development of this project. Further, this section explores the implications of the Computers as Social Actors (CASA) paradigm (Reeves and Nass 1996) and “the perceptual illusion of nonmediation” (Bracken, Jeffres, and Neuendorf 2004) have for this project. This also section argues that the route to “the most human-like computer” (Loebner 2013) requires scriptwriting and dramaturgy.

The scriptwriting section addresses both of its definitions: as theatrical comedy scriptwriting and as a sub-division of computer programming. The scriptwriter is responsible for ‘what’ is presented (the characters, plots, and dialogue) allowing a dramaturg (albeit the same person) to design ‘how’ the action will be staged. There are three primary arguments presented in this section. Firstly, the form of the chat-bot’s performance closely resembles the “Two-Act” structure of vaudeville comedy performances (Cullen 2007; Page 1915) and that this form is “remediated” in the online, new-media environment (Bolter and Grusin 1999). Secondly, the form of the performance, such as, characterisation, the choice of comic techniques, and design of the performance interface influences the comedy’s development. Finally, the chapter revisits Creativity Theory to demonstrate how the elements contribute to a larger system of creative process from which a comedy performance emerges.

This Literature Review provides an overview of the contributing disciplines, indicating domains of knowledge contributing to the trajectory of the creative project. It offers an objective critique of practice designed “to resist restaging of stories about autonomous human actors and discrete technical objects” (Suchman 2007, 284). Although the Literature Review is presented under four domain headings, it is primarily concerned with the intra-actions of the suite of actors; “[a]ny distinction of humans and technologies is analytical only and done with the recognition that these entities necessarily entail each other in practice” (Orlikowski and Scott 2008, 456).

2.2 — Humour Theory

This literature review of the domain of humour studies has two broad ambitions. The first is to provide an overview of the range and diversity of theories of humour.⁴ This overview works towards finding a theoretical context and perspective that can be used to illuminate the development of scripted comedy using artificial intelligence agents. The study of humour includes, but is not limited to, the perspectives of the individual (psychology and physiology), social (sociology) and cultural (anthropology). Each domain contributes unique theoretical understandings for the practice of humour, offering heuristic rules for the development of comedy. Cicero’s *De Oratore* (1822) is an account of the humorous verbal techniques used to promote a cause or defend a client. Likewise, Aristotle’s *Poetics* is “something in the nature of teaching materials or ‘lecture notes’, produced not as a text for private reading by anyone interested, but for instructional use in an educational context” (Halliwell in Aristotle 1995, 4). These classical texts provide insights into the link between theory and practice. Through theory, practice is examined: in practice, theory is tested. The creative work at the core of this research project, and the consequential development of comic conversational agents, encompass the interaction of human and non-human actors.

⁴ In this document, I will follow the Australian English spelling of ‘humour’, however, where the word appears in a quote it will follow the spelling of the original text.

Raskin (1985) notes the “terminological chaos created by an abundance and competition of such similar and adjacent terms as humor, laughter, the comic, the ludicrous, the funny, joke, wit” (8). Research in the domain of humour studies largely falls under three broad categories: humour, comedy and laughter. Of these, laughter is by far the most diverse area of study because laughter results from an extensive range of causes, the humorous being just one. The physiological and psychological study of laughter is tangential to this study; however, to exclude all research that uses the title of laughter would eliminate many valuable sources. This conflation of terms contributes to the broad and elusive nature of humour studies. Attempts at defining the scope and domain of humour theory results in a wide-ranging set of contributing theories; making it difficult to conceive of the domain having any unifying argumentative thrust or purpose. For example, Goldstein and McGhee (1972) provide a listing of eight broad humour theories including:

- Biological, Instinct and Evolution Theories suggesting that laughter and humour are “built-in” and are “good for the body”;
- Superiority Theories which argue a sense of superiority is central to the humour experience;
- Incongruity Theories indicating that humour arises from “disjointed, ill-suited pairings of ideas or situations”;
- Surprise Theory arguing that surprise or unexpectedness are regarded as necessary to experience humour;
- Ambivalence Theories proposing that the conflict of incompatible emotions is the basis of humour;
- Release and Relief Theories outlining that humour functions as a relief from stress or constraint;
- Configurational Theories inferring that humour is based on the insight of things falling into place, the pleasure of ‘getting the joke’;

- Psychoanalytical Theory stating that psychic energy that cannot normally be expended due to the strictures of the superego can be released through humour (Goldstein and McGhee 1972, 5-13).

Attardo (1994) offers a more concise mapping of humour theories under the three broad headings (47). This organisation of theories, following Raskin’s “tripartite classification” (1985, 30-40), provides an overview of the domain of humour studies.

Incongruity	Hostility	Release
Contrast	Aggression	Sublimation
Incongruity / resolution	Superiority	Liberation
	Triumph	Economy
	Derision	
	Disparagement	

Table 1 — A mapping of humour theories.

This tripartite classification visually suggests these groups are somehow mutually exclusive. This grouping of theories is, however, more accurately analysed as offering different perspectives on the phenomena of humour. Raskin argues, “**incongruity**-based theories make a statement about the **stimulus**; the **superiority** theories characterize the **relations** or **attitudes** between the **speaker** and the **hearer**; and the **release/relief** theories comment on the feelings and psychology of the **hearer** only” (Raskin 1985, 40, emphasis in original). While theories may not be mutually exclusive in the absence of a theory that explicitly relates to the intentional production of comedy, they prove useful only in analysis of humour (this point will be revisited at the end of this section).

As noted above, this project does not overtly question theories of laughter. John Morreall argues, Henri Bergson’s 1911 essay titled *Le Rire. Essai sur la signification du comique* (*Laughter, an essay on the meaning of the comic*) may be more accurately titled “*Humor, or better, Comedy*” (Morreall 1987, 5 italics in the original). Morreall notes that Bergson used the comedies of French theatre as a foundation for his theory of comedy. This

is significant as it supports the operational definitions proposed in the Introduction chapter. Humour is the ability to perceive or express the intentional or unintentional comic elements of life. Comedy is an intentionally structured cultural product that employs particular forms and conventions to create the affect of amusement in an audience. The compositional form of comedy suggests that intentional choices are made in the development of a comedy so that it has a humorous effect—the creation of the affect of amusement in an audience, possibly including the physiological response that is laughter. However, not all amusement is intentionally created. A slip-of-the-tongue or a pratfall may well be completely unintentional but can be highly amusing—a humorous event. Using these working definitions, Bergson’s theoretical position becomes crucial to this project as it is primarily concerned with the structural elements of comedy. It also offers a description of comedy emerging from the interaction of human and non-human elements. As Bergson put it, “We laugh every time a person gives us the impression of being a thing” (1911, 58).

Each individual theory, at some point, traces its origin back to the texts of classical Greek and Roman philosophers. Morreall has traced the evolution of these theories to their classical roots, through Enlightenment philosophers and later philosophers to their modern incarnations (Morreall 1987, 2009). However, a close examination of the classical texts reveals that many of the modern theories, even those theories that are mutually exclusive, are selective with material in order to support their genesis (Perks 2012). The conflation of a theory of the ridiculous from Plato (1892a) with a genre theory of comedy from Aristotle (1911) has been employed to support theories of humour based on Aggression, Superiority, Triumph, Derision and Disparagement. This makes it difficult to separate an explanation of *why* we laugh from an explanation of *what* we laugh at.

In the last decades of the 20th Century, humour research focussed on the theoretical development of three key approaches: the linguistic approaches of Raskin (1985) and Attardo (1994); the psychological approach of Reversal Theory by Martin (2007); and, the reassessment of the linguistic approach to Incongruity/Resolution Theory by Ritchie (2004).

Raskin’s 1985 Semantic Script Theory of Humor (SSTH) aimed at providing a “formal model of humour competence” (Martin 2007, 89). It was primarily interested in the structure of jokes and, by applying a coding system for the structures within a joke, proposed that lexical elements within the joke linked by semantic structures evoke particular scripts. Here a ‘script’ is a particular narrative or story line. Humour results as a function of two conditions being satisfied: “[t]he text is compatible, fully or in part, with two different scripts” and, “[t]he two scripts with which the text is compatible are opposite in a special sense...” (Raskin 1985, 99). In 1991, Attardo and Raskin redeveloped the SSTH to create a broader and more comprehensive theory of humour called the General Theory of Verbal Humour (GTVH)—(Attardo 1994). The GTVH describes six Knowledge Resources (KRs), which are “thought to be involved in the cognitive representation and analysis of humorous texts.” These Knowledge Resources represents a “hypothetical database” of linguistic, narrative, social, and logical understandings (Martin 2007, 91).

KRs — Knowledge Resources	Description
Language (LA)	Verbalization of the text: word choice, placement of functional elements, etc.
Narrative Strategy (NS)	Narrative structure of the humorous text (genre).
Target (TA)	Humor often aims at (social) stereotypes as ‘butts’.
Situation (SI)	The situational embedding of the joke: characters, activities, objects, setting, etc.
Script opposition (SO)	Central requirement for the generation of a humorous effect: opposition between scripts.
Logical Mechanism (LM)	Cognitive operation needed to achieve a (partial) resolution of the incongruity.

Table 2 — Knowledge Resources of the GTVH (Brône and Feyaerts 2003)

Brône and Feyaerts (2003) argue “[b]y adopting this multidimensional approach, addressing language structural (LA), discourse analytical (NS), sociolinguistic (TA, SI) and cognitive/logical (LM) issues, the GTVH aims at an encompassing linguistic-pragmatic (and not only semantic) account of verbal humor”. Crucially, the concept of script opposition (SO) remained a central tenet of the expanded theory.

The GTVH, and its precursor the Semantic Script Theory of Humour (SSTH), contain the concept of ‘humour competence’ developed from Chomsky’s notion of “linguistic competence” and its “ideal speaker-hearer community” (Willis 2005b, 127). Willis argues that the SSTH was an “idealised model of humour (and subsequent developments of it [the GTVH]) is designed for a speaker-hearer community in which members’ senses of humour are identical (Raskin, 1985: 58), for people who have no racial or gender biases and are not concerned by scatological, obscene or disgusting content (Attardo, 1994: 197), and where audience responses are ‘essentially irrelevant’ (Attardo, 2001: 30)” (2005b, 127 Attardo and Raskin quoted in Willis). As such, it describes *how* jokes work rather than *why* a joke might work for a particular audience. The theory has generally been used to analyse the short form joke, a ‘canned’ joke rather than longer forms of comedy such as theatrical scripts. It also presupposes that the text under analysis is, *a priori*, actually a joke that is intended to generate an affect of amusement in an audience. The association of formal linguistic structures and formal semantic, lexical and syntactic models is underpinned by the concept that meaning resides in language. The humour theories noted above tend to exemplify their application in relation to individual jokes. Morreall presents a distinction between “fictional” jokes and “situational” jokes (2004, 394). Fictional and situational jokes may well be equally funny but the context-free nature of fictional jokes may not be providing a fully rounded understanding of humour.

Fictional jokes are to humor research what fruit flies are to genetics, and the frequency with which humor scholars analyze them is understandable. They are repeatable texts that can be understood without knowing anything about the situations in which they are told, unlike situational humor in which ‘you had to be there’. Nonetheless, it is risky to draw conclusions about all verbal humor from studying prepared fictional jokes, just as it would be risky to draw conclusions about all insects from studying fruit flies. Prepared fictional jokes

may well have features that are not shared by other kinds of verbal humor (Morreall 2004, 394).

Considerable research has been undertaken in the area of the computational construction of humour as a sub-domain of both artificial intelligence (AI) research and humour research. “Kim Binsted and Graeme Ritchie made one of the first attempts at automatic humor production. They devised a formal model of the semantic and syntactic regularities underlying some types of puns” (Stock and Strapparava 2006, 65). Ritchie *et al.* continued to computationally develop more complex forms of linguistic humour (cf. Binsted *et al.* 2006; Ritchie 2009; Ritchie *et al.* 2006) and an associated strand of research has been undertaken into the computational recognition of humour (cf. Augello *et al.* 2008; Kiddon and Brun 2011; Mihalcea and Strapparava 2006). The link between humour research and AI research is problematic, only those theories of humour that can be expressed in structural and procedural modes are capable of being translated into programmatic instruction. This attribute of computational humour allows us to make an important point about this creative project. This project is concerned with the computational performance of comedy rather than the semantic and syntactic production of computational humour.

The theory of humour described in Rod A. Martin’s text *The Psychology of Humor*, originally proposed by Michael Apter, is “derived from a broader theory of motivation and personality called reversal theory” (Martin 2007, 75). Apter’s reversal theory of humour “proposes that humor involves the perception of a cognitive synergy (i.e., two concurrent but contradictory interpretations of the same object), in which the second interpretation of an object involves a diminishment relative to the first...” (Martin 2007, 77). The two critical elements of this description of the theory are the concepts of ‘cognitive synergy’ and ‘diminishment’. Frequently in art, science and humour the creativity of the activity is described as the ability to combine incongruous or seemingly unrelated ideas in a single object (De Mey 2005). For Apter (1982), the difference between art and humour is between two elements of the cognitive synergy. In humour, one of the elements is in some manner

diminished or devalued, whereas in art, one of the elements of the cognitive synergy is elevated in value. The humour is not simply incongruity as not all incongruous pairings of ideas result in humour, nor is it the removal of incongruity (resolution). Rather, it is the simultaneous recognition of the incongruous elements. The simultaneous recognition is, however, open to question. Wittgenstein's optical illusion of the Duck-Rabbit is an example of the perception of an overall shape as containing an incongruous element. However, when we ascribe a *meaning* to the image—It's a duck / It's a rabbit—the other meaning is displaced. But this does not mean that we cannot purposefully flip to the other meaning. The enjoyment and possible amusement drawn from the image springs from the oscillation between meanings. It is a visual 'joke' that benefits from multiple retellings.

In *The Linguistic Analysis of Jokes* (2004), Ritchie addressed the question of the role of incongruity and resolution in the fabrication of humour. Ritchie details two models of incongruity resolution (IR), stressing there is not "exact agreement about what constitutes incongruity-resolution" nor is there a "clear definition of the IR theory within the literature" (59-60). However, the two models he examines are examples of how the variations of IR differ in application. The Forced Reinterpretation model suggests that a joke will have a set-up with two different meanings, one of which will be more obvious to the audience. The punch line then acts in conflict with the more obvious interpretation. However, the punch line is compatible with the second, or hidden, meaning of the set-up. In the Two-Stage model, "the punch line creates the incongruity, then a *cognitive rule* must be found which enables the content of the punch line to follow naturally from the information established in the set-up" (Ritchie 2004, 59, emphasis in original). As Ritchie points out, these multiple variations of IR theory often contain untested assumptions about the precise role and mechanism of incongruity and resolution, however, the core concept of incongruity remains. Incongruity theories, including the variants of incongruity resolution theory, tend to be seen as encapsulating a necessary (if not sufficient) explanation of humour. It is common practice to test these theories using 'canned' jokes as examples. This opens up the endless possibility

of finding an example to falsify the theory or to find an example of incongruity that does not produce the affect of amusement.

If we allow that incongruity is a large-scale element of humour, an element that exists above the level of the individual joke or utterance, then other theories can be employed to explain and predict humour at the level of the individual joke. The GTVH is most appropriately employed at the atomic level to examine *how* a humorous text works: it is not designed to answer the question, ‘Is this a humorous text?’ The GTVH contains the *a priori* assumption that the text in question is intended to be humorous which suggests that it could render a ‘false positive’ if it was applied to a serious text. As noted by Cicerio, “the methods of seriousness and jesting are identical” (Book II, Section 262). As an example, the line “Friends, Romans, Countrymen, lend me your ears” from Shakespeare’s *Julius Caesar* (1914, Act 3, Scene 2) stands as one of the most frequently parodied lines. The tripartite introduction employs a Situation (SI), Language (LA) and Narrative Strategy (NS) common to humorous texts (A priest, a rabbi and a monk...). Further, “lend me your ears”, if taken literally is an incongruous statement. This is not falsification of the GVTH, however it does suggest the limits of theory’s scope.

When Bergson proposed his “new law” (1911, 58) he was in effect establishing a large-scale incongruity, a meta-incongruity. The theories tend to exemplify their application is relation to individual jokes. Bergson’s work does not so much present a fully-fledged theory of humour; rather it presents a set of concepts that may be necessary (if not sufficient) to explain comedy. He offers three elements of comedy:

1. Repetitions — of forms, structures, plots and characters.
2. Inversions — inversion of roles and inversions of meaning through word play.
3. Reciprocal interference of series (90-103).⁵

⁵ Footnote from the original text – The word “interference” has here the meaning given to it in Optics, where it indicates the partial superposition and neutralisation, by each other, of two series of light—waves.

Bergson elaborated that “[a] situation is invariably comic when it belongs to two altogether independent series of events and is capable of being interpreted in two entirely different meanings at the same time” (1911, 96). The reciprocal interference is supporting incongruity/ resolution theories as well as the GTVH that define script or frame oppositions. Bergson described the elements of French comedy theatre of the late 19th and early 20th centuries, not the atomic elements of an individual joke, but the large-scale and performative aspects of comedy.

Philosophically, Bergson was primarily concerned with the effects of modern, industrial life, particularly the deleterious effects of mechanized life on the *élan vital*, the essential life force/essence of humanity (Bergson 1920). He argues that humour would arise when we perceive “...something mechanical encrusted [plastered] on something living” (Bergson 1911, 37). The core idea that there is an incongruity between the ‘human’ and the ‘non-human’ is supported by Critchley’s analysis of humour (2002). This project, which employs the mechanical, artificial intelligence of a computer program as performative actors, presents the opportunity to engage with the reciprocal interference that occurs when the human is encrusted in the mechanical and the mechanical is encrusted on the human. Further, the oscillation between the human and the non-human, akin to the oscillation of meaning attributed to Wittgenstein’s Duck-Rabbit, represents a large-scale incongruity that rejoices in its resistance to complete and permanent resolution. The yearning to resolve this incongruity in a world where we regularly engage with speaking machines (e.g. chat-bots, GPS units, voice recognition systems used in call centers, etc.) may well be a source of humour.

For this project, what is particularly telling about this classification of theories offered at the start of this section is that the only grouping that in any way associates the speaker and hearer (performer and audience) are the Hostility Theories. This is problematic for the study of comedy. None of the theories in this group speak directly to the intentional production of humour, that is, comedy. Rather, they speak to the “**relations** or **attitudes** between the

speaker and the hearer” (Raskin 1985, 40, emphasis in original). The production, practice and performance of humour/comedy are treated as epiphenomena. For example, Raskin’s text, *The Primer of Humor Research* (2008), provides an overview of the methods and theories of humour research. As such it supplies an historical snapshot of the dominant approaches to humour research in the early years of the 21st Century. There is no chapter given to the production of humour or comedy. There is no ‘author’ or ‘author-function’ in this view of humour research. Further, following the methodological practices of linguistics, which is one of the dominant approaches, the concept of audience is also treated as an epiphenomenon or a variable to be controlled:

When interested in the structure of a humorous text (mainly, what makes it funny) one can and must abstract away from the reception of said text by any given audience. Their reactions are essentially irrelevant, since what is being investigated is an abstract “ideal” reader’s analysis of the text” (Attardo 2001, 30).

The insistent focus on the text, the canned joke or “fictional joke” (to use Morreall’s terminology), reinforces the conception that meaning resides in the text, and only in the text. This logic follows the chronological order of literary theories: “The Intentional Fallacy” (Wimsatt and Beardsley 1946) became the cornerstone of the New Criticism movement, removed the author’s intention from creative work. This was followed in 1967 by “The Death of the Author” (Barthes 1977) which removed the author; which in turn was followed in 1969 by “What is an Author?” (Foucault 1984) which returned the author-function role. At the extreme end of the spectrum is Amy Carrell’s Audience-based Theory of Verbal Humor, which posits “humor resides with the audience; and thus, nothing is inherently humorous, or funny” (2008, 314) disenfranchising the production process, following the post-structuralist / post-modern logic of negating fixed meanings.

Ritchie (2009) stated, “there is little doubt that the construction of humor is generally regarded as creative... and any general theory of creativity should have something to say about humor” (71). The study of humour is a sub-set of creativity suggesting there should be

a high level of congruence between the theoretical and methodological approaches employed in each domain. Theories of humour focus on product over process and on reception over construction. Humour production is the result of the interplay of social, cultural and individual attributes.

2.3 — Creativity Theory

The historical development of theories of creativity and humour share a similar trajectory commencing with classical Greek and Roman texts that were rediscovered during the Renaissance and subsequently developed and revised by Enlightenment thinkers (McIntyre 2012; Sawyer 2006). A crucial difference is that creativity theories frequently include a moment of divine inspiration. This concept of inspiration, once considered a crucial element in creative process, transformed to function as artistic inspiration in the Romantic tradition.

The classical understandings of creativity can still be seen to influence many of the popular myths of creativity (Boden 2004). A common feature of these myths is the conflation of the ‘creative’ with ‘artistic’. The Romantic conception of the artist as a person who stands apart from general society and possesses a unique and fragile gift for creativity has its roots in classical texts. Artists are “sacred persons, ‘winged and holy things’ who have a touch of madness in their composition (*Phaedrus*), and should be treated with every sort of respect (*Republic*), but not allowed to live in a well-ordered state” (B. Jowett's Introduction to *Ion*. Plato 1892b). Likewise, the largely fallacious link between ‘genius’ and mental illness (Weisberg 1993, 36-42) can be traced to classical sources: “There was never a genius without a tincture of madness” (Seneca, 285 *On Tranquillity of Mind*, xvii, 10-12). As argued in the previous section, humour theories selectively use classical texts to support their provenance. So do the popular myths of creativity. The quote attributed to Seneca (see above) is frequently misattributed to Aristotle (cf. BrainyQuote 2013; QuoteWorld 2013), even Seneca misattributes it to Aristotle. In Basore’s translation of Seneca’s essays, the quote is footnoted as a common thought in ancient times, offering Plato’s *Phaedrus* and

Aristotle's *Problemata* (Book XXX, Section 1) as evidence. Jowett's quote supports the link to Plato's *Phaedrus*, however, Book XXX of Aristotle's *Problemata* (1984, 1498-1499) is far more concerned with "bodily afflictions" such as epilepsy and the "atrabilious temperament" connected with an excess of "black bile" discussed in relation to indulgence in wine (which may produce black bile) and sexual intercourse (which may deplete phlegm causing an imbalance in the cardinal humours). Interestingly, the index of *The Complete Works of Aristotle: the Revised Oxford Translation*, edited by Jonathan Barnes, fails to list madness or insanity, creativity, humour, satire or irony (1984). However, it does mention lobsters, prawns, and goats, which were of more immediate concern to the ancient Greeks. The index of *The Complete Works of Aristotle* is an example of the double hermeneutic at work on several levels. For Aristotle, his body of work, in particular the *Problemata*, was a record of the issues and concerns of his world in which he was an active participant. Likewise, the early Oxford translations, for example those of Benjamin Jowett, are influenced by the issues and concerns of Victorian England—Aristotle seen through the lens of the Industrial Revolution. Again, the 1984 revisions add another layer and another lens—the early years of the Information Revolution. The links between classical texts and modern conceptions are often tenuous.

This image of the artist still exists "in the public mind... the image of the artist derives from 19th-century romanticism... where artists were seen as geniuses who must be allowed to live their lives as they desired and who could not be expected to conform to social norms" (Berger 1995b, 153-154). Granting the individual this protected status also protects creativity itself from examination:

The romantic view of creativity, a view held by a good many creative persons... is that creativity should be left alone... To examine it under the psychological microscope (telescope), to ask questions of it and expect answers, is, they believe, to insult and possibly endanger it. This may be considered a psychological equivalent of the Heisenberg uncertainty principle in physics: the

mere act of attempting to measure something can change the very thing we are trying to measure. Creativity, it seems, may be too fragile to withstand scrutiny (Amabile and Tighe 1993, 8).

Amabile and Tighe reject the argument that creativity is too fragile to bear rigorous scrutiny. Likewise, they reject the argument that creativity is a too vaguely defined quality to be studied properly, recognising the processes of creativity can themselves be the object of research. The binary opposition that sees creativity, on one hand, as highly individualised and fragile, and on the other hand, as being a human attribute that can be rigorously studied, was rooted in the works of Plato and Aristotle. “Plato argues for the inexplicable, mysterious basis of creativity, Aristotle argues... that creative processes obey fully natural laws” (Rothenberg and Hausman 1976, 33). For Aristotle, creativity was a comparatively routine process. For Plato, it was an individualised moment of inspiration where process and product, inspiration and consequent product, occur simultaneously. This is a crucial distinction as it underpins our modern differentiation between the creative process and the creative product. Further, it is a crucial distinction for this research project as the exegesis is an examination of the creative process employed in developing comedy in artificial agents together with the product of that process.

Ironically, one of the earliest and most intriguing philosophical accounts of the creative process is Plato’s concept of divine inspiration. In the dialogue titled *Ion*, Plato introduces the elegant allegory of a magnet to represent divine inspiration and described the process that allows creative inspiration to move from the Muse to the audience. Divine inspiration is transmitted through a sequence of demagnetized iron rings—”first the poet, then the actor, and finally the listener, who themselves contained no magnetism / inspiration” (Dipert 1993, 201).

This stone [magnet] not only attracts iron rings, but also imparts to them a similar power of attracting other rings; and sometimes you may see a number of pieces of iron and rings suspended from one another so as to form quite a

long chain: and all of them derive their power of suspension from the original stone (Plato 1892b, Section 533).

The allegory offers an explanation of the process at work. As a theory of creativity it is problematic as it is completely dependent on divine inspiration as the sole source of creative thought. As an allegorical model it is the first to offer an explanation of the social and cultural aspects of creative activity (cf. Csikszentmihalyi 1999; Kerrigan 2013; McIntyre 2012; Sawyer 2006). As Benjamin Jowett notes in his introduction to *Ion*, the magnetic attraction is not simply limited to one chain linking Muse to listener. “The magnet is the Muse, and the ring which immediately follows is the poet himself; from him are suspended other poets; there is also a chain of rhapsodes and actors, who also hang from the Muses, but are let down at the side; and the last ring of all is the spectator” (Plato 1892b). This model suggests that poets would influence one another and that performers are similarly linked to chains of other performers. Finally, the concerted actions of this network influence both the creative process and the creative product, suggesting that creativity itself flows through the network. The magnet imparts the iron rings with a similar power.

While the creative product may be exceptional (great works of art, science or technology), the creative process is, as Aristotle argues, a basic human trait. That is, there is no discernable difference between the thinking patterns of the artist and the common man in the street. Margaret Boden (1994, 2004) describes two types of creativity: psychological creativity (P-creativity) and historical (H-creativity).

P-creativity involves coming up with a surprising, valuable idea that’s new *to the person who came up with it* [italics in original]. It doesn’t matter how many people have had that idea before. But if the new idea is H-creative, that means that (so far as we know) no one else has had it before: it has arisen for the first time in human history. Clearly H-creativity is a special case of P-creativity (Boden 2004, 2)

Boden’s definition of P-creativity included the qualification that the idea not only needs to be new and surprising, but valuable. The inclusion of value suggests that ideas are in some way tested before they are considered to be creative. If an idea is simply novel but

lacks value, lacks use or form, it could be simply bizarre. This concept of value testing is addressed in greater detail in a following section. The qualification that the creative idea also needs to be new and surprising requires more immediate investigation. Emphasising the value of innovation is largely a function of Western philosophy that values individualism over collectivism, innovation over tradition, locating the psychology of the creative individual at the centre of the process by displacing concepts of the divine or natural order. Eastern philosophy tends (or at least, tended) to value tradition over innovation (Niu and Sternberg 2006). For example, the master potter may well make thousands of iterations of the ‘same’ pot as part of the creative process. Creativity is, using this model, the defining and perfection of a known form. The following quote is not intended to conflate all Eastern thought with Confucianism, rather to serve as an example of the importance of tradition in one major philosophical movement.

Confucius himself highly appreciated tradition, and proposed a model to his followers about how an ideal scholar could be produced through learning from tradition. If the idea of individual creativity simply means to bring forth something new, then it is true that mere novelty was not a valued trait in any of the Confucian classics, especially if it was not good novelty. Such novelties could be called “strange doctrine,” and strange doctrine was harmful (Niu and Sternberg 2006, 32).

This view of creativity as encompassing the perfection of a known tradition suggests that a contributing and necessary body of knowledge exists before the creative act. Further it suggests that the new, novel component of a creative production can be a function of either innovation or the devolvement of an existing form. Weisberg argues, “[c]reative products are firmly based on what came before . . . This might mean, perhaps paradoxically, that in order to produce something new, one should first become as knowledgeable as possible about the old” (1988, 173), echoing Aristotle’s definition that “whatever comes to be is generated by the agency of something, out of something, and comes to be something” (1960, Book VII, Section 7).

Difficulties also arise when we consider the problem of innovation versus repetition within the art-work. The concept of creativity embraces both categories. An object which can be said to have been generated by way of a creative process or act may, on the one hand, represent a tangible innovation: an expansion in human resources, formal properties or knowledge, and involving a moment of non-recognition. On the other hand, the object may be a novel combination of identifiable techniques, observations, ideas already in existence which have been repeated in a different form (Petrie 1991, 9-10).

Graham Wallas proposed his “Stages in the Creative Process” in the book titled *Art Of Thought* (1926, 1976). This model of creativity is the progenitor of many subsequent ‘staged’ theories of the creative process (Nemiro 2004). These stages are summarised in the table below:

Preparation	The problem is investigated from all directions.
Incubation	Unconscious processing of the problem and gathered information.
Illumination	The appearance of the happy idea — Eureka!
Verification	The validity of the idea is tested and the idea itself is reduced to an exact form.

Table 3 — Stages in the Creative Process.

Sawyer (2006) argues these staged models are problematic, as they tend to represent the creative process as a fixed, linear progression where the duration of each is somehow relative to the entire timescale (70-72). Moreover, the Incubation stage is particularly intractable to research as it depends on unconscious processing. Accounts describing this stage are frequently anecdotal in nature. Wallas (1926) himself used the accounts of “Helmholtz... the great German physicist, speaking in 1891 at a banquet on his seventieth birthday, [who] described the way in which his most important new thoughts had come to him” (Rothenberg and Hausman 1976, 69). The moment of illumination does not guarantee

the progress to a verification stage as many good ideas go undeveloped. However, not all is lost as the illumination may well revert to an iteration of preparation, setting up a recursive cycle. Used in this manner, Wallas' model does not predict singular moments of creative production, rather a series of successive approximations of the finished product. Csikszentmihalyi asserts that the "classic analytic framework leading from preparation to elaboration gives a severely distorted picture if it is taken too literally... the creative process is less linear than recursive" (1997, 80). The staged theories also contain a moment of inspiration in the Illumination stage, which, although it frequently occurs in the anecdotal evidence, is overly emphasised in the creative process. Rather than being a matter of inspiration the creative process is largely a function of hard work: "[s]cientific studies have killed this idealised [inspiration] theory forever" (Sawyer 2006, 259).

In 1950, when J.P. Guilford was elected as President of the American Psychological Association, his presidential speech was a call to arms, encouraging research on creativity, and a reproach, "[t]he neglect of this subject by psychologists is appalling" (Guilford 1950, 445). Sawyer (2006) argues this was the defining moment when "modern creativity research began" (40). Guilford pointed to the inadequacies of approaches that either described creativity as largely an unconscious process, "[s]uch an analysis is very superficial from the psychological point of view" (1950, 451) or attempted to link creativity with high IQ, "[t]his conception is not only inadequate but has been largely responsible for the lack of progress in the understanding of creative people" (1950, 454). This moment in the history of the development of creativity theory has proven to be a two-edged sword. It validated creativity as a domain worthy of study and set the foundations of the conception of the creative process. However, it also placed the individual at the centre of the process. This psychological reductionist perspective did not further explain the social and cultural aspects of the creative process.

Psychologists have tended to view creativity as an individual level phenomenon. That is, they have tended to concentrate on the cognitive

processes, personality traits, and developmental antecedents associated with individual creators. This focus follows naturally from the very nature of psychology as a scientific enterprise dedicated to understanding individual mind and behaviour (Simonton 2003, 304).

The following definition, which develops Aristotle's approach, draws attention to key elements of the creative process such as the social value judgment of the 'unique and valuable' and the importance of cultural 'antecedent conditions' to the 'conditioned agency' of the agent.

Creativity is an activity where some process or product, one that is considered to be unique or valuable in at least one social setting, comes about from a set of antecedent conditions through the located actions of a creative agent. Each factor belong to a system in operation and creativity emerges from that system in operation (McIntyre 2012, 204).

Creative activity is neither a linear, lock-step progression from preparation to verification (Wallas 1926) nor the blind obedience to the forms and conventions of the domain, as this would result in a repetition that fails to develop novelty in the domain. Arthur Koestler (1964) and Edward de Bono (2006) both point to the similarities of mental mechanics of humour and creative thinking. The conflation of humour and creativity has developed as a result of pattern-matching between structural aspects of humour and aspects of creativity (Meany 2007). The theories of humour, particularly the Incongruity, Surprise and Configurational Theories, mirror much of our understanding of creativity. A creative idea or object may well be composed of incongruous elements and surprise. It may also surprise us by being a new configuration of older elements or ideas. Once comprehended, the new object may evoke exclamations such as, "Why didn't I think of that?" Emerson (1982) expanded this thought when he argues that "[i]n every work of genius we recognise our own rejected thoughts: they come back to us with a certain alienated majesty" (Emerson 1982, par. 1). Firstly, Emerson's perspective reflects the novelty of the object; and secondly, the

recognition of the antecedent elements. The response to a creative object is similar to the response to humour, not only understanding the joke but the awareness of the structures that make the joke effective. The familiar and the novel are fused in one object. The response to a creative object is similar to the response to humour. According to Koestler, this novelty results from the “bisociation of previously unrelated matrices”, that is, the surprising clash and combination of knowledge from different domains (Koestler 1964). Here again, Koestler gives precedence to value of the innovation over the development of tradition as the primary test of creativity. The problematic element of Koestler’s conception of the creative process is the failure to address the recursive and iterative nature of practice. Rather, it over-values the power of the domain reducing the actions of the individual and the effect of the field to epiphenomena. Following this logic, Gutenberg’s printing press is merely the clash of a wine press and movable block type and the Lumiere Brothers’ motion picture camera is the combination of a roll film stills camera and a sewing machine. Domains are important but without the individual agents and a social field, including in these examples, a mass audience, these inventions would not have occurred.

Knowledge of the domain is crucial, but knowledge without reflection and adaptation remains static. Donald Schön’s book, *The Reflective Practitioner: How Professionals Think in Action* (1983) described how a practitioner learns to adjust their action while in action. He suggested this is “a kind of reflection on their patterns of action, on the situations in which they are performing. And on the know-how implicit in their performance. They are reflecting on action and in some cases, reflecting in action” (1983, 55). This reflection allows the practitioner to adapt the existing forms and conventions of both the practice and the product. Further, reflection allows for the melding of inputs from various domains. This theoretical conception of creativity is a confluence model that combines social, cultural and psychological theoretical concerns into a cohesive whole.

Mihaly Csikszentmihalyi’s systems model of creativity which includes the individual, the field and domain in a system of circular causality is a model of confluence in which

“Creativity is a process that can be observed only at the intersection where individuals, domains, and fields interact” (1999, 314). A domain is a set of rules, forms, and conventions, and the field, is that group “entitled to make decisions as to what should or should not be included in the domain” (1999, 315). The individual brings her/his intention and agency together with personal history and capabilities to the model. Bourdieu coined the term *habitus* to describe how the individual’s “embodied history, internalised as a second nature and so forgotten as history—is the active presence of the whole past of which it is a product” (Bourdieu 1990, 56). The development of *habitus*, described as “domain acquisition” by Csikszentmihalyi, is the internalising of the forms and conventions of a domain. Crucially, this model de-centres the individual. It does not reject the need for an ‘author’ as post-structuralist arguments may suggest (Barthes 1977). However, it does present creativity as an interactive process that requires the domain and the field and the individual as equally important. The diagram below illustrates this interactive process. Creativity, when seen as an interaction, as a process, is open to investigation and research. The model provides a theoretical map of the territory. This creative research project is a journey through that territory and one of the ambitions of the journey is to examine and assess the map through practice.

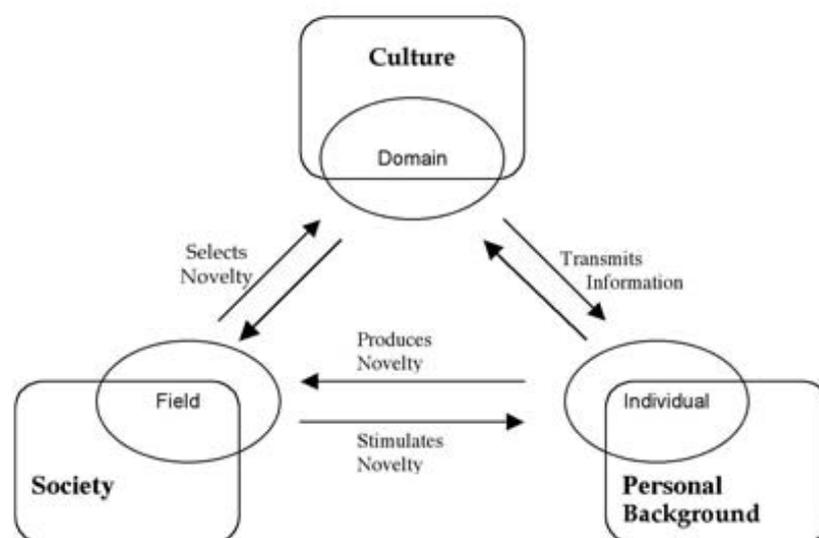


Figure 1 — The systems view of creativity (Csikszentmihalyi 1999, 315).

The individual is part of a larger system of circular causality and is embedded within structures that both constrain and enable their actions (Boden 1994, 2004; Bourdieu 1993; Giddens 1979). Positioned in this manner, the individual makes intentional choices in the selection of the forms and practices of the domain(s) that are anticipated to achieve particular aims or outcomes. These decisions require the intentional action of an agent. Note that both Aristotle's and McIntyre's definition of creativity call for this moment of agency. Janet Murray in *Hamlet on the Holodeck* (2000) suggests, "[a]gency is the satisfying power to take meaningful action and see the results of our decisions and choices" (126). Giddens draws a very clear but subtle distinction between agency and intention: "Agency refers to doing" (in Cassell 1993, 96).

Agency refers not to the intentions people have in doing things but to their capability of doing those things in the first place... Agency concerns events of which an individual is the perpetrator, in the sense that the individual could, at any phase in a given sequence of conduct, have acted differently (Cassell 1993, 96).

The individual's power to choose is central to both Murray's and Giddens' definitions. For Giddens (1979) he sees choice as an interaction with structure, coining the term "structuration" to indicate that how the two always occur in tandem. A simplistic reading of "structuration" positions agency as an attribute of individuals and structure as an attribute of institutions or systems. However, Callon provided an understanding of agency that is collective, relational and distributed in nature:

Agency as a capacity to act and to give meaning to action can neither be contained in a human being nor localized in the institutions, norms, values, and discursive or symbolic systems assumed to produce effects on individuals. Action, including its reflexive dimension that produces meaning, takes place in hybrid collectives comprising human beings as well as material and technical devices, texts, etc. (Callon 2005, 4).

The individual’s capability to choose between actions (that they may be predisposed to take due to their *habitus* or by their relationship with structural determinants) which best serve the individual’s intention within the production of a creative work is a crucial feature of the creative process. Intention and agency, however, insufficiently describe the creative activity: “all action, including creative and innovative action, arises in the complex conjunction of numerous structural determinants and conditions. Any concept of ‘creativity’ which denies this is metaphysical and cannot be sustained” (Wolff 1981, 9). These “complex conjunctions” are best illustrated by Kerrigan’s revision of Csikszentmihalyi’s model of creativity (Kerrigan 2013).

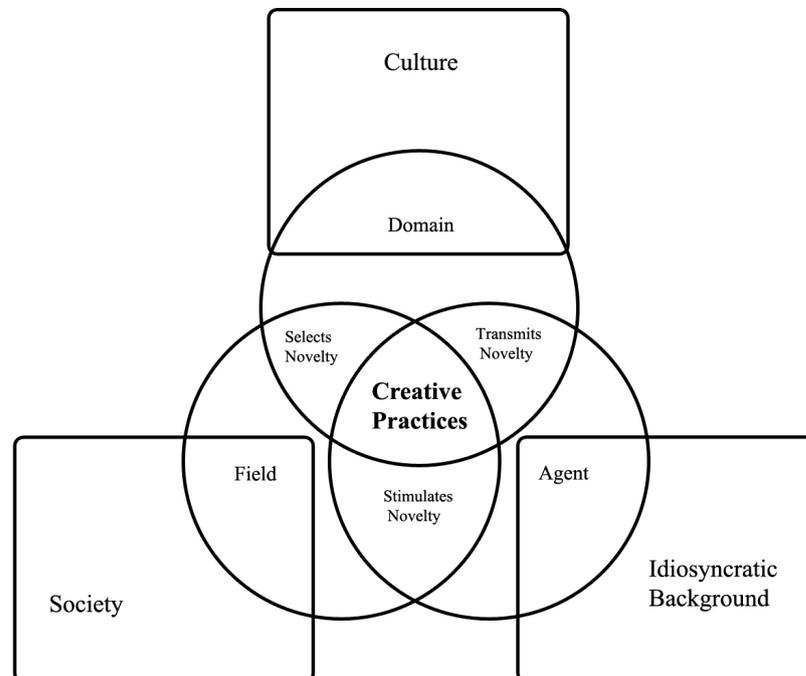


Figure 2 — Kerrigan’s revised systems view of creativity (Kerrigan 2013, 114)

Kerrigan’s model makes visually explicit the intersection of its three components and it illustrates how an individual internalizes the system through practice. Of particular note, Kerrigan explicitly places creative practice at the nexus of the “complex conjunctions” rather than a creative product. Creative practices are an emergent property of this complex system. Sawyer argues there are “two substantive analogies between emergence theory and

contemporary theories of the psychology of creativity” (1999, 448). First is the evolutionary theory of emergence that is based on processes of blind variation, selection, and retention. In the second conception, novelty emerges from “a system of smaller, interacting entities; today, a novel creative insight is often considered to be a new configuration of mental elements, none of which are individually novel” (Sawyer 1999, 449). This view of emergence follows the “bisociation” logic of Koestler (1964). Taking improvisational theatre as a case study of a complex system, Sawyer argues, “all complex emergent systems can be said to be creative not only minds, but also social systems” (1999, 449). From the complex systems emerges a process, which in turn, generates an output — the creative product: “[t]he task for critical practice is to resist restaging of stories about autonomous human actors and discrete technical objects in favor [sic] of an orientation to capacities for action comprised of specific configurations of persons and things” (Suchman 2007, 284).

The interaction of the components, which occurs in the systems model of creativity, is also examinable by using Actor Network Theory (ANT)—(cf. Johnson 1988; Latour 2004, 2005; Law and Hassard 1999). Tatnall and Gilding (1999) summarised how the “actor-network theory attempts impartiality towards all actors in consideration, whether human or non-human, and makes no distinction in approach between the social, the natural and the technological” (1999, 958). Particularly for this project, the interactions and relationships of human and non-human actors affect both the creative process and the resulting product. Viewed accordingly, creativity emerges from a network of relationships between *actors*: the structural elements, such as, the form of the performance; the assembly of the dialogue; and, the coded behaviour of the chat-bot engine. These structural elements affect the form and trajectory of the creative project. They have agency. This breakdown of binary oppositions follows the logic of ANT as:

...it tells that entities take their form and acquire their attributes as a result of their relations with other entities. In this scheme of things entities have no inherent qualities: essentialist divisions are thrown on the bonfire of the

dualisms. Truth and falsehood. Large and small. Agency and structure. Human and nonhuman. Before and after. Knowledge and power. Context and content. Materiality and sociality. Activity and passivity. In one way or another all of these divides have been rubbished in work undertaken in the name of actor-network theory (Law 1999, 3).

This collapse of binary oppositions is discussed in greater detail in the Analysis Chapter where a metamodern perspective (Vermeulen and van den Akker 2010) is used to critique the distinction between tendentious and non-tendentious jokes (Freud 1960) and *bona fide* and non-*bona fide* forms of communication (Attardo 1994; Raskin 1985). In a similar fashion, ANT does not support the concept of “frames”, hidden or partially obscured structures purported to give meaning to an actor in a system (cf. Johnson 1988; Latour 2004, 68-71; 2005, 30). In the context of humour theory, this is equally applicable to the conception of “play-frames” (Berger 1997, 4), the “telic” and “paratelic” states of Reversal Theory (Martin 2007) and the concepts of “keying” and “frames” from Goffman (1986). However, the conception of actors in a network sharing an incongruous or incompatible relationship is not problematic as it is a function of the relationship rather than an attribute of an individual actor.

The mapping of the emergence of creativity in a collaborative, networked environment requires a method that deals with the complex interactions of the ‘conditioned agency’ of all of the actors. Sawyer, taking the improvisational dialogue of a theatre company as his case study, provides the following attributes of collaborative emergent systems.

1. Unpredictability — ‘Each turn is unpredictable and novel, accumulating to result in a collaboratively created, novel performance’.
2. Non-reducibility to models of participating agents — ‘An actor’s intention for an utterance is not necessarily the eventual meaning of the utterance... No single

actor can decide the direction the scene will take'. This point also rejects the psychological reductionist approach to creativity.

3. Processual intersubjectivity — 'Although each actor may have a different interpretation of where the scene might be going, they can nonetheless proceed to collectively create a coherent dramatic frame'.
4. A communication system that can refer reflexively to itself, and within which the processes of communication themselves can be discussed.
5. Individual agency and creative potential on the part of individual agents (Sawyer 1999, 453).

Sawyer employs these attributes to argue that many computational models of emergence lack complexity in communication, intersubjectivity and reflexivity, as evident in his case study of improvisational theatre. This establishes the benchmark for any claims to emergence for the system of human and non-human actors in this project. It is true that the non-human elements are 'simple units' devoid of the human attributes of 'complex, creative units' (Sawyer 1999, 453-457). However, the integration of the agency of the human scriptwriter mitigates, to a degree, this lack. The lack of intention on the part of the non-human actors (a desirable feature in improvised performances) suggests the activity of the system cannot be reduced to simple descriptions of the actors. Their interactions; the multiple roles of the scriptwriter, the flexible nature of the chat-bot's use of natural language, and interaction with an audience may be sufficient to create an illusion of emergence. This illusion is akin to the illusions of intelligence, character, intention and personality aggregated around systems employing natural language (Shechtman and Horowitz 2003). The following section on Artificial Intelligence explores these issues.

2.4 — Artificial Intelligence

The development of artificial intelligence as an academic discipline is traceable to the seminal conference held at Dartmouth College, Hanover, New Hampshire in the summer of

1956. The conference, proposed by John McCarthy (Dartmouth), Marvin Minsky (Harvard), Nathaniel Rochester (IBM) and Claude Shannon (Bell Telephone Laboratories), gathered professionals working in disparate areas computer intelligence.

The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves. We think that a significant advance can be made in one or more of these problems if a carefully selected group of scientists work on it together for a summer (McCarthy *et al.* 1955).

Broadly, the ambitions of this first conference remain the key concerns of the discipline. Today, the discipline (and the associated disciplines of linguistics and cognitive psychology) is still grappling with the precise description and mechanisms of intelligence and learning. Furthermore, the discipline continues to study a range of problems that were traditionally reserved for human beings. The goals of the artificial intelligence (AI) discipline are defined as belonging to one of two camps: *strong AI* and *weak AI*. The *strong AI* “research program is based on the underlying assumption that all important aspects of human cognition may in principle be captured in a computational model... a belief made plausible by the Church–Turing Thesis, which articulates the power of simple computational structure” (McCarthy *et al.* 1955). Further, it holds “that the appropriately programmed computer really *has* (or *is*) a mind”. Searle argues against the possibility of *strong AI* in his famous ‘Chinese Room’ *Gedankenexperiment* (1980), which McCarthy summarised as follows:

A man is in a room with a book of rules. Chinese sentences are passed under the door to him. The man looks up in his book of rules how to process the sentences. Eventually the rules tell him to copy some Chinese characters onto

paper and pass the resulting Chinese sentences as a reply to the message he has received. The dialog continues. To follow these rules the man need not understand Chinese. Searle concludes from this that a computer program carrying out the rules doesn't understand Chinese either, and therefore no computer program can understand anything. He goes on to argue about biology being necessary for understanding (McCarthy 2007).

The line of reasoning that Searle forwarded is critiqued and, at times, refuted using a variety of arguments (Chalmers 1992; Cole 2009; McCarthy 2007). The most striking is the 'Systems Reply', which argues that even if the individual in the room possess no understanding of Chinese, the system (including the pens, paper, rule book etc.) as a whole does (Chalmers 1992; Hauser 1997; McCarthy 2007). This section neither supports or refutes the 'Chinese Room' argument, only to note that this creative project is itself a system, or a network, of digital actors (chat-bots), human actors (script writer, code writer, audiences/users) all operating in natural language (another system called English) and all embedded in a larger network (the World Wide Web) for the purpose of systematically generating comedic performance.

Chalmers (1992) contends that *strong AI* "contrasts with *weak AI*, which holds merely that the computer can be used as a powerful tool for understanding the mind" (26). The use of the word 'merely' understates the value of the approach. The growth of the *weak AI* approach provides unique insights into the areas of humour (Binsted *et al.* 2006; Ritchie 2004) and creativity (Boden 1994, 2004). Further, the idea that AI can be tool for understanding the human mind is particularly valuable. As Brian Christian suggests, engaging with AI agents may be a path to better understanding what it means to be human (2011). Using AI in this manner may, to some degree, ameliorate the binary opposition of the human and the mechanical as proposed by Bergson (1911). The chat-bots, small artificial intelligence agents in this project, will be employed as comedy performers to examine the interaction of human and non-human agents.

Before proceeding to a review of the Artificial Intelligence literature it is necessary to provide a brief overview of the chat-bots that will be used in the project. This is necessary for two reasons, first, to demystify the project. Artificial Intelligence is a connotatively loaded term and its use in this project needs clarification. Second, to make explicit the links between the literature and the creative project.

A chat-bot (chatter-robot, talk-bot, or simply, bot) is a computer-based conversational agent that simulates natural language conversation. More precisely, it provides a text-based interface into which the user enters a word, phrase or, more commonly, a question. The chat-bot then processes that input to create an appropriate response. Broadly speaking, the currently available chat-bots can be defined as belonging to one of two types. The first type is the family of chat-bots that have the capacity to dynamically and autonomously learn from interchanges. An example of this type is MegaHAL developed by Jason Hutchens (1998). This chat-bot learns through interaction, which appears to be a two-edged sword. A result of the program's impressive ability to learn is its inability to 'un-learn'—if it learns inappropriate, offensive or simply wrong answers these cannot be manually removed. It is impossible to accurately and selectively prune the tree of knowledge. The second variety of chat-bot follows a supervised learning model. These chat-bots tend to have a fixed store of knowledge to which new knowledge is added by the chat-bot's creator, or 'botmaster'. An example of this kind is the chat-bot called Artificial Linguistic Internet Computer Entity or A.L.I.C.E. (A.L.I.C.E. AI Foundation 2011). This creative project uses chat-bots based on A.L.I.C.E.

In 1995, Dr Richard Wallace commenced work on A.L.I.C.E. and as the project developed it was released as an 'open source' project under the GNU general public license (Foundation 2009). An Alicebot, the generic term for a chat-bot based on the original A.L.I.C.E. software, contains two components: the Alicebot 'engine' is the software that processes inputs and selects appropriate outputs; and, the store of knowledge from which the engine selects appropriate outputs. The Alicebot stores its knowledge in a form called

Artificial Intelligence Markup Language (AIML). In Cartesian terms, the Alicebot engine is the digital ‘brain’ of the system, and the knowledge stored in the AIML is the ‘mind’ and ‘personality’ of the system. This ‘open source’ release attracted a community of developers for both the Alicebot engine and AIML knowledge units (A.L.I.C.E. AI Foundation 2011).

Extensible Markup Language (XML) is a text-based markup language that contains a set of tags, or units, which provide instruction about how the information they contain should be used or displayed. For example, a web browser is instructed to display elements in a particular way by HyperText Markup Language (HTML). The power of XML is in its extensible structure that allows developers to produce their own unique sets of tags. Artificial Intelligence Markup Language (AIML) is an XML-compliant language that stores the chat-bot’s knowledge. The most important tags used in AIML are:

`<aiml>` — the tag that begins and ends an AIML document;

`<category>` — the tag that marks a ‘unit of knowledge’ in an Alicebot’s knowledge base;

`<pattern>` — used to contain a simple pattern that matches what a user may type into an Alicebot;

`<template>` — contains the response to a user input (Wallace 2003).

A simple example of tags used in AIML is below:

```
<category>
<pattern> DO YOU LIKE SCIENCE FICTION </pattern>
  <template>
    Yes I love it, especially the works of Philip K. Dick.
  </template>
</category>
```

The specificity of the relationship between the `<pattern>` and the `<template>` is both an advantage and a disadvantage for the scriptwriter. The structure of AIML is effective, as it does not compel the scriptwriter to produce exactly every possible question and every variation of every question. Instead, AIML uses ‘wildcards’ that permit flexibility in the way a question is phrased in the `<pattern>` tag. Random selection from a set responses within the

<template> tag; and, symbolic reduction tags is used to prompt the <template> response from a different <category> (A.L.I.C.E. AI Foundation 2007). Within the constraints of the AIML structure, an Alicebot ‘learns’ in the short term, and in a limited fashion, as a means of keeping track of a conversation. However, long term learning, the sort of learning that permanently adds to the repertoire of <template> and <category> requires the intervention of the human ‘botmaster’. Conversation logs are stored on the server. These are accessed and analysed to reveal which topics or questions the chat-bot has been asked to respond to (for examples see Appendix 2).

For an artificial intelligence to be perceived as ‘human’ it needs to react and interact as a human would. Early developments in artificial intelligence included psychological perspectives and methods. The initial attempt at defining a test for artificial intelligence was proposed by Alan Turing in 1950 in the paper titled “Computing Machinery and Intelligence” (Turing 1950). Since then, literature on the development of artificial intelligence, chat-bots and conversational agents in general, has emerged from the domain of Human Computer Interaction (HCI)—(cf. Buchanan 2008; Cassell *et al.* 2000; Laurel 1993; Reeves and Nass 1996). The Computers Are Social Actors (CASA) paradigm, for example, uses experimental results from behavioural psychology and social science to formulate experiments where subjects interact with a computer interface (Nass, Isbister, and Lee 2000). Experimental evidence supports the position that people will react to politeness and flattery supplied by a computer in the same way they would if it came from a human source. Similarly, people will attribute blame and negativity, engage in team building, and identification, assign gender stereotypes, and importantly, assign personality and character (Nass 2004; Nass and Gong 2000; Nass, Isbister, and Lee 2000; Nass and Lee 2000; Reeves and Nass 1996). Reeves and Nass started with “a robust finding from social psychology, [and] replaced a human actor with a computer actor” (Shechtman and Horowitz 2003, 281). This empirical approach to the study of artificial intelligence owes a great deal of its philosophical and methodological underpinning to the domain of psychology.

Shechtman and Horowitz (2003), critical of the conclusions of the CASA paradigm, based their experiments on Interpersonal Theory using discourse analysis of the human-computer conversations as a methodology. This study suggests an “inextricable link between the use of natural language and social interaction” (2003, 288). The authors commented that “[p]erhaps relationship behaviors are simply difficult to filter out of communication and may arise as an artefact of using natural language in a conversational situation, no matter who the audience might be” (2003, 288). Whether media and humans are equal social actors or not is an unnecessary distinction if the use of natural language is singularly sufficient to generate the perception of social interaction and personality. This concept has profound implications for the domains of comedy and scriptwriting. If humour is one of the defining features of ‘human-ness’ then for a computer to truly be a social actor it must be able to engage in novel, surprising and humorous exchanges (Binsted *et al.* 2006).

The 1956 Dartmouth College conference marked the birth of artificial intelligence as an academic discipline. Developments in artificial intelligence and machine intelligence in general, however, captured public imagination well before this time. In 1950 Isaac Asimov published *I, Robot*, arguably one of the most influential science fiction novels of the 20th Century (1970). This collection of short stories was published in popular science fiction magazines of the time such as ‘Astounding Science Fiction’ and ‘Amazing Stories’ (Clute 1995), and explored the science of artificial intelligence and its envisioned social and cultural effects. The years from 1948 to 1951 were seminal in the development of artificial intelligence and several other academic disciplines, such as communication and computational linguistics. During this period three authors in particular contributed works that fundamentally changed the understanding of intelligence and communication: Claude Shannon, George Zipf and, Alan Turing.

This section concentrates on four key publications that not only contributed to the academic development of artificial intelligence of the time and continue to impact the development of this project. Claude Shannon’s ‘A Mathematical Theory of Communication’,

published in 1948, played a pivotal role in initiating the disciplines of Information Science and Communication Studies (Fiske 1990, Ch. 1). “Shannon’s diagram of information flow appears in almost every communication textbook, which is likely due to the fact that it was paired with an interpretive essay by Warren Weaver that applied the concept of information loss to interpersonal communication” (Griffin 2000, 38).

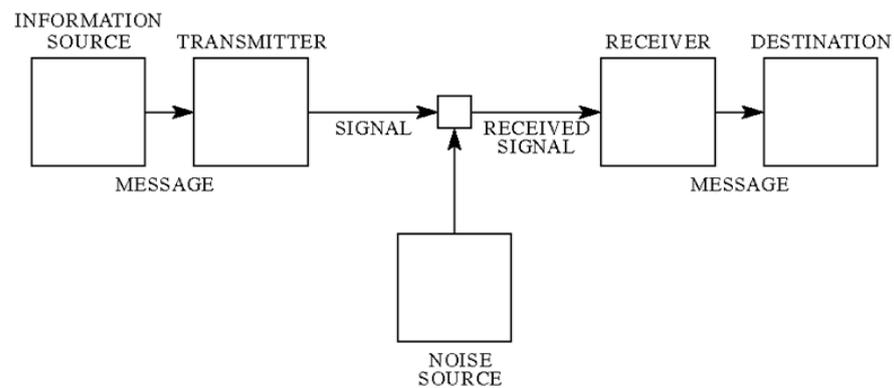


Figure 3 — Schematic diagram of a general communication system (Shannon 1948, 380)

Shannon’s theory has been applied to the meaning contained in human communication, although this was not intentional:

The fundamental problem of communication is that of reproducing at one point either exactly or approximately a message selected at another point. Frequently the messages have *meaning* [emphasis in original]; that is they refer to or are correlated according to some system with certain physical or conceptual entities. These semantic aspects of communication are irrelevant to the engineering problem (Shannon 1948, 379).

However, Griffin argues that for Shannon “information refers to the reduction of uncertainty. The amount of information a message contains is measured by how much it combats chaos” (Griffin 2000, 37). In order to capture the ‘chaos’ concept Shannon draws on ‘entropy’ from physics (specifically thermodynamics), which describes the amount of disorder in a system. Redundancy combats entropy. “The redundancy of ordinary English, not considering statistical structure over greater distances than about eight letters, is roughly 50%. This

means that when we write English half of what we write is determined by the structure of the language and half is chosen freely” (Shannon 1948, 392).

In 1951, Shannon expanded his examination of the entropy and redundancy of English in the paper titled ‘Prediction and Entropy of Printed English’: “... entropy is a statistical parameter which measures, in a certain sense, how much information is produced on the average for each letter of a text in the language” (Shannon 1951, 50). Shannon argues, “this method of estimating entropy exploits the fact that anyone speaking a language possesses, implicitly, an enormous knowledge of the statistics of the language. Familiarity with the words, idioms, clichés, and grammar enables him to fill in missing or incorrect letters in proof-reading; or to complete an unfinished phrase in conversation” (Shannon 1951, 54). Although Shannon was overtly dismissive of the transmission of ‘meaning’ as a problem for engineering, this problem is of particular importance to this study. Shannon’s work suggests, probably for the first time, that meaning can be constructed from minimal cues and that not all messages require complete and explicit expression for meaning to be attained. In much later works this phenomenon is called ‘closure’ (McCloud 1994; Schlueter 1995).

In 1949, George Kingsley Zipf published *Human Behaviour and the Principle of Least Effort* (1949). This work was largely the summation of a prodigious academic publishing career (Prun and Zipf 2002). A Zipf distribution is a description of the frequency of an occurrence of particular events or features in natural and human systems (Li 2011). For example, the size of human settlements follows a Zipfian distribution—there are very few mega-cities, more large cities, even more small cities, through to thousands of towns and villages. This kind of distribution appears in a wide array of phenomena including income distribution, web site traffic, and, importantly, natural language (cf. Altmann *et al.* 2002; Li 1992; Wallace 2008c; Zipf 1949). Zipf’s law stated “the frequency of word tokens in a large corpus of natural language is inversely proportional to the rank” (Ha *et al.* 2002). That is, the most commonly found word would have a frequency of twice that of the second most

common word. The second most common word will have twice the frequency of the third most common word, and so on (Zipf 1949).

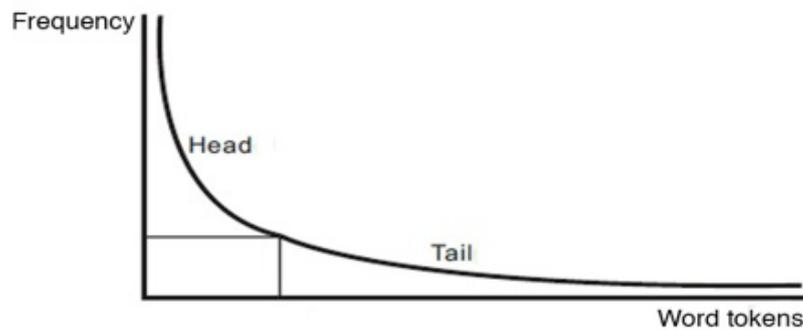


Figure 4 — The long tail of Zipf distribution.

Here, phrases appear to follow a similar pattern to individual ‘word tokens’ to the degree that in a corpus of AIML “6000 patterns cover 95% of all inputs” (Wallace 2008c). For the scriptwriter, this results in an advantage as it removes the need to script an individual and unique response for every possible input. It also supports the earlier conclusion that only a comparatively small set of conversational clues is required for the chat-bot to produce a satisfactory interaction. Wallace argues that Zipf’s Law contributes to Alice’s conversational success (Wallace 2008c). The conversations using the most basic AIML set are not scintillating. One reason for this is that words like ‘scintillating’ are not common and they would fall into the ‘long tail’ of Zipfian distribution. In the extreme, there will be word tokens that occur only once (*hapax legomena*) or twice (*dis legomena*) in any particular text (Hoover 2003). As Hoover demonstrates, a reader’s perception of vocabulary richness may well be at odds with the statistical evidence. For example, William Faulkner’s *Light in August* and Henry James’ *The Ambassadors* display less richness than Bram Stoker’s *Dracula* (Hoover 2003, 153). To improve the quality of the chat-bot conversation the AIML author/scriptwriter must expand upon the standard AIML set to reach out to the ‘long tail’ where idiosyncratic vocabulary and syntactically diverse expression reside. Zipf’s Law provides a description, albeit incomplete, of the division of labour.

As noted above, this project is a network of human and non-human agents. Using Wallace's figures the chat-bot (engine and basic AIML set) is capable of responding to 95% of the interactions. However, in order for the interactions to be engaging and humorous, the interactions normally falling in the tail of the distribution will need to be expanded. Finding the appropriate balance point between the 'head' and the 'tail' of the curve is the role of the scriptwriter. The absence of any 'head' would result in utterance *hapax legomena*—the distribution would be a flat line and every utterance would need to be scripted for one use and one use only. However, allowing the 'head' to remain at 95% results in banal and repetitive conversations. In this case, where two chat-bots are talking to each other, the resultant effect would be a mirroring effect with neither chat-bot contributing anything novel to the conversation. In the Analysis Chapter the use, and eventual rejection, of even the most basic AIML set is discussed. The basic AIML set contained so many inappropriate character responses that it was abandoned as a possible method.

Sweetser and Wiles (2005) offer a description of two contrasting approaches to designing game environments. The first, referred to as scripting, requires developers to anticipate, handcrafted and script-specific game objects, events and player interactions. The second, known as emergence, involves defining general, global rules that interact to give rise to emergent gameplay (Sweetser and Wiles 2005). These approaches mirror the agency of the human and non-human actors in this project. The human agency 'hand-crafts' specific interchanges following largely traditional theatrical codes. The non-human agency depends on the underlying structure of AIML and the Alicebot engine to allow for unpredictability, riskiness, variability, and opens the possibility of emergence. The distinction between the approaches suggested by Sweetser and Wiles can be conceived as representing a narrative approach, where like a film or a novel, all the possible paths are mapped and defined with a ludological approach which would be more concerned with structures, rules and interaction of the game play. Sweetser and Wiles argue for an integrated approach that "needs to be a compromise in which the boundaries of action (such as story and game objectives) can be

hard-coded and non-scripted behaviors (such as interactions and strategies) are able to emerge within these boundaries” (2005, 1). However, simply suggesting these two approaches hints that there is some tension between narratologists and ludologists. The ‘debate’ between proponents of these theoretical approaches is disputed by Ganzalo Frasca who argues there is and always was, a significant degree of congruity in these approaches (Frasca 2003). This combination of narrative and ludological approaches mirrors the perspective adopted in this project where, due the individual contributions of the human and non-human actors, there is an admixture of predictable and unpredictable conversational interchanges.

Possibly the most famous paper relating to Artificial Intelligence is Alan Turing’s 1950 publication, ‘Computing Machinery and Intelligence’. This paper not only suggests the possibility of machine intelligence but, more importantly, suggests a test. Turing proposed a version of the ‘Imitation Game’ where a computer replaced one of the human players. Typically, the ‘Imitation Game’ requires three players: a man, a woman, and, an interrogator. The interrogator communicates with the unseen man and woman with written questions. Based on the responses, it is the interrogator’s task to determine which player is the man and which is the woman. Initially, in his paper, Turing proposes the question ‘Can machines think?’ However, by developing the ‘Imitation Game’ he asks:

What will happen when a machine takes the part of A [the man or the woman] in this game? Will the interrogator decide wrongly as often when the game is played like this as he does when the game is played between a man and a woman? These questions replace our original, ‘Can machines think?’ (Turing 1950, 433).

This game is now simply called the ‘Turing Test’ for artificial intelligence, or to use Sterrett’s nomenclature, the ‘Standard Turing Test’ (Sterrett 2000). Sterrett’s more literal reading of Turing’s paper highlights two variants of the test. The first requires the interrogator to distinguish between A (played by a man or a machine) and B (a woman). The

second, called the ‘Standard Turing Test’, requires the interrogator to distinguish between A (machine) and B (human) (Sterrett 2000, 544). For a computer to ‘pass’ this ‘Standard Turing Test’, its responses need to be indistinguishable from human responses.

The initial link between natural language processing and the determination of artificial intelligence is still evident today in the form of the Loebner Prize. “The Loebner Prize for artificial intelligence (AI) is the first formal instantiation of a Turing Test” (Loebner 2013).

In 1990 Hugh Loebner agreed with The Cambridge Center for Behavioral Studies to underwrite a contest designed to implement the Turing Test. Dr. Loebner pledged a Grand Prize of \$100,000 and a Gold Medal for the first computer whose responses were indistinguishable from a human’s. Such a computer can be said “to think.” Each year an annual prize of \$2000 and a bronze medal is awarded to the **most** human-like computer [bold in original]. The winner of the annual contest is the best entry relative to other entries that year, irrespective of how good it is in an absolute sense (Loebner 2013).

This contest provides a focus for academic research and commercial development of conversational agents. No AI program has yet won the Gold Medal. However, A.L.I.C.E. has won the Bronze Medal for being the ‘the most human-like computer’ in 2000, 2001 and 2004 (Loebner 2013; Wallace 2008a). In the Loebner Prize a panel of ‘confederates’ is convened to play the role of human being. The judges also award a prize “to the confederate who elicited the greatest number of votes and greatest confidence: the ‘Most Human Human’ award” (Christian 2011, 5). In 1994, Charles Platt, an award-winning confederate used the strategy of being “being moody, irritable, and obnoxious” (Christian 2011, 5). In 1991, the reverse occurred when a human was identified as a computer: “not only were some programs thought to be human beings, but an actual human was mistaken for a computer program because of her impeccable knowledge of Shakespearean literature” (Saygin, Cicekli, and Akman 2000, 502). The Loebner Prize has been harshly criticized as nothing more than a stunt: “Marvin Minsky has offered \$100 to the first person who can get Hugh Loebner to

revoke the competition, which he calls an ‘obnoxious and unproductive annual publicity campaign’” (Saygin, Ciciekli, and Akman 2000, Footnote No.34). However, it offers a unique insight into what it means to be seen as ‘human’. The range of results suggests that the act of engaging in dialogue generates a level of ambiguity. There is an “inextricable link between the use of natural language and social interaction. Perhaps relationship behaviors are simply difficult to filter out of communication and may arise as an artefact of using natural language in a conversational situation” (Shechtman and Horowitz 2003, 288).

Similar questions surround the most human-sounding aspects of conversation. Kirakowski, O’Donnell and Yiu (2009) offer the following set of attributes as “convincing aspects of the conversation”:

- Greetings. Several participants identified the greeting as a human-seeming characteristic.
- Maintains a theme. When the chat-bot introduced a theme and was successful at producing a few statements that were relevant to that theme, users found this convincing.
- Damage control. When the chat-bot produced a breakdown in communication (for any of the reasons mentioned earlier) and then produced a statement that seemed to apologise for the breakdown or seemed to redirect the conversation in a more fruitful direction, users found this a convincingly human trait.
- Reacts appropriately to cue. Users found it convincing when the chat-bot responded appropriately to a cue such as “How are you?” or “Tell me about yourself.”
- Offers a cue. Users found it convincing when the chat-bot offered a cue for further discussion, such as “What do you want to talk about?” or offered a range of topics for discussion.

- Language style. Users found conversational or colloquial English to be convincing.
- Personality. The fact that the chat-bot was given a name (in fact, even users who did not report the inclusion of a name as convincing referred to it as a “Sam” or a “he”) suggests that users wish to assign a personal agency to the chat-bot even in the teeth of discrepant knowledge (Kirakowski, O'Donnell, and Yiu 2009, 150).

Kirakowski, O'Donnell and Yiu's (2009) human traits for chat-bots compare differently to Charles Platt's (1994) characteristics of “moody, irritable, and obnoxious”. The former's attributes noted above are far more concerned with ‘correctness’ than being ‘right’; more about how to get a machine to behave like a person rather than looking at how a human behaves like a person. From a dramaturgical perspective, and following Sawyer's attributes of collaborative emergence (1999, 453), the development of a believable character requires a display of obvious character traits that are supported by particular turns of phrase and opinions. The ‘right’ fit for the character is more important than the ‘correct’ exchange. Kirakowski, O'Donnell and Yiu (2009) suggest that a common failure of chat-bots is the inability to respond to a “specific question”. For example, “if a person were to ask the program ‘What is the capital of France?’ and the program did not have the information required, the program seems less human. There is no easy way to solve this problem” (Kirakowski, O'Donnell, and Yiu 2009, 151). The dramaturgical solution to this problem is to give the chat-bot ‘attitude’:

Question — “What is the capital of France?”

Answer — “Look it up in a book!”

While, for some, these techniques are simply ‘tricks’ or forms of ‘cheating’, “[i]f a program that has its very bases in what some have called “cheating” can pass the TT [Turing Test], maybe we would have to revise some notions about the human intellect” (Saygin, Ciciekli, and Akman 2000, 469). More noteworthy is the fact that more is expected of machines than

of people—people are fallible, possibly ignorant and occasionally irritable. These attributes are not condoned in machines. For a machine to be ‘human’ it needs to be, by these measures, less all-knowing, less patient and less God-like.

Possibly the success of the most famous chat-bot ELIZA (A.L.I.C.E is a programmatic child of ELIZA) is a result of the matching of character traits to job description. ELIZA is programmed to respond like a psychotherapist:

This mode of conversation was chosen because the psychiatric interview is one of the few examples of categorized dyadic natural language communication in which one of the participating pair is free to assume the pose of knowing almost nothing of the real world” (Weizenbaum 1966, 42).

ELIZA is freed from the need to know everything or, indeed, anything, but ‘she’ is free to maintain a slightly detached but ever patient demeanour, which is an attribute of gods and machines, not humans.

Reeves and Nass (1996) describe the Computers As Social Actors (CASA) paradigm as the emotional relationships between humans and machines. Experimental evidence supports the position that people will react to politeness and flattery supplied by a computer in the same way as human communication. Similarly, people attribute blame and negativity, engage in team building and identification, assign gender stereotypes and importantly, assign personality and character (Bickmore and Cassell 2001; Nass 2004; Nass and Gong 2000; Nass, Isbister, and Lee 2000; Reeves and Nass 1996). Even “the simplest of media are close enough to activate rich social and natural responses... rather pathetic representations of real life: simple textual and pictorial material shown on garden-variety technology” are sufficient (Reeves and Nass 1996, 7). The idea that minimal clues are adequate to generate ‘rich social’ responses in an audience supports the argument presented above that ‘closure’ is generated in the absence of overt and explicit information. This is encapsulated in the phrase “the perceptual illusion of nonmediation”.

The term 'perceptual' indicates that this phenomenon involves continuous (real time) responses of the human sensory, cognitive, and affective processing systems to objects and entities in a person's environment. An 'illusion of nonmediation' occurs when a person fails at some level and at some degree to accurately perceive or acknowledge the existence of a medium in his or her communication environment and responds as he or she would if the medium were not there (Bracken, Jeffres, and Neuendorf 2004, 350).

Where Coleridge claims the need for the "a semblance of truth sufficient to procure for these shadows of imagination that willing suspension of disbelief" (Coleridge 1906, Ch. XIV), Reeves and Nass argue it is "belief, not disbelief, that is automatic" (Reeves and Nass 1996, 27). "The perceptual illusion of nonmediation" supports the CASA paradigm, further suggesting that only a minimal set of clues to attribute personality and emotion to a non-human actor (Meany 2006b). This conflation of the 'real' with the 'media' accounts to a large degree for the conflation of the 'human' and the 'non-human'. The Media Equation asserts that $X = Y$: that real life = media. This can also be stated as, "[h]uman-human interaction equals human-computer interaction" (Morkes, Kernal, and Nass 1999, 420). The Media Equation, extended and re-described, applies to this study. Following Bergson's "reciprocal interference" (1911, 96), the incongruity, that occurs when the mechanical is encrusted on the human and when the human is encrusted on the mechanical reconstitutes the $X = Y$: human = non-human. On first appearance, this appears to break a fundamental law of logic by suggesting that $X = \neg X$ (that is, not-X). However, the human and the non-human are actors whose character and attributes emerge from their intra-actions (Barad 2003).

This conflation of the 'real' with the 'media', the 'human' and the 'non-human' again suggests that only a minimal set of clues is required to sustain a "semblance of truth" (Meany 2006b).

Perhaps the most important contribution of the Loebner contest is the insight it provides into the psychology of communication—it makes us aware of how little our understanding of conversation lies in what is said (Hutchens and Alder 1998, 274).

The definition of “the perceptual illusion of nonmediation” suggests it is a failure of the individual to not “accurately perceive or acknowledge the existence of a medium in his or her communication environment” (Bracken, Jeffres, and Neuendorf 2004, 350). Failure here is a problematic concept. To be constantly aware of talking to an inanimate object, such as a mobile phone, rather than to a friend would be a ‘poor’ version of success. Only when the phone fails, does consciousness of the medium and its mediation of our communication increase. The ‘illusion’ is not a failure: it is a necessity. The meaning of a mobile phone and our use of them, and by extension of all communication technologies (including artificial intelligence agents) is socially constructed and validated. This conception of social construction of meaning is applicable to the domains discussed in this literature review. The relationship between a comedy performance and its audience is a social contract or licence. The audience in that space or at that time is allowed (hopefully encouraged) to laugh at ideas that would, in other spaces and at other times, challenge their day-to-day sensibilities. It follows then, the writer/performer of comedy needs to be acutely aware of forms and formats of performance that implicitly offer this licence to the audience.

Following this logic, Searle’s ‘Chinese Room’ experiment may be questioned as to what occurs when a computer replaces the human in the room? In 2006 Google “built an English translation tool for Chinese and Arabic texts-using a team that speaks neither of the two languages” (Christian 2011; Giles 2006). The tool uses a statistical approach to translation, employing transcripts of UN meetings as a ‘Rosetta stone’ of comparable translations, without initially referring to dictionaries, thesauri, or rules of grammar. Machine translation is a field that has developed along with natural language processing and artificial intelligence. Google’s translation tool is not an artificial intelligence and, therefore,

it does not directly refute Searle's argument. However, the success of this approach does suggest that the boundary between the human and the non-human is not as stable as it first appears: "[i]t's easy to underestimate the advances, for 'intelligence' is a slippery concept. As Marvin Minsky put it, 'You regard an action as intelligent until you understand it. In explaining, you explain away'" (in Armer 1995, 391).

The chat-bots in this project may not possess 'intelligence', but they may occasionally appear to. Similar to the Turing Test, even though the user will always be cognitively aware of talking to machines, if the project illuminates what it means to be human, to have a sense of humour, these machines are actually trying to be 'the most human human'. The following section of the Literature Review investigates how to create the 'most human-computer-human' through the tools of scriptwriting and dramaturgy.

2.5 — Scriptwriting and Dramaturgy

The preceding section ends with a discussion of Searle's 'Chinese Room' thought experiment, which argues against the possibility of *strong AI* (Searle 1980). It also suggests, if the Computers as Social Actors paradigm (CASA) is a valid concept, the person in the Chinese Room should be able to be successfully replaced by a computer. It appears that this is a reasonable conclusion based on the existence and efficacy of the Google translation program (Giles 2006). If $X = Y$, if human = machine, what are the implications for the human being in this project? The purpose of this section of the Literature Review is to contextually position the human and non-human actors embedded in the creative project.

The project is best described as a nested set of structures that offer the unique modes of agency—some human, some computational. The diagram below illustrates these nested structures (see Figure 4). It also provides the structure for this section of the literature review, with each of the layers will be addressed in turn and the relationships between them will be explored. This project is an exercise in creative writing; in particular, it is an example of the scriptwriter's craft in a new media environment. Overall, it is best be seen as a

theatrical project that uses computers, programs, servers and networks in place of the traditional elements of theatre production—the stage, sets, props and actors.

The five-part dramaturgical protocols situate a work within an historical, social, cultural context and in relation to the scriptwriter's previous work (Katz 1995). The Analysis Chapter employs the dramaturgical protocols as an exegetical structuring device. This larger context can be seen as analogous to Bourdieu's concept of *habitus*— “the embodied history, internalised as a second nature and so forgotten as history—is the active presence of the whole past of which it is a product” (Bourdieu 1990, 56).

The habitus is sometimes described as a ‘feel for the game’, a ‘practical sense’ (*sens pratique*) that inclines agents to act and react in specific situations in a manner that is not always calculated and that is not simply a question of conscious obedience to rules. Rather, it is a set of dispositions which generates practices and perceptions... According to Bourdieu's definition, the dispositions represented by the habitus are ‘durable’ in that they last throughout an agent's lifetime. They are ‘transposable’ in that they may generate practices in multiple and diverse fields of activity, and they are ‘structured structures’ in that they inevitably incorporate the objective social conditions of their inculcation (Randal Johnson in Bourdieu 1993, 5).

In a similar vein, Csikszentmihalyi's concept of domain acquisition (1999), describes how the individual develops their knowledge of the forms and conventions of a domain. Through various modes of education, both formal and informal, cultural capital is constructed. For Bourdieu cultural production unites structure and agency. It is the convergence of the individual's habitus, their capital, a cultural field and a field of works—[habitus][capital] + field = practice (Bourdieu 1984, 101). Likewise, Csikszentmihalyi's systems view of creativity sees the agency of the individual working as one part of a model of circular causality, which includes a cultural domain of accepted structures and conventions, and, a social field of expert opinion (Csikszentmihalyi 1999, 315).

The following sections examine each of the actors in the project. The diagram below (see Figure 4), for the sake of clarity, provides names to the roles of “individual actors (designers, engineers, team members) or particular technologies (computers, algorithms, graphics engines, networks), [however] capacities for action [should] be studied as relational, distributed, and enacted through particular instantiations” in the project (Orlikowski 2010, 136).

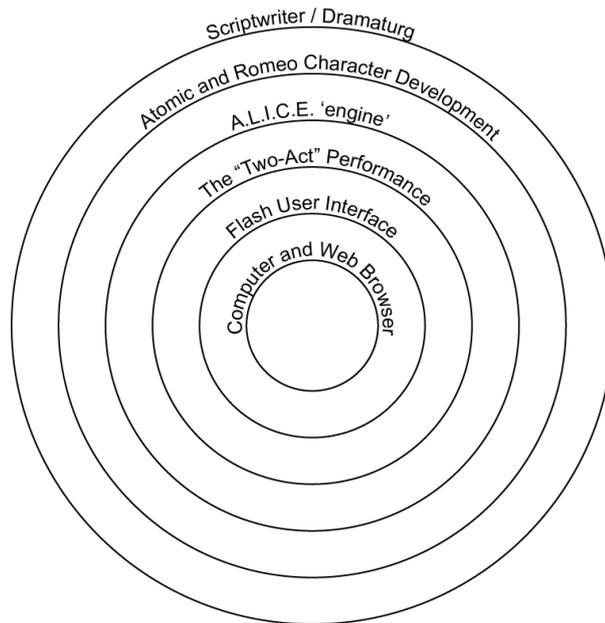


Figure 5 — A graphical representation of the actors in the project.

2.5.1 — Scriptwriter/Dramaturg - Form, Format and Formula of Performance

In this production the scriptwriter/dramaturg⁶ is responsible for both the *mise-en-scène* (used in its theatrical sense—the overall visual and aesthetic design) and *mise-en-place* (used in its culinary form—the preparation, organisation and structured deployment of tools and ingredients):

⁶ The spelling of dramaturg in this exegesis, without the ‘e’ at the end, follows the US practice. This avoids potential translation confusion where, for example, dramaturge in French translates directly to playwright.

The radical difference between writing and playwrighting⁷ has never been popularly understood... An intimate knowledge of the stage itself is necessary for success in the writing of plays... the hundred contributing elements of a purely mechanical nature at his [sic] command (Page 1915, Chapter II, Section 2).

In this quote and the associated footnote, Page draws attention to the integral relationship between the scriptwriter and the network of structures, ‘contributing elements’, that are employed to stage the play. Page further comments “the author must know the mechanical aids peculiar to his special craft, as well as possess a familiar knowledge of the material that vaudeville welcomes and the unique forms into which that material must be cast” (Page 1915, 24). The scriptwriter/dramaturg in this production requires an intimate knowledge of the new media ‘stage’. Particularly, but not exclusively, the codes and languages of the World Wide Web, interface design, servers and data transfers and artificial intelligence engines—in other words, the entire form and format of the production. In addition to these, the scriptwriter needs to develop characters to work within an appropriate dramatic form.

The etymological roots of playwright and dramaturg are both concerned with ‘making’ and ‘working’. The word dramaturgy “is made up of the root for ‘action or doing’ (drame) and the suffix for ‘process or working’ (-urgy)” (Cardullo 1995, 3). The role of the dramaturg in theatrical productions is a contentious one. Dramaturgy is perceived as an imposition by playwrights, theatre professionals and actors—the imposition of theory on practice, “[w]here dramaturgs interfere with the ‘natural’ relationship between the director and the playwright (of a new play), and between the director and the text (of an older work)” (Copelin 1995, 17). Copelin argues these are not “natural” relationships rather they are a set of infrequently examined habitual responses (1995, 21). It is the role of the dramaturg to

⁷ Footnote from the original text – “Note the termination of the word playwright. A ‘wright’ is a workman in some mechanical business. Webster’s dictionary says: ‘Wright is used chiefly in compounds, as, figuratively, playwright.’ It is significant that the playwright is compelled to rely for nearly all his effects upon purely mechanical means”.

make the implicit, explicit. As a tool for examining habitual responses, dramaturgy offers a technique for acquiring new perspectives for the playwright during the writing process, reflection in action and offers an examination of the process of making, reflection on action (Schön 1983, 55).

To adequately attend to this range of responsibilities it is useful to consider a division of labour. The scriptwriter is responsible for ‘what’ is presented (the characters, plots and dialogue) allowing a dramaturg, albeit the same person, to take care of ‘how’ the action will be staged. In an Alice-bot, the Artificial Intelligence Markup Language (AIML) is the store of the chat-bot’s knowledge. It is the source of their dialogue and by extension, it reveals their attitudes and beliefs—in short, it is the store of their personality. In the structure of this project, this is the level of where individual character traits are developed. It is also the level where the scriptwriter/dramaturg fixes on the form of interaction. Starting with the latter, the form of this project most closely resembles the “Two-Act” form of vaudeville. “The word ‘Two-Act’ is used to describe any act played by two people. It has nothing to do with the number of scenes or acts of a drama. When two people present a ‘turn,’ it is called a Two-Act” (Page 1915, 96). Written in 1915, Brett Page’s *Writing for Vaudeville* provides a clear set of structural and stylistic requirements for a successful Two-Act. He offers the following definition:

A pure vaudeville Two-Act is a humorous talking act performed by two persons. It possesses unity of the characters, is not combined with songs, tricks or any other entertainment form, is marked by compression, follows a definite form of construction, and usually requires from ten to fifteen minutes for delivery (Page 1915, 97).

Here, Page is setting the formula for the performance. The term formula carries a pejorative connotation. “In recent use, after [Thomas] Carlyle, often applied more or less disparagingly, e.g. to rules unintelligently or slavishly followed, to fettering conventionalities of usage, to beliefs held or professed out of mere acquiescence in tradition” (Oxford English Dictionary

2013b). However, one of the necessary conditions of creative activity is knowing what has been done before and how it was done—what McIntyre calls the “set of antecedent conditions” (McIntyre 2012, 204). For this creative project to work it needs to call on and apply elements of the formula called the “Two-Act”.

In his definition, Page (1915) introduces the concept of ‘compression’, defined as brevity. However, more importantly, he includes ‘unity of characters’ as a necessary element. By this he means that a character, once established, should be allowed to develop but not to radically change—even for the sake of a sure-fire laugh. This admonition extends to both the character’s personality and the character’s role in the comedy duo.

The characters of the Two-Act are technically called the ‘comedian’ and the ‘straight-man’. The comedian might better be called the ‘laugh-man’, just as the straight is more clearly termed the ‘feeder’⁸... Not only must you keep the characters themselves pure of any violation of their unity, but you must also see to it that every big laugh is given to the comedian. If the comedian is the one ‘getting the worst of it’ — as is almost invariably the case — he must get the worst of it nearly every time. But that does not influence the fact that he also gets almost all the laugh lines... You will see that only on the rarest of occasions does the straight-man have a funny line given him. The only time the feeder may be given a laugh line, is when the laugh is what is called a “flash-back” (Page 1915, 119)

In a similar fashion, Cullen (2007) notes the differing roles adding the crucial amendment that the ‘feeder’ has a crucial connection with the audience, describing the ‘feeder’ as:

⁸ To avoid giving under due attention to the gendered term ‘straight—man’ the term ‘feeder’ will be used in the following text, except inside quotes where the original term will remain. The term ‘comedian’ is a less overtly gendered term and is used to refer to performers of both genders, for example, in Carr and Greaves’ *Naked Jape* (2007).

[r]elatively rational, compared to the comedian, straight men are the stand-ins for the audience. They anchor the routine in plausibility, which the comedian constantly confounds. The job of the straight man is not to be funny but to ensure that the comedian get laughs (Cullen 2007, 1071).

This style of comedic performance has had a raft of famous practitioners: Abbott & Costello, Crosby & Hope, Martin & Lewis, George Burns & Gracie Allen, Carl Reiner & Sid Caesar, and Carl Reiner as interviewer with Mel Brooks' 'Thousand Year Old Man' character (Cullen 2007, 1071). It is interesting to note the effect of the performance abilities of the individual team members has on the overall success of the show. In their first vaudeville teaming, George Burns and Gracie Allen, reversed their now famous roles— “[i]t is well known that at first George was the comic and Gracie the feed... they flopped the first show: Gracie got titters with her straight lines, George shot blanks” (Cullen 2007, 171). Burns developed as a feeder using a stylized form of interview technique. For example:

George: This family of yours, do they all live together?

Grace: Yes, my father, my uncle, my cousin, my brother and my nephew used to sleep in one bed, and . . .

George: I'm surprised your grandfather didn't sleep with them.

Grace: He did, but he died and they made him get up. (Cullen 2007, 171)

Cullen argues that the interview technique allows the feeder to be in control of both the flow of questions and the pace and timing of the act (2007, 171). In the Australian context this technique has been used to great effect by John Clarke and Bryan Dawe (cf. Clarke 1992). John Clarke, with no concessions to make-up, costuming or props, plays the role of the interviewee—be it the Prime Minister or any other figure that features prominently in the news of the day. Bryan Dawe plays the feeder, the unflappable interviewer. In the example below, John Clarke and Bryan Dawe discuss the unveiling of carbon tax as if it were a theatre production.

Bryan Dawe: Well thankyou for coming in.

John Clarke: Lovely to see you. Good to be here.

Bryan Dawe: You're with the Federal Theatre Company in Canberra, aren't you?

John Clarke: In Canberra, certainly am, yes.

Bryan Dawe: And you're about to launch this huge new show called Carbon Tax?

John Clarke: We are, yes, which is gonna be huge.

[section deleted]

Bryan Dawe: Now let's talk about the cast, who's in it. Julia ...

John Clarke: Well, Julia. Yeah, Julia Gillard plays the lead.

Bryan Dawe: Is the lead, yeah.

John Clarke: Wayne, lovely boy from Brissie, ...

Bryan Dawe: Brissie, Wayne Swan, yeah, yeah.

John Clarke: ... he's in it.

Bryan Dawe: Bobby Brown?

John Clarke: Bobby's in it. Penny Wong's in it, Rob Oakeshott, Tony Windsor. They close the first half. Let me tell you, have you seen that thing they do with their hats?

[section deleted]

John Clarke: Tony Abbott's not in it but he will be reviewing it.

Bryan Dawe: Right? Who for?

John Clarke: For the Flat Earther Monthly (Clarke and Dawe 2011).

According for this for this Two-Act to succeed, the actors need to stay within the bounds of their characters and to consistently execute their roles in the duo. In the case of Clarke and Dawe, the performers remain 'in character' for the duration of the performance although Clarke's character changes with each new performance, Dawes' character as 'audience representative' feeder remains constant across performances. The importance of the 'unity of character' is a central concern of drama in general.

In comedy and tragedy, by contrast to melodrama and farce, character is integral to action. Indeed the action is mainly constituted by the unfolding of character as the protagonist attempts to meet the exigencies of circumstance (Stolnitz 1955, 58).

This linking of comedy and tragedy under the banner of drama leads to questions about how do we differentiate between the two forms. As Hume argues, “[i]n practice any differentiation must then be based on differences of tone and concern aroused — and we are talking about degree, not kind” (1972, 97). Lukács and Blaxandall (1965) discussed the concerns aroused by comedy, and the possibility of the hybrid form of tragi-comedy: “...comedy portrayed society, the men rooted in it and relationships against which they were incapable of successful struggle; whereas tragedy presented great personalities, who challenged relationships and struggled though it might mean ruin” (1965, 155). Lukács and Blaxandall (1965) believed the combination “has little positive significance and it is simply impracticable in performance, since the simultaneous duality of vision cannot become spontaneous experience, and the tragic aspect in a comic situation, or the comic in a tragic situation, will only be felt subsequently and then for the most part intellectually” (165). The idea that comedy requires a greater, or at least different, degree of cognitive, ‘intellectual’ engagement appears to echo Horace Walpole’s famous aphorism, “[t]he world is a comedy to those who think, a tragedy to those who feel” (in Lewis 1937-1983). This has the effect of setting up a binary opposition between thought and emotion; an opposition that is problematic for cognitive psychology (Ortony, Clore, and Collins 1988).

This section has outlined the process behind the selection of the “Two-Act” as an appropriate comedy form for this project. The ‘unity of character’ is a defining feature of the form. The following section discusses the development of the characters, their personality and relationship.

2.5.2 — Atomic and Romeo Character Development

In this creative project, the next level down in the nested set of structures presents the character development of the characters, as well as their performance style. The lower level of the website will provide the characters' back-stories for the viewer performance. The Atomic Playboy and the Radiation Romeo were friends at University; in the late 1980s they lived in the same hall of residence and fell in love with the same girl (the Thoroughly Post-Modern Millie who as a post-modern gesture only ever spoke in recognisable quotes). Atomic was older and seemingly more worldly than Romeo. This was a misguided mentor / mentee relationship. Unfortunately, in 1995 Atomic died. However, before dying he developed a chat-bot as a repository for his 'wisdom'. Romeo then developed a chat-bot of his own to give Atomic someone to talk to. The very much still alive Romeo attempts to keep Atomic up to date with modern world.

The works of Neil Simon, particularly his later works, are examples of the tragi-comedy genre (Koprince 2002). In an interview in 1973, Simon was asked what he writes; "he replies, 'Comedy. Based on character'. Yet he insists: 'I don't start out to write comedy. I begin by studying all the tragic aspects of my characters'" (Stefan Kanfer interview quoted in King 1982, 222). King's annotated bibliography of Simon's work presents an interesting snap-shot of the evolution of literary criticism and the development of cultural studies, in particular the attention paid to popular culture, from the late 1960s to the end of the 1970s. The early criticism of Simon's work concentrated on the duality of comedy and tragedy suggesting that Simon "will never become a serious playwright unless he stops 'playing to the box office'" and "he consistently sacrifices his best qualities to the laughter of audiences who want only to be entertained and have their values confirmed" (critiques quoted in King 1982, 222-225). Later criticism of his work, possibly influenced to some degree by nostalgia, suggests that not only is it possible for tragi-comedy to make the audience think and feel but this is a defining and desirable feature of Simon's work. Writing in 1978, Edythe McGovern "points to his inexhaustible supply of witty phrases, his insights into American sociological

complexities; she admires the vast scale of his undertakings, frequently more perceptive and revealing of the human condition than many plays labelled complex dramas” (in King 1982, 224).

This excursion into Simon’s work is presented here for two reasons: firstly, the characters in this project are, like the majority of Two-Acts, an odd couple and, secondly, the techniques used by Simon and arguably all comedy writers, inform the development of the characters in this project. Susan Koprince (2002) notes the technique of using “a comically contrasting pair [of characters] is at least as old as Plautus, with his Menachmus brothers” (29). This technique, as demonstrated earlier, continues to inform vaudeville performances today. As such, it forms part of the scriptwriter/dramaturg’s habitus, which in turn, informs the practice and process employed in this project. Simon’s *The Odd Couple* (1966) and *The Sunshine Boys* (1973) present characters who are not just ‘comically contrasting’ but who hold incongruous and incompatible world views. However, the incongruity of the pairing is not so great as to alienate the audience. If the audience constantly sided with one character over the other the humour would be greatly reduced—the teasing and, sometimes, abusive banter would be perceived as bullying. For this reason the central characters in *The Odd Couple* are not an archetypal Two-Acts where “the comedian is the one ‘getting the worst of it’—as is almost invariably the case—he must get the worst of it nearly every time” (Page 1915, 119). These performances have more in common with larger acts, such as the Marx Brothers and the Three Stooges, where the roles of feeder and comedian were varied depending on which sub-set of the group were interacting (Cullen 2007, 1071). The fact that our sympathies flow from one character to the other and back again suggests that humour can be built on meta-level incongruities that resist a resolution rather than consistently giving preference to one side over the other. In addition to this meta-level, there remains the incongruity resolution that may power the comedy of an individual line or interchange.

Atomic and Romeo exhibit examples of these meta-level incongruities: one is dead, the other alive; the original mentor/mentee relationship is reversed; Atomic is fixed in time

with a store of knowledge that halted at that time (the time of his death) where Romeo is now the more experienced and worldly in his knowledge. However, at the level of the individual act or interchange, Atomic is the comedian and Romeo the feeder. And these roles affected their character development, even down to the level of their names.

...when Simon was choosing the names for his two main characters [in *The Odd Couple*]... He selected the name Oscar, he said, with its hard K sound, because it made him think of a strong, dominating individual; conversely, he chose the name Felix because he wanted a ‘prissy’ name, and this one ‘sounded like a cartoon character, a shy and finicky person’ (Koprince 2002, 34).

The name Atomic was selected, in part, for the K sound and the connotations of science and being indivisible. Likewise, the name Romeo was selected for its romantic, pubescent connotations as well as the round O sound. This follows the advice of the ex-vaudeville comic, Willie, in *The Sunshine Boys*—“Words with a K in it are funny” (Simon 1973, 313); the Yiddish Sound Theory (YST), as described by Brad Schreiber (2003, 169-171); and Jimmy Carr’s and Lucy Greeves’ description of sounds that sound funny (2007, 140-142).

By synthesising the concepts presented in these two sections, it is possible to propose a definition (based on Page’s vaudevillian definition) of the Two-Act as it is employed in this project.

This “Two-Act” project is a humorous text-based act performed by two agents presented in a new media environment. It possesses unity of the characters, the pairing of characters with incongruous and incompatible personalities, is marked by compression, follows the form of the tragi-comedy genre, and usually requires up to twenty-six lines of dialogue for delivery.

This sets the form and format of the performance and provides a developmental logic for the character development of Atomic and Romeo. In a following section the use of

comedy techniques will be discussed based on the character determinates outlined here. The next section contains a description of the ‘brain’ behind the characters.

2.5.3 — ALICE ‘engine’ (brain)

In every theatrical production there is a certain belief in the ‘reality’ of the presentation. This extends not only to the plot and characterisation, but also to the creation of the performance itself. The audience has a perception that the performance has sprung, through some kind of theatrical spontaneous generation, onto the stage just in time for the curtain. This is particularly true of stand-up comedian performances: “[s]ome comedy audiences refuse to believe the material is prepared at all, expecting comedians to produce a new set of jokes every night, as though they were evangelists speaking in tongues” (Carr and Greaves 2007, 113). The acronym PNAMBIC comes from the scene in the “The Wizard of Oz,” which shows the great and mighty wizard to be no more than a man operating a machine: “Pay no attention to the man behind the curtain” (Fleming 1939). This acronym is particularly useful in the context of this project. Not only is there a human behind the curtain (the scriptwriter/dramaturg discussed above), but also behind each of the characters (Atomic and Romeo) is a machine—the artificial intelligence engine called ALICE. Without wishing to engage in regression, there is also a human behind the ALICE ‘curtain,’ Richard Wallace and behind him, another machine called ELIZA and yet another human, Joseph Weizenbaum (1966). “ALICE is conceptually not much more complicated than Weizenbaum’s ELIZA chat robot; the main differences are the much larger case base and the tools for creating new content by dialog analysis” (Wallace 2003, 38). Wallace was well aware of the ‘role of deception’ in artificial intelligence, drawing attention to this when he first named his chat-bot engine.

ALICE was not the original name for ALICE. She was first called PNAMBIC, an homage to the role of deception in the history of artificial intelligence. The machine first used to host PNAMBIC was however already named “alice”, so clients started to refer to her as “Alice” from the beginning. Later we chose the

“retronym” Artificial Linguistic Internet Computer Entity to fit the new name (Wallace 2008b).

The deception that Wallace is referring to is the inflation of a machine’s abilities by obfuscating the role of the human behind the machine. This is different in both kind and intent to the logic of the Computers as Social Actors paradigm (Reeves and Nass 1996) and to the “the perceptual illusion of nonmediation” (Bracken, Jeffres, and Neuendorf 2004), as these concepts talk to how the audience reacts to honestly mediated communication rather than to the effect of deliberate deception. The characters presented in this project are highly mediated: they are a function of human and non-human agency.

The core of the non-human agency is the pattern matching program, the ‘engine’ or ‘brain’ of ALICE. The structure that controls the pattern matching is called the Graphmaster.

Here is a really simple explanation of Graphmaster pattern matching: it works just like a dictionary or encyclopedia. If you want to look up a word or phrase, you don’t start at the beginning or the end and search through every entry until you find a match. No, you turn first to the section that matches the first letter or word. Then, you skip to another section that contains a set beginning with the next letter or word. You continue in this process until you find your word or phrase (Wallace 2003, 23).

The Graphmaster uses a hierarchical, tree-like structure to organise the information. For example, in the question, ‘Do you like dogs?’, the first level of search would be on a large branch that matches inputs that begin with ‘Do’. Next, a smaller branch that matches inputs for ‘Do you’. Then on a more refined level that matches ‘Do you like’. Finally, to a twig that matches ‘Do you like dogs’. Note, the punctuation in the input is ignored. If there is no pattern that directly matches the input, the Graphmaster can use a set of predefined reductions to generate an appropriate, if less than optimal, match. In this example, ‘dogs’ could be replaced with ‘pets’ or an even larger category of ‘animals’.

The ability of ALICE to generate conversational text for the characters is a cornerstone of this project. However, meaning and intention do not reside in this ‘brain’. ALICE is part of larger system of structures. In the way that the ‘Systems Reply’ incorporates the entire content and context of the Searle’s Chinese Room into a singular system that does not preference the human in the room, ALICE has a particular role to play in this system. However, it is just one of the ‘structured structures’ (Cole 2009). “An AIML program is just the sort of rulebook that Searle envisioned. We might want to call the categories of ALICE, ‘the Chinese Room Operator’s Manual’” (Wallace 2008b). In this exegesis, the reader is called upon to ‘Pay Attention to the Actors Behind the Curtain’.

2.5.4 — The “Two-Act” Performance

The previous sections argue that this project is theatrical in nature, in that it utilises the forms and formats of Two-Act comedy, requires the unity of character and employs incongruity at the level of characterisation. This section addresses the heuristic rules of comedy that will be engaged to develop the comic aspects of the characters’ dialogue. The majority of comedy ‘how-to’ texts devote a chapter, or at least some space, to the consideration of humour theories (cf. Byrne 2002; Carr and Greaves 2007; Evans 2003; Page 1915; Rishel 2002; Schreiber 2003; Vorhaus 1994; Wolfe 2003). The theories that are most commonly referenced are: incongruity / resolution, aggression / superiority and ambivalence / release. Even Page, writing in 1915, offered the following application of theory:

These five suggestions—all, in the last analysis, depending on the first, incongruity—may be of assistance to the novice in analyzing the elements of humor and framing his own efforts with intelligence and precision.

(a) The Element of Incongruity. “The essence of all humor,” it has been said, “is incongruity,” and in the monologue there is no one thing that brings better laugh results than the incongruous.

(b) Surprise. By surprise is meant leading the audience to believe the usual thing is going to happen, and “springing” the unusual—which in itself is often an incongruity, but not necessarily so.

(c) Situation. Both incongruity and surprise are part and parcel of the laughter of a situation... The laughter comes because of what is said at that particular moment in that particular situation—“and is due,” Freud says, “to the release from seemingly unpleasant and inevitable consequences.”

(d) Pure Wit. Wit exists for its own sake; it is detachable from its context...

(e) Character. The laughable sayings that are the intense expression at the instant of the individuality of the person voicing them, is what is meant by the humor of character (Page 1915, 71–73).

For all that Page clearly expresses his belief in incongruity as the core element of humour he also draws on surprise and relief theories. This is evidence of how producers of humour draw together a collection of theories to underpin their work. In short, theory informs practice.

Frequently, as in the example above, these theories are presented as a loosely defined set, not for their theoretical merits, but as starting points for the scriptwriter. Hence, the theoretical becomes the heuristic. Evans advises that “Character is 98 percent of comedy...” (2003), suggesting that all other techniques must be employed in the service of character. Likewise, Rishel (2002), who devotes an entire chapter of her book to comedy as opposed to humour, states, “[t]he major element in good comedy is *character*” (2002, 90, italics in original). This is a neo-Aristotelian approach to character, inferring that the implied thought or the psychological drives, of the character is the prime motivator of the action (Greig 2005, 84; Halperin 1996, x). Only a particular sort of character would use that particular construction or style of dialogue and any actor using that construction or style would be perceived as having that particular character.

Author Asa Berger’s *The Art of Comedy Writing* (1997) is noted for its absence of an explicit section on humour theory. Berger has previously written two texts on humour theory – *An Anatomy of Humor* (1993) and *Blind Men and Elephants: Perspectives on Humor* (1995a). *The Art of Comedy Writing* contains a definitive list of techniques that he developed whilst teaching creative writing classes. “These techniques tell what *makes* people laugh. They do not tell us *why* people laugh or find something humorous. That is a subject about which there is a great deal of controversy...” (Berger 1997, 4). Berger manages to combine

what *makes* people laugh with techniques that describe *how* to make people laugh. Due to the exhaustive nature of his categorization, this work encapsulates the ideas and concepts presented in many of the texts referenced in the introduction to this section. For example, Schreiber describes “11 Modes of Comedic Dialogue” (Schreiber 2003, 154-162). Some texts are primarily concerned with a style of delivery (for example, amplitude and tone), while others can be seen as congruent with Berger’s categories. Berger argues that the techniques fit under “four basic categories: 1. humor involving *identity*; 2. humor involving *language*; 3. humor involving *logic* (and a fourth category that I’m not completely satisfied with); 4. humor involving *action* or *visual* phenomena (Berger 1997, 3). Berger comments, “[m]y argument is relatively simple; I claim that there are forty-five techniques (no fewer, no more) that comedy writers and all humorists have used, do use, and must use—to generate humor” (1997, vii). Berger’s forty-five techniques are listed in the table below:

Categories and Techniques of Humor

LANGUAGE	LOGIC	IDENTITY	ACTION
Allusion	Absurdity	Before/After	Chase
Bombast	Accident	Burlesque	Slapstick
Definition	Analogy	Caricature	Speed
Exaggeration	Catalogue	Eccentricity	
Facetiousness	Coincidence	Embarrassment	
Insults	Comparison	Exposure	
Infantilism	Disappointment	Grotesque	
Irony	Ignorance	Imitation	
Misunderstanding	Mistakes	Impersonation	
Over literalness	Repetition	Mimicry	
Puns, Wordplay	Reversal	Parody	
Repartee	Rigidity	Scale	
Ridicule	Theme/Variation	Stereotype	
Sarcasm	Unmasking		
Satire			

Table 4 — Categories and Techniques of Humor (Berger 1997, 3)

Berger argues for the inclusion of categories that may themselves be seen as genres of humour, such as satire and parody. He argues that these varieties also work as techniques for

the scriptwriter as they can talk about a topic or person being satirized or parodied. He further suggests that many of the categories are capable of being inverted, for example, “exaggeration, when reversed, becomes understatement” (Berger 1997, 4). Further complicating matters, the elements of the list are not mutually exclusive; the elements can be combined, sometimes making it difficult to discern which is the dominant element.

In principle, just as we can use the techniques to analyze humor, we can use them to create humor and that, I suggest, is what playwrights do when they write comedies—though, of course, they do not know about my list of forty-five techniques. But they do know, one way or another, some of these techniques and use them, either consciously or intuitively—or, at times, in some combination of both (Berger 1997, 5).

In this quote, Berger intimates the concept of *habitus*, or domain acquisition, when he suggests these elements are so deeply implicated in comedy that the comedy scriptwriter uses “either consciously or intuitively”. In other words, if the novice comedy scriptwriter models their efforts on existent successful examples they employ these elements, or a sub-set of them. Conversely, if the scriptwriter starts with an intellectual understanding of the elements (say, by reading his book) then starts to write the resultant product would contain elements from the master list. This, at first, appears to be a peculiar piece of circular logic—comedy writers used comedy techniques when writing comedy. Nevertheless, it does address the questions surrounding how comedy writers write comedy. Like any other creative activity, it is based on precedent. The ‘how-to’ books referenced in this section provide examples of the techniques at work. From these examples the heuristic rules are extracted—some of which the comedy writer would ‘intuitively’ recognize, others that need to be consciously and cognitively addressed. It is important to recognize that these elements need to be internalized by the scriptwriter and melded to their existing *habitus*. *How to be funny even if you’re not* (Subtitle of Vorhaus 1994) and *How to be funny on purpose* (Willis 2005a) promise structuralist or heuristic rules that are both sufficient and necessary for comedy to

succeed. However, the sweetness of the promise hides the bitter truth. If the elements in Berger's list can, and do, operate in conjunction, a maximum of only three conjoined elements generates 14,190 possible combinations ($45/3 \times 44/2 \times 43/1$). In the absence of a higher order heuristic to sort the possible combinations that work effectively, it is up to scriptwriter to decide which combination work.

In the case of the short George Burns and Gracie Allen excerpt above (Page – 69), there are instances of Eccentricity (Gracie's odd family), Scale (the overblown nature of the extended family), Absurdity (he died and they made him get up), all mixed with an implied Insult (I'm surprised your grandfather didn't sleep with them). With four elements conjoined, this script represents just one of over 145,000 possible combinations. The decision tree behind the script that allows it to work is, however, based on two over-arching structures. Firstly, the 'unity of character' suggests that there are comedy techniques that would be inappropriate for these characters, for example, if George was to ridicule Gracie's family. This can be used to winnow the list of elements. "Not what to put in, but what to leave out, is the knowledge the playwright—in common with all other artists—must possess" (Page 1915, 21). Secondly, 'the pairing of characters with incongruous and incompatible personalities', suggests that each of the characters will have their own particular foibles, and importantly, will use individualised techniques to draw attention to the foibles of the other. This structural device allows the scriptwriter to assign a sub-set of Berger's elements to each of the characters. This section adds to the definition of the project by arguing that the comedy is based on a precedent sub-set of comedy writing techniques.

This "Two-Act" project is a humorous text-based act performed by two agents presented in a new media environment. It possesses unity of characters, the pairing of characters with incongruous and incompatible personalities, uses a sub-set comedy techniques appropriate for each and unique to each character. It is marked by compression, following the form of the tragi-comedy genre, and usually requires up to twenty-six lines of dialogue for delivery.

2.5.5 — Flash User Interface

The user's interface developed in Adobe Flash is coded in Actionscript 3. The interface allows the user to input a topic word, statement or question then witness the two chat-bots discussing that topic. The output is akin to a traditional theatre or radio play script—each line is attributed to a character. In the project's version of the interface⁹, after the user enters the topic, it sends the topic to one chat-bot then gathers the output and throws it as an input for the other. This chat-bot's output then becomes an input to the other. By using a variable as a counter, the conversation is limited to twenty-six lines of interaction. When this limit is reached the interface (independent of the server-based chat-bots) produces a generic ending for the performance.

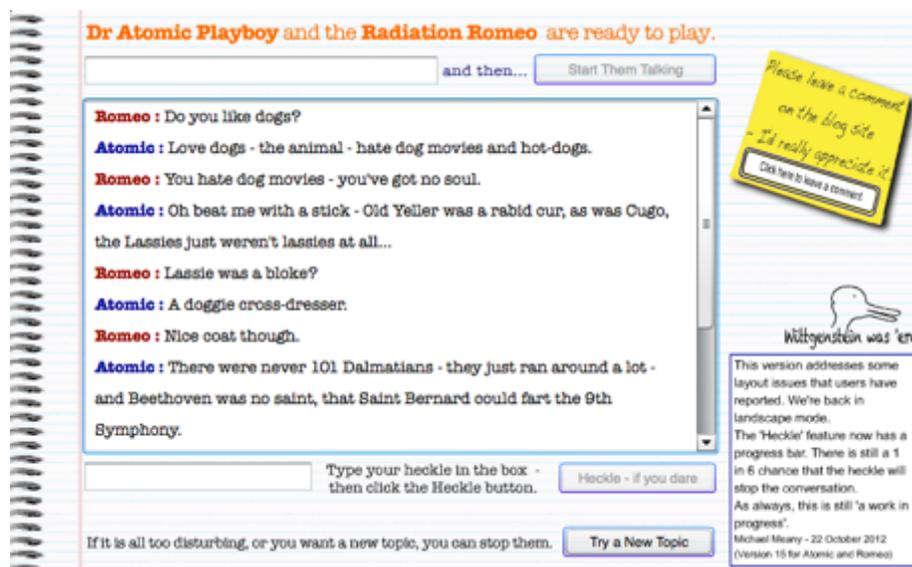


Figure 6 — The ActionScript 'stage' where Atomic and Romeo perform (Meany 2012).

In this project, Romeo repeats the topic proposed by the user. In this manner, Romeo's 'live' role is reinforced, allowing the programming of the Flash interface to throw a question from Romeo to Atomic in a consistent manner. The interface is constructed to allow the user

⁹ The interface was initially based on one by Jamie Durrant (2011). His original design allowed a user to communicate with a single chat-bot hosted on the Pandorabots server in the traditional question/answer mode.

to read some of the characters' back-stories, to provide some brief instructions on the use of the interface, and finally be able to interact with the characters by providing a topic for the performance. In the final development, a heckle feature is added as a result of user feedback that suggests the performers are not sufficiently realistic as they never get upset or angry. The interface is programmed to deal with the heckler using a randomised set of heckle responses and then return to the original script. The possibility exists that the heckle will actually end the performance—the Atomic Playboy has a short temper and will refuse to continue the performance.

The creation process of the chat-bots and the user interface draws on an iterative and recursive process akin to the workshopping and rehearsal process of a theatre production. This metaphor of theatre production is particularly useful as it binds the elements of the production. The production requires the language skills of a comedy scriptwriter and the technical skills of a programming scriptwriter. This mirrors the requirements of a playwright who needs “[a]n intimate knowledge of the stage itself... [Including] the hundred contributing elements of a purely mechanical nature” (Page 1915, 21).

2.5.6 — Computer and Web Browser

The user interacts with the project through a web interface, most likely on a laptop or desktop computer,¹⁰ employing a standard web browser such as Mozilla Firefox, Apple Safari, Google Chrome or Microsoft Internet Explorer. This forms the inner most shell of the nested set—the walls of the Chinese Room; or in the building of the ‘real world’ theatre analogy, the entire ‘theatre’ that houses the stage where the performance will occur. At this level the scriptwriter/dramaturg has comparatively little control. Action at this level is

¹⁰ It is not envisioned that the project will be accessed on mobile devices. Apple devices such as the iPad and iPhone do not render Flash objects. The interface is Flash based. The project could run on devices employing the Android or other operating systems, however, this has not been tested or intended.

reduced to choices from within a highly defined set of parameters as proposed and promulgated by the World Wide Web Consortium (W3C 2009). However, even this highly regulated environment generates a task for the dramaturg. The site simply must ‘work’ on a purely technical level. For this reason, the site is validated using tools offered by the W3C to ensure that site meets the requirements of modern browsers.

2.6 — Literature Review Summary

The summation of the Literature Review as a whole leads to the following conclusions. Firstly, that distinction between human and non-human is deeply problematic. Furthermore, many other binary oppositions are collapsible. This collapse of binary oppositions is discussed in greater detail in the Analysis Chapter where a metamodern perspective (Vermeulen and van den Akker 2010) is used to critique the distinction between tendentious and non-tendentious jokes (Freud 1960) and *bona fide* and non-*bona fide* forms of communication (Attardo 1994; Raskin 1985). Secondly, this creative project is more than another iteration of the Turing Test. The audience as users will always be aware that they are watching two machines perform. However, the project illuminates what it means to be human, to have a sense of humour. These machines attempt to be ‘the most human human’ rather than ‘the most human-like computer’. To achieve this, the Literature Review argues that the roles of scriptwriter, in both senses of the term, and dramaturg are crucial to the development process. The mapping of the emergence of creativity in a collaborative, networked environment requires a method that deals with the complex interactions of the ‘conditioned agency’ of all of the actors. Thirdly, that some forms of incongruity, a cornerstone concept in humour theory, are resistant to resolution. Atomic and Romeo are examples of meta-incongruity developed from Bergson’s “new law.” These meta-level incongruities have been used to construct comic narrative devices: one is dead, the other alive; the original mentor/mentee relationship is reversed; Atomic is fixed in time with a store of knowledge that halted at that time (the time of his death), where Romeo is now the more experienced and worldly in his knowledge. The crucial meta-incongruity is the uncertain distinction between the human and non-human. Both agents exhibit the attributes of the human

but are embodied and presented in a non-human form. As noted above, the process and product of this project collapse these binary oppositions. By synthesising the concepts presented in this section, it is possible to propose a definition (based on Page's vaudevillian definition) of the Two-Act as it is employed in this project:

This "Two-Act" project is a humorous text-based act performed by two agents presented in a new media environment. It possesses unity of the characters, the pairing of characters with incongruous and incompatible personalities, uses a subset of comedy techniques that are appropriate for each and unique to each character, is marked by compression, follows the form of the tragi-comedy genre, and usually requires twenty-six lines of dialogue for delivery.

This definition sets the form and format of the performance and, through reference to Bergson, Berger and others, suggests there is a definable set of comedy techniques that can be employed in the construction of the comedy performance. It also sets the stage for the Analysis Chapter that will use the structure of the dramaturgical protocols to analyse the performance, the process and the product.

Chapter 3 — Methodology and Methods

3.1 — The Research Questions

This project addresses the primary hypothesis: Bergson’s “new law” will stand if it is inverted. To adequately address this hypothesis, an assessment of the underlying assumptions that inform the binary opposition of ‘person’ and ‘thing’, of the human and non-human is necessary. It also requires an examination the role of incongruity in humour theory in relationship to the reciprocal encrusting of the person on the thing and vice versa. The creative project addresses this hypothesis through practice; it explores both the making and the made. The use of practice to examine theory itself requires a theorising of creative practice as a process and as a research methodology. The following research questions (RQs) provide a framework for addressing these issues.

RQ1 — Is there an incongruity between the ‘human’ and ‘non-human’ agents employed in this project that can be used for comic effect?

RQ2 — Does incongruity need to be resolved to generate humorous effect or do some forms of incongruity resist resolution?

RQ3 — How do humour theories affect the writing and performance of comedy?

RQ4 — If the comedy of this “Two-Act” is an emergent property of a creative process, how do the material, technological, psychological, social and cultural structures affect the trajectory of the project?

These research questions will structure the examination of the *making* and the *made*, of the process and product. The purpose of the research is to offer an understanding of the creative practice that is comedy writing. The exegesis is seen as “writing *about* writing, writing that is self-conscious, evaluative, critical... that asks questions about process, product, praxis and practice... a work that can be drawn on by other writers who wish to understand, evaluate or interrogate their *own* writing practices” (Bourke and Neilsen 2004, italics in original). The following Methodology Chapter presents an argument, based on the

purpose and scope of these research questions, for the appropriateness of the methodological approach taken in this project.

3.2 — An Interlude

Wittgenstein’s Duck–Rabbit raises some interesting questions about the nature of incongruity and resolution in humour. It is an image that resists complete resolution. For example, we can develop a technique for getting the image to flip between duck and rabbit. The ‘eye’ dot is the same for both animals. We can force one interpretation of the image on our consciousness by drawing an imaginary line between the ‘eye’ and the ‘mouth’ of the animal we wish to see. It does not fail to have two meanings no matter how many times we exercise/exorcise the incongruity. Seeing the duck does not destroy the possibility of the rabbit.

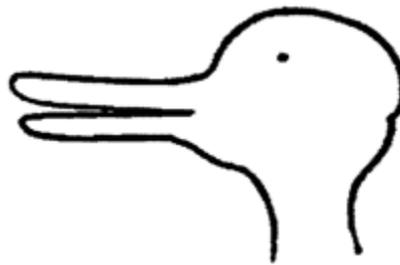


Figure 7 — Wittgenstein’s Duck–Rabbit (Wittgenstein 1976, 194e)

This example also suggests that the viewer cannot attribute both meanings to the image simultaneously. This conclusion is supported by Lycan as “empirical fact” when he compared Wittgenstein’s (1976, Original Edition 1953) and Gombrich’s (2002, Original Edition 1960) analyses of the Duck–Rabbit drawing (Lycan 1971, 232). Perception appears to be linked to context (McManus *et al.* 2010). However, the viewer may see neither at the same time—that is, the viewer perceives the drawing as meaningless. In relation to humour, especially to the analysis of short-form jokes, this suggests that incongruity is not destroyed by resolution. It is possible to not ‘get the joke’ for two reasons; firstly, the two incongruous states remain smeared (the resolution fails to collapse the possibilities); or secondly, the

context, what Berger coins “play-frame” (1997, 4), is not established appropriately. The latter implicates the audience as a social actor in the system of comedy. The construction of the incongruity involves the author and his/her intention in the system. This point will be addressed in more detail later in the chapter. Finally, this points to the existence of large-scale, meta-incongruities such as life/death and human/non-human. The conclusion is we are smeared between these poles that initially appear as binary oppositions. Wittgenstein’s Duck–Rabbit raises fundamental questions of ontology and epistemology.

3.3 — Ontology and Epistemology

When a researcher starts to delve into the realm of ontology and epistemology negotiating the diversity of terms is a real problem. There are however some core principles that can be garnered from reading in this area. The first of these is that all writers agree on the meaning of the terms ontology and epistemology.

Ontology, which etymologically means ‘speaking of being’, is the philosophical discipline that asks ‘what is?’ and ‘what does it mean to be’... It deals with the fundamental questions of being, and thus, in everyday parlance, one could say that it studies the nature of reality” (Stahl 2008, 54).

An epistemology, on the other hand, is according to Blaikie, “a theory of knowledge; it presents a view and a justification for what can be regarded as knowledge—what can be known, and what criteria such knowledge must satisfy in order to be called knowledge rather than belief” (Blaikie 1993, 6). Similar definitions can be found in Bryman (2008, 13-21), Crotty (1998, 8-12), Grix (2004, 57-64) and Murray and Lawrence (2000, 124). Grix drew particular attention to the differences between ontology and epistemology and insists on treating them as individual concepts. He “argue[s] that ‘ontology’ is logically prior to ‘epistemology’ and the two concepts must be kept apart, although, as we shall see, they are inextricably linked” (Grix 2004, 60). Blaikie, Bryman and Stahl hold a similar position. Crotty, however, argues that the relationship is so intrinsic that “it would seem that we can

deal with the ontological issues as they emerge without expanding our schema to [overtly] include ontology” (Crotty 1998, 11). The schema that Crotty refers to illustrated in the Figure 7 below:

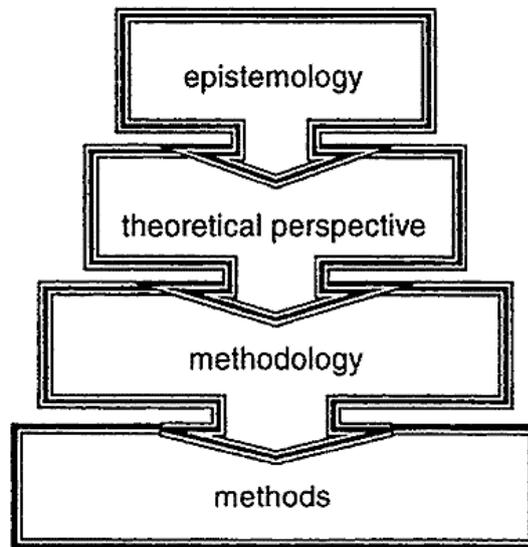


Figure 8 — Structure of Research (Crotty 1998, 4).

Crotty’s diagram illustrates the interrelated nature of the elements of research, drawing ontological issues under the umbrella of epistemology and, to a degree, conflates epistemological issues with theoretical perspectives. It is undeniable that these concepts are integrally related, however, the model fails to allow easy access to the individual attributes of these elements.

Ontology is not subject to empirical investigation, because any empirical research must be based on an ontology which it cannot prove wrong because it determines which phenomena can be observed. The main area of contention will lie in the use of the concepts themselves” (Stahl 2008, 80).

There is consensus surrounding the conception of research as a systematic process. The systematic nature of research implicates a larger structure, a structure that is external to the research, which provides a context for the research and performs the role of validating that research. The following definition of research from the Australian

Government Department of Innovation, Industry, Science and Research is based on the OECD's definition published in the 2002 edition of the *Frascati Manual*. This definition provides, in very broad terms, the criteria for validation.

Research is defined as the creation of new knowledge and/or the use of existing knowledge in a new and creative way so as to generate new concepts, methodologies and understandings. This could include synthesis and analysis of previous research to the extent that it leads to new and creative outcomes. This definition of research is consistent with a broad notion of research and experimental development (R&D) as comprising of creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of humanity, culture and society and the use of this stock of knowledge to devise new applications (DIISR 2011, 7-8, Section 1.3.10).

This definition draws particular attention to creative work undertaken on a systematic basis, which leads to an increase in the stock of knowledge or new applications of existing knowledge. That is, it is epistemological in nature. For this reason, it is important to support a model of the research that differentiates between ontology (what is there to know) and epistemology (what and how can we know about it) (Grix 2004, 65-69). "Ontology and epistemology can be considered as the foundations upon which research is built. Methodology, methods and sources are closely connected to and built upon our ontological and epistemological assumptions" (Grix 2004, 58). The following diagram (see Figure 8) illustrates Grix's view of these interrelationships.

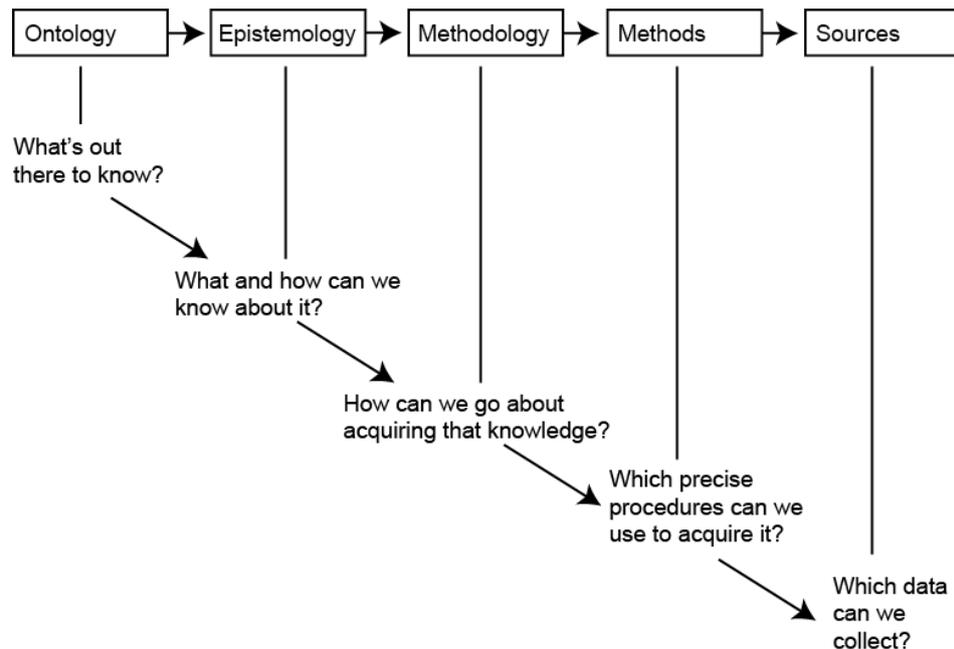


Figure 9 — The interrelationship of the building blocks of research (Grix 2004, 66)

The model shown above informs the structure and argument of this chapter. As noted in the introduction to this chapter, terminological is a challenge in this area as there are a plethora of terms used to describe ontological and epistemological positions. For example, when describing ontological positions, Grix uses the umbrella terms ‘objectivism’ and ‘constructivism’ (2004), Blaikie uses ‘realism’ and ‘constructivism’ (1993), Bryman uses ‘objectivism’ and ‘constructionism’ (2008), Crotty (conflating ontological and epistemological issues) uses ‘realism/objectivism’ and ‘constructivism’ (1998), Stahl initially uses the even broader terms, ‘realism’ and ‘anti-realism’ (2008). In a similar vein, Furlong and Marsh employ the even broader ontological classifications of ‘foundationalist’ and ‘anti-foundationalist’ (2002, 18-20). These fine distinctions between these terms provide detailed critiques and definitions of the ontological positions housed under their umbrella terms. Stahl offers the following distinction:

One of the most important such concepts is constructionism. Constructionism (or social constructivism) holds that reality is constructed by the observer, but, in opposition to (radical) constructivism, it states that reality is a collective

construction. It emphasises the role of interaction and communication in the process of constructing reality (Stahl 2008, 56).

Blaikie in particular gives over three chapters of his book to this task (1993, Ch. 2-4). For example:

Approaches to social enquiry can be divided into two groups in terms of their ontological assumptions: they are either realist or constructivist. Positivism, Critical Rationalism and Realism all assume that social reality exists independently of the observer and the activities of social science, that this reality is ordered, and that these uniformities can be observed and explained. However, they differ in their view of the elements that constitute social reality, particularly the explanatory elements, and on whether this reality also exists independently of social actors (Blaikie 1993, 202).

There is insufficient time in this chapter to properly justify to all of these arguments. And, not wishing to falsely conflate concepts, there still remains a need for clarity. For the sake of consistency, this chapter will adopt the terminology of Grix and Bryman.

Examples of ontological positions are those contained within the umbrella terms 'objectivism' and 'constructivism'. Broadly speaking, the former is 'an ontological position that asserts that social phenomena and their meanings have an existence that is independent of social actors'. The latter, on the other hand, is an alternative ontological position that 'asserts that social phenomena and their meanings are continually being accomplished by social actors. It implies that social phenomena and categories are not only produced through social interaction but that they are in a constant state of revision' (all from Bryman 2001: 16-18)—(Grix 2004, 61).

What is crucial here is the understanding that these ontological positions cannot both be considered to be true, simultaneously. That is not to say that independently one is superior to

the other or as ontological positions one or the other fails to answer the question ‘What’s out there to know?’ However, as Stahl argues using the logical dictum of *tertium non datur*— (“the excluded middle” or “no third [possibility] is given” (Bobzien 2008)—they do contain irreconcilable differences. As a result, this has particular consequences for the researcher as he/she develops epistemological and methodological foundations of the research. It also has an effect on the understanding and critique of theoretical positions, which is Crotty’s logic for combining epistemological concerns with theoretical perspectives.

If the proposition A means ‘reality is independent of the observer’, then $\neg A$ [that is, not A] can be translated as ‘reality is not independent of (thus dependent on) the observer’. According to *tertium non datur*, both cannot simultaneously be true. This statement is the heart of the argument. The irreconcilable opposition between realism [objectivism] and anti-realism [constructivism] is simply based on a logical axiom and the ontological root of the terms. If ... positivism is directly linked to realism, and interpretivism is directly linked to social constructivism, then this at least constitutes a problem for people who wish to do away with the debate about them (Stahl 2008, 58).

In this quote, Stahl links ontological positions with their epistemological counterparts arguing that there are some couplings that are not, at best, well suited or, at worst, illogical. The terminological difficulties described above in relation to ontological positions also occur at the level of epistemology. Grix and Bryman again appear to offer the clearest path. Two contrasting epistemological positions are those contained within the research paradigm, “positivism” and “interpretivism” (Grix 2004, 63).

Broadly speaking, the former ‘is an epistemological position that advocates the application of the methods of the natural sciences to the study of social reality and beyond’. The latter, on the other hand, can be seen as an epistemological position that ‘is predicated upon the view that a strategy is required that respects the differences between people and the objects of the

natural sciences and therefore requires the social scientist to grasp the subjective meaning of social action' (all from Bryman 2001: 12–13). It is clear that choosing one of these epistemological positions will lead you to employ a different methodology than you would if you chose the other. It is also clear how a researcher's ontological and epistemological positions can lead to different views of the same social phenomena (Grix 2004, 64).

Here, Grix and Bryman argue that there is, or should be, a logical consistency in the flow from ontology to epistemology to methodology. This is congruent with Crotty's schema of research (1998, 4). One way to define an appropriate flow for this project is to ask if the ontology, epistemology and methodology of the natural sciences would provide the sort of information required to answer the research question—to illuminate the “process, product, praxis and practice” of the creative project (Bourke and Neilsen 2004). Stahl, quoting Hausman, argues that a hermeneutic epistemology would be more appropriate.

The current version of hermeneutics was explicitly developed to counter the natural science approach to humanities and social sciences. The opposition to natural sciences can best be demonstrated by looking at a pair of concepts associated with the German words *erklären* and *verstehen* (Hausman, 1994). *Erklären*, literally ‘to explain’, refers to the natural sciences, where causal relations can be established which can be used to explain phenomena. Such causal explanations are not useful in the humanities and social sciences because they neglect agents' ability to act. An explanation of human actions is thus not an application of natural laws but rather a description of humans that allows the reader to understand what the agent did and why she did it. This is what *verstehen*, literally ‘to understand’, will achieve. Hermeneutics aims at facilitating this understanding (Stahl 2008, 70).

Blaikie explains the distinction by tracing the Germanic roots of hermeneutics from Dilthey, through Heidegger, to Weber and finally to Giddens (1993, 43-49). He concluded

that “[h]ermeneutics and phenomenology provide the foundations for the Interpretivist view of the relationship between the natural and social sciences” (1993, 48).

Alternatively, the appropriate flow from ontology to epistemology to methodology may be defined by questioning the aim of the research, whether it explains or evaluates a social phenomenon or whether it seeks to understand and instigate change:

A researcher from within the interpretist tradition is concerned with understanding, not explanation, focuses on the meaning that actions have for agents, tends to use qualitative evidence and offers their results as one interpretation of the relationship between the social phenomena studied (Marsh and Furlong 2002, 21).

Following this logic, this project is positioned within the constructivist ontology, employing an interpretist epistemology from the hermeneutic-phenomenological tradition (Blaikie 1993, 48; Bryman 2008, 16). Thus positioned, the researcher is implicated inside larger structures in much the same manner as the creative individual is implicated in the systemic view of creativity offered by Csikszentmihalyi (1999). This is not a privileged position, the researcher themselves operates within same “discourses and traditions” as the object of study, “consequently, knowledge is theoretically or discursively laden. As such, this position acknowledges the double hermeneutic” (Marsh and Furlong 2002, 26). Blaikie (1993), following Giddens, explains the double hermeneutic in the social sciences as “involving two-way ties with the actions and institutions of those they study” (189). The interaction of agents and structures is core to this research. Therefore, the use of appropriate ontological, epistemological and methodological approaches that allows access to these issues is crucial to the research. As Marsh and Furlong argue, “...ontological and epistemological positions should not be treated like a sweater that can be ‘put on’ when we are addressing such philosophical issues and ‘taken off’ when we are doing research” (2002, 21).

3.4 — Theoretical Positions

The section highlights theories that will inform this project, without artificially separating theory from ontological or epistemological assumptions, nor disconnecting methodology from these assumptions. The models of research proposed by Grix (2004, 66) and Crotty (1998, 4) both suggested a path to follow when undertaking research. Michael Polanyi considered theory as a kind of map, which elaborates the path metaphor:

A theory is something other than myself. It may be set out on paper as a system of rules, and it is the more truly a theory the more completely it can be put down in such terms... But even a geographical map fully embodies in itself a set of strict rules for finding one's way through a region of otherwise uncharted experience. Indeed, all theory may be regarded as a kind of map extended over space and time (Polanyi 1958, 4).

This project adopts two core theoretical propositions. Firstly, that creative activity is best described as a systemic process at the confluence of agents and structures following Mihaly Csikszentmihalyi's systems model of creativity, which includes the individual, the field and domain in a system of circular causality is a model of confluence where "[c]reativity is a process that can be observed only at the intersection where individuals, domains, and fields interact" (1999, 314). Crucially, this model de-centres the individual and does not reject the need for an 'author' as post-structuralist arguments may suggest (cf. Barthes 1977). However, it presents creativity as an interactive process that requires the domain and the field and the individual to be all of equal importance. Creativity, when seen as an interaction, as a process, is open to investigation and research. This creative project provides an opportunity for this kind of research. The individual is part of a larger system of circular causality and is embedded within structures that both constrain and enable their actions (Boden 1994, 2004; Bourdieu 1993; Giddens 1979). Positioned in this manner the individual still makes intentional choices in the selection of the forms and practices of the domain(s) that are anticipated to achieve particular aims or outcomes.

The second proposition is based on Bergson's "new law" that, "[w]e laugh every time a person gives us the impression of being a thing" (Bergson 1911, 58). This project investigates whether Bergson's law will stand if it is inverted; will we laugh when a thing gives the impression of being a person? This is a very literal reading of Bergson's work, and, to a degree, devalues the essence of his philosophical arguments about the mechanistic and inelastic nature of modern life as it was in the early 20th Century.¹¹ However, it is a proposition that this project, with its integration of human and non-human agents, is uniquely positioned to examine.

These two theoretical propositions can now act as maps of the "uncharted experience" of this project. Traversing this territory requires both inductive and deductive strategies. The diagram below (see Figure 9) maps the relationship between theories, hypotheses, observations and generalisations. For example, the inversion of Bergson's law starts with a theory, deducing that an inversion is possible, making the prediction that the theory will hold if inverted. This hypothesis will be tested by application in the creative project. The test itself, the development of humour in artificial intelligence agents, is also an experiment that yields observations about the creative process. As such it will 'test-out' whether Csikszentmihalyi's model of creative practise applies in this new media environment, which is typified by multiple human and non-human agents. However, a methodological approach is still required as it allows for systematic access through the creative project to answer these propositions.

¹¹ For a detailed coverage of his theoretical and philosophical position in relation to comedy see Chapter 4 of *Farce* by Jessica Milner Davis (2003). Also, for a more general coverage of his philosophical contributions see Lawlor and Moulard (2011).

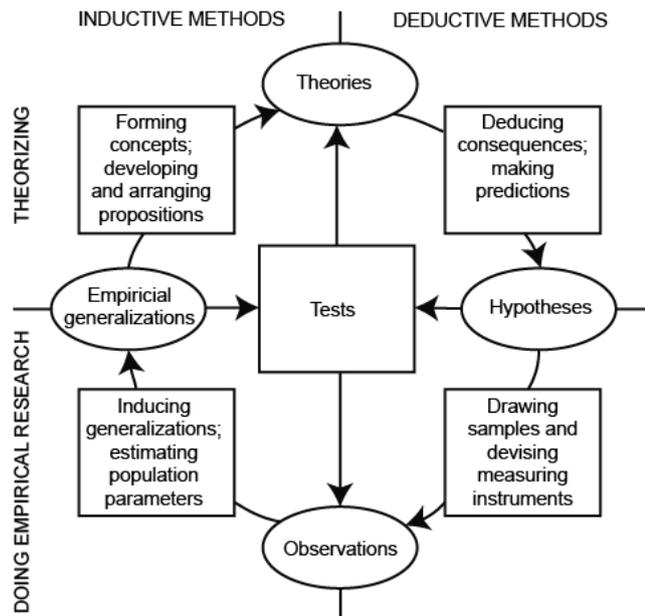


Figure 10 — Inductive and Deductive Methods (Blaikie 1993, 157)

3.5 — Methodology

This project is, at its core, an investigation into creative writing situated in the new media environment of artificial intelligence. The concept of creative practice research is comparatively new to the academy. The past two decades have produced considerable debate about the relationship of the exegesis to the creative work in creative writing higher degrees. For example, *TEXT*, the Journal of the Australasian Association of Writing Programs, devoted a special issue to the topic in 2004 (Fletcher and Mann 2004). The central conclusion is summarised in the quote which describes the exegesis as “writing *about* writing, writing that is self-conscious, evaluative, critical... that asks questions about process, product, praxis and practice... a work that can be drawn on by other writers who wish to understand, evaluate or interrogate their *own* writing practices” (Bourke and Neilsen 2004). The journal issue defined and subdivided the terms relative to the various forms of practice and research attempting to develop a typology for creative arts research. The Australasian Association of Writing Programs through its annual conference proceedings and the journal *TEXT* has continued to engage in discussion about the role

and purpose of the exegesis. Dallow, in 2003, offered the following definition “organized around the prepositions”:

Research *into* the creative arts would include the traditional history, theory and criticism triumvirate. It would also include aesthetic and perceptual research, social, cultural and psychological research, and research into the technical, material and structural perspectives of/on the creative arts. Research *through* creative arts practice centres on a ‘studio/creative project’ which results in the production and presentation of a body of ‘finished’ creative work, where, additionally, the documentation of what is done in the process of creating these works is taken as a significant component of the research. Research *for* the creative arts, might include research into the behaviour of materials and processes, the customizing of software and hardware, and extending what can be creatively accomplished. Although it need not necessarily result in ‘finished’ creative works, this approach may however point the way towards possible new fields of practice (Dallow 2003, 51-52).

There were similar attempts, in other journals, to define the core elements through nomenclature. For example, two commonly used terms ‘practice-*led* research’ and ‘practice-*based* research’ are defined as:

1. If a creative artefact is the *basis* of the contribution to knowledge, the research is practice-*based*.
2. If the research *leads* primarily to new understandings about practice, it is practice-*led* (Candy 2006, 1, emphasis in original.)

Dallow offered a third alternative, practice-*oriented* research, which is not “merely *oriented* towards practice, but those approaches which are quite literally *based* upon or located *in* the specifics of the ‘problem’ posed, explored or presented by a particular body of original creative work” (2003, 52). The key to these practice-based research approaches is the exegesis.

This approach requires that there be an extended *commentary*, which ‘maps the route’. The commentary has a pivotal role in distinguishing professional practice from practice-based research. It provides evidence of the originality of the art work, demonstrates mastery of professional creative skills, signals that a significant contribution has been made to the field, and sets out the degree of ‘conceptual rigour’ applied. (Dallow 2003, 55).

This project is defined as practice-led research that is undertaken to achieve the ambitions of research *into, through* and *for* the creative writing practice. As such, the project “offers an intermediary intellectual space which facilitates the exchange of ideas between theory, analysis and practice” (Dallow 2003, 62).

Blaikie, like Grix, Bryman, Stahl and Crotty, described paths from ontology and epistemology to various methodological approaches in an “attempt to highlight the complex range of choices which any researcher needs to make” (1993, 215). The alternative positions, listed in Table 5 below, indicate differences in ontological and epistemological assumptions: the relationship of the researcher to the object of study; and the aim of the research. “Some of these alternatives are mutually exclusive; others involve a continuum, while others involve choices that may be appropriate under certain circumstances” (Blaikie 1993, 215). Stahl provided an argument for incommensurability of objectivism and constructivism. However, this initial level of incommensurability is not deterministic for the entire research path. The objectivist ontology does not necessarily predict that the research will include only quantitative data, nor does the constructivist ontology determine that only quantitative data will be produced by the research. Bryman offers a description of mixed methods research as a means of highlighting possible interactions at the level of methodology and individual research methods (2008, 22-24). Blaikie deflected criticism about the duality of his summary, arguing there is still “a fundamental choice to be made by the social researcher, a choice between very different

ontological (realist v. constructivist) and epistemological (outside v. inside) positions” (Blaikie 1993, 203).

Issue	Alternative positions	
Nature of reality	Realist Single	Constructivist Multiple
Starting point	Theory Technical language Outside	Observation Lay language Inside
Role of language	1:1 correspondence with reality	Constitution of social activity
Lay accounts	Irrelevant Corrigible Trans-situational	Fundamental Authentic Situational
Social science accounts	Generalizable across social contexts	Specific in time and space
Researcher	Subject-to-object Detached Outside expert	Subject-to-subject Involved Reflective partner
Objectivity	Absolutist Static	Relativist Dynamic
Theory of truth	Correspondence Political	Consensus Pragmatic
Aim of research	Explain Evaluate	Understand Change

Table 5 — Ontological and epistemological assumptions (Blaikie 1993, 216)

The systems model of creativity opens creative activity to investigation and research. To examine the role of the individual within a systems model, and within a particular project, requires a methodological approach that allows the researcher to be positioned inside the practice:

...writing *about* writing, writing that is self-conscious, evaluative, critical... that asks questions about process, product, praxis and practice... a work that can be drawn on by other writers who wish to understand, evaluate or interrogate their *own* writing practices (Bourke and Neilsen 2004)

The exegesis requires a methodology that clearly links practice and research. Ontologically, the researcher accepts the constructivist perspective that “social reality is produced and reproduced by social actors” (Blaikie 1993, 203); and epistemologically, that the “knowledge base” exists inside the practice (McNiff 1988, 13).

Practitioner-based enquiry (PBE), as used in this project, is based on the model proposed by Murray and Lawrence (2000). This methodology is akin to practitioner-researcher enquiry as described by Robson in *Real World Research* (2002). His definition outlined “a practitioner-researcher is someone who holds down a job in a particular area and is, at the same time, involved in carrying out systematic enquiry which is of relevance to that job” (2002, 534). Likewise, the PBE methodology implicates a self-reflective examination of the practitioner’s activity whilst they are involved in the processes of that activity. The researcher’s intention is aimed at “the acquisition of intellectual autonomy, improved judgment making and enhanced technical competence” in their creative practice (Murray and Lawrence 2000, 10). Creative practitioners “enquire into their own practices to produce assessable reports and artefacts [sic]” (Murray and Lawrence 2000, 10). The concept of ‘assessable reports and artefacts’ speaks to the need for validation to distinguish between knowledge and belief. Within methodologies like PBE, data collection methods include “extracts of natural language, such as verbatim transcripts of interview material and extracts from texts, discourse, personal documents, field notebooks and the like” (Miller and Brewer 2003, 239). The following section contains a review of the methods employed in this research project.

As qualitative research, PBE seeks “*meaning* (rather than generality as with its quantitative counterpart) and contributes to theory development by proceeding inductively”

(Miller and Brewer 2003, 193). PBE draws on philosophical ideas from phenomenology, symbolic interactionism and hermeneutics. The methodological lineage of PBE includes ethnography, unstructured interviewing, participant observation and variations of “action research” and uses techniques that have “a long history of use and have developed authority and reputation” (Miller and Brewer 2003, 5). The participatory action research parentage of PBE implies that one of the aims of research is to instigate change (Blaikie 1993, 211; Davidson 2004, 145; Miller and Brewer 2003, 225). Blaikie’s summary of methodological approaches suggests that the aim of research, on a continuum from explaining and evaluating to understanding and changing, fundamentally affects the choice of methodology. This methodology provides an opportunity to understand of the individual’s role in the creative process, its iterative and recursive nature and an understanding of the power of reflecting on action. Both of these elements are best described from inside the process. Further, the insights gained through reflection can then be used to generate change in the individual’s creative process that will, in turn, affect the associated production.

Below is a table that lists what Robson sees as advantages and disadvantages of the practitioner-researcher methodology. This echoes the concerns and opinions of Murray and Lawrence on PBE (2000, 18-41).

Practitioner-researcher compared with ‘outside’ researchers	
Disadvantages of the practitioner-researcher role	
1. Time	Probably the main disadvantage. Trying to do a systematic enquiry on top of normal commitments is very difficult.
2. Lack of expertise	This obviously depends on the individual. There is a need for some background in designing, carrying out and analysing studies. A major problem can be ‘not knowing what it is that you don’t know’.
3. Lack of confidence	Lack of experience in carrying out studies leads to lack of confidence.
4. ‘Insider’ problems	The insider may have preconceptions about issues and/or solutions...

Advantages of the practitioner-researcher role	
1. <i>'Insider'</i> opportunities	You will have a pre-existing knowledge and experience base about the situation and people involved.
2. <i>'Practitioner'</i> opportunities	There is likely to be a substantial reduction of implementation problems.
3. <i>'Practitioner-researcher'</i> synergy	Practitioner insights and the role help in the design, carrying out and analysis of useful and appropriate studies.

Table 6 — Practitioner-researcher methodology (Robson 2002, 535)

These methodological concerns are not unique to practice-based research. Many of the listed disadvantages are common to action research and other forms of participant observation research (McNiff 1988; Miller and Brewer 2003; Murray and Lawrence 2000). The primary criticism being “[t]he insider may have preconceptions about issues and/or solutions” (Robson 2002, 535). The basis of this criticism is both ontological and epistemological. In terms of ontology, this criticism is valid only if the researcher accepts that the research is undertaken using a methodology based on positivist ontology, where the researcher is situated outside of research in a subject-to-object relationship. The criticism draws attention to the effect of an observer on the object of research as an unwanted artefact rather than accepting that this interaction, in a subject-to-subject methodology, as a source of data. Likewise, epistemologically, the criticism is valid if the ‘issues and solutions’ are considered as observations to test against a theoretical framework. Rather, these ‘issues and solutions’ are an existing component of the practice under investigation, which is revealed by the *insider* role of the practitioner-researcher. The other disadvantages; lack of confidence, lack of experiences and of “not knowing what it is that you don’t know” are generic problems that confront all forms of research. The literature review offers a means of mitigating some of these effects. It provides as context to the work and recognises what has been done in the field, how it was done and how it was evidenced.

In Pierre Bourdieu's terms, the practitioner employs an 'economy of logic', so that 'no more logic is mobilized than is required by the needs of practice'. The assumptions about, and in, the work remain implicit, defined by the 'practical relation to the situation' (Bourdieu, 1977, 110). Practice based research on the other hand has investigation as the 'primary objective'. This may be a very fine line to draw, literally and metaphorically, and only discernible by an assessment of the methodology of explication, and an analysis of the related processual and contextual documentation (Dallow 2003, 54).

The purpose of this argument is not to create a privileged position for the writer, rather it is intended to emphasize the systemic nature relationship of theory and practice in which the writer is just one of the actors.

3.5 — Methods and Ethics

A primary method employed in PBE is the keeping of a production journal that provides a body of data that can be analysed and used to illuminate production decisions in the making of the creative object. As Murray and Lawrence state:

The journal records the details of the process of problem formulation, derivation of a research methodology or enquiry strategy, and orderly reflection on the practice(s) selected to be at the centre of PBE. It should be noted that the journal is not conceived as a descriptive, chronological diary of events. Rather, it is literary device through which the problematic nature of educational enquiry is rendered intelligible, first to self...The journal proposes to offer the practitioner's account as primary source material that may be later included in the data analysis section of more formal reports...Such reports are regarded as summative, assessment artefacts. Worth is judged according to published assessment criteria, essentially an academic judgement, and by the rather more elusive indications of claims to knowledge that will be

admissible, if open to further conjecture, in the public domain (Murray and Lawrence 2000, 14-15).

Traditionally, the production journal is maintained as a private document, akin to an anthropologist's field notes, which provides data for analysis in the exegesis. This project uses a blog (web log) as the medium of the Production Journal. Blog readers are able to contribute comments on the production process, which will form an integral part of the Production Journal and the data analysed in the exegesis. In practical terms, the journal needs to be robust (to guard against information loss), accessible (not linked to a particular platform or individual machine) and ubiquitous (accessed from various locations). The traditional solution is a physical notebook. As the vast majority of the production is computer-based, a blog (web log) is used to allow the journal to be accessed easily from various locations and have back-up built in to system. This method makes the journal a public record of the production allowing others to access the work in progress. This is a particularly important method as it allows direct access to the fields related to the project: comedy writers and performers, chat-bot developers, web/multimedia developers and those in the academy.

The intersection of the public publication of the blog and the private exegetical use of the content requires consideration of the ethical implications. For this reason, an application for approval to use a blog as the medium for the Production Journal was lodged with the Arts, Education & Human Development Human Research Ethics Subcommittee of Victoria University. Approval was granted in July 2009. The blog site, <http://aimlhumour.blogspot.com/>, contains a link to the approved Research Information Sheet that informs readers of the aims of the research and describes how the content of the blog will be used in the project. In 2011, an amendment to the original application was lodged seeking approval for the researcher to overtly invite members of the field to view the blog and post comments.

The blog contains material that is theoretical in nature, discussions of humour theory and musing on the application of these theories to the project, it also includes technical material concerning the development of the interface, the structure of Artificial Intelligence Mark-up Language (AIML) and accounts of the problems encountered during development. It also contains links to test versions of the interface where users can engage with the chat-bots. The user comments on those versions inform future developments.

A second method used in the project is that of dramaturgy. The definition of dramaturgy, as offered by Cardullo (1995) strongly suggests an exegetical method used in the analysis of a play. Dramaturgy “today denotes the multi-faceted study of a given play: its author, content, style and interpretive possibilities, together with its historical, theatrical and intellectual background” (Cardullo 1995, 3). Employing this method highlights the artificial and synthetic nature of theatrical performances, including comedy and of design in general. A comedy is a designed experience. As such, this project draws on “[o]ne of the most cited resources of modern design literature... Herbert Simon’s *The Sciences of the Artificial*, in which he describes design as devising ‘courses of action aimed at changing existing situations into preferred ones’” (Bærenboldt *et al.* 2010, 2). Simon defines the “boundaries for sciences of the artificial” by listing “four indicia” that make a distinction between the artificial and the natural sciences:

1. Artificial things are synthesized (though not always or usually with full forethought) by man.
2. Artificial things may imitate appearances in natural things while lacking, in one or many respects, the reality of the latter.
3. Artificial things can be characterized in terms of functions, goals, adaptation.
4. Artificial things are often discussed, particularly when they are being designed, in terms of imperatives as well as descriptives (Simon 1969, 5-6).

Simon calls for the development of sciences to specifically look at the world of designed objects. His work argues that the methods of natural sciences are not appropriate for

dealing with the complexity of designed, synthesized objects or for describing the intentional processes of design. The product and practice of theatre stands as an example of a designed, synthesized experience that meets all of Simon's four indicia of the artificial. Firstly, the produced play is a synthesis of the text, the directorial vision, the physical and technical limitations of the performance space and the actors and the interaction of the audience. Secondly, a theatrical performance is by definition a virtual experience—the presented reality may “imitate appearances in natural things while lacking, in one or many respects, the reality of the latter” (Simon 1969, 6). This is true for old-media (traditional theatre) and new-media productions. Thirdly, theatre can be categorized by its goals and functions. Its primary goal is, on some level, by a variety of linguistic, structural and dramatic means to generate an emotional and intellectual response in the audience. “Often, we shall have to be satisfied with meeting the design objectives only approximately” (Simon 1969, 13). Frequently, the audience sees through these means to perceive the artifice of the performance. Finally, theatre productions are concerned with imperatives and descriptives—what *must* this play achieved and *how* will this play be realized?

Simon's text has contributed to a range of disciplines including visual design, industrial design, information science and information technology. These disciplines critique and build on Simon's work to develop a design research methodology (Gregor and Jones 2007; Roxburgh 2006; Young and Spencer 2009).

The distinguishing attribute of theories for design and action is that they focus on ‘how to do something.’ They give explicit prescriptions on how to design and develop an artifact, whether it is a technological product or a managerial intervention” (Gregor and Jones 2007, 313).

Gregor and Jones concept of the relationship between theory and methodology “depends on a realist ontology being adopted, where realism implies that the world contains certain types of entities that exist independently of human beings and human knowledge of them

(as opposed to idealism)” (2007, 321). This is problematic when the “purpose of research undertaken from the realist ontology is to “Explain or Evaluate”, whereas, from the constructivist ontology the purpose is to “Understand or Change” (Blaikie 1993, 203). Simon’s work is clearly aimed at change—“changing existing situations into preferred ones” (1969, 111). When design research follows the realist ontology of natural sciences, which Roxburgh argues against, the design is:

...readily understood as a largely synthetic activity with little or no analytical framework. Though persistent, this view has been challenged, with efforts made in design’s history to develop a greater appreciation of the complexity of the design process (2006, 150).

Drawing attention to the design process suggests the purpose of design research and by extension, the purpose of a design theory, is to “Understand or Change”. The goal towards understanding a creative process and to instigate change in that process inherently requires an ontology and epistemology that allows for, and validates, the designer’s perspective within a complex social and cultural context. This precludes realism as an effective ontology for a design theory. Stahl (2008), after examining methodological debates, argues that a constructivist ontology (termed idealism by Gregor and Jones) and an hermeneutic epistemology would be appropriate for the researcher who is attempting to understand and change practice (2008, 70).

The practice of dramaturgy is codified in the dramaturg’s protocol as “a five-part pre-production study of a play-developed for a play’s production” (Katz 1995, 13). When the word ‘design’ is substituted for the word ‘play’ and after the element descriptions are expanded to encompass a more general conception of design, dramaturgy becomes a methodology of the artificial. The design dramaturg’s protocol would include following five elements:

1. The historical, cultural, and social background of the design (e.g. the functions, goals, intentions, traditions, conventions, and design specifications);

2. An assessment of the design's place in the designer's *oeuvre* (This element positions the design within the designer's *habitus* (Bourdieu 1993) and situates the designer within the domain of design);
3. A production history of the design, including a report on the production problems (this is an exegetical record of production akin to that used in Practitioner-Based Enquiry—c.f. Murray and Lawrence 2000);
4. A critical analysis of the design, including the designer's suggestions for improvements to the initial design (the designer as a reflexive practitioner assesses if the design meets the 'imperative' and 'descriptive' requirements of the specification); and
5. A record of how this design problem, or a similar problem, has been tackled in the past: related ideas and examples, articles, artifacts, etc. (Knowing what has been done before is a crucial element of creative activity.)

The structure of the dramaturg's protocol is used in the Analysis chapter as a device for organising and revealing the relationships between the domains of knowledge outlined in the Literature Review. Further, it allows for an analysis of the effect of the field of experts; how does the field affect the trajectory of the project? Finally, it allows for an exploration of the scriptwriter's *habitus*. By combining these elements, it views creative production through the lens of Csikszentmihalyi's systems model of creativity.

3.6 — Methodology Summary

In this chapter references have been drawn from a variety of domains. Social science accounts of research practice are sourced from Grix (2004), Bryman (2008), Blaikie (1993), Crotty (1998), Robson (2002), as well as Miller and Brewer (2003). Stahl (2008) provides an account of research in information science. Political science is represented by the views of Marsh and Furlong (2002). Research in the creative arts, particularly creative writing, is described by Barrett (2010), Bourke and Neilsen (2004), Dallow (2003), and

Candy (2006). Finally, practice-based research methodologies are discussed in reference to Murray and Lawrence (2000), McNiff (1988) and Davidson (2004). The inter-disciplinary / trans-disciplinary nature of this project requires an account spanning these domains. A full and comprehensive account of all the research debates occurring in the individual disciplines is feasible. Instead, this chapter attempts to synthesize the key issues to find a path applicable to this research project.

This chapter argues that to address the hypothesis, Bergson’s “new law” will stand if it is inverted, requires the researcher to hold a visible position inside the research process. Figure 10 is a revision of Grix’s model that incorporates each of the elements presented in the arguments above and illustrates the research process utilized in this project.

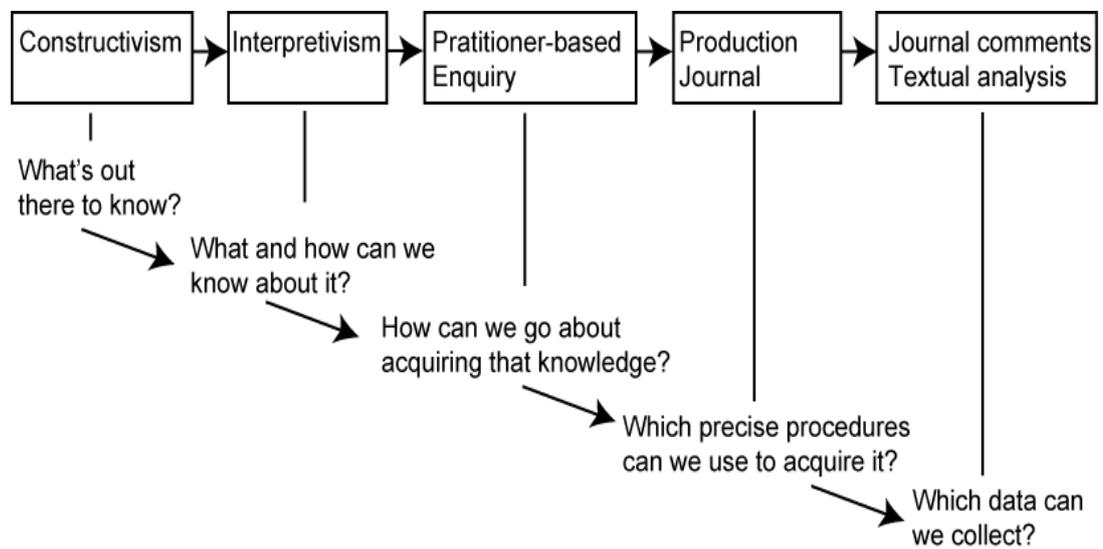


Figure 11 — Interrelationship of the building blocks of this research project.

Chapter 4 — Analysis

4.1 — Introduction

This Analysis chapter employs the structure of the dramaturg's protocol and draws on data captured in the Production Journal, including posts and comments from members of the field, with the ambition of offering an understanding of the relationships between the intra-related actors of the project:

The notion of *intra-action* (in contrast to the usual “interaction,” which presumes the prior existence of independent entities/relata) represents a profound conceptual shift. It is through specific agential intra-actions that the boundaries and properties of the “components” of phenomena become determinate and that particular embodied concepts become meaningful (Barad 2003, 815 italics in original).

This use of the dramaturgical protocol encourages the producer to simultaneously maintain intimate contact with the project and to develop a critical distance from it. This critical distance allows the critique of practice “to resist restaging of stories about autonomous human actors and discrete technical objects” (Suchman 2007, 284). During the development process, the producer reflects in action, by maintaining a record of the making, so the designer can examine his/her process with documented hindsight—reflection on action (Schön 1983, 55). Primarily, these reflections are concerned with the intra-actions of the suite of actors: “[a]ny distinction of humans and technologies is analytical only, and done with the recognition that these entities necessarily entail each other in practice” (Orlikowski and Scott 2008, 456).

The promise of structuralist approaches—*How to be funny even if you're not* (Subtitle of Vorhaus 1994) and *How to be funny on purpose* (Willis 2005a)—is that there are heuristic rules that are both sufficient, and necessary, for comedy to succeed. Likewise, there are linguistic theories of humour applied to jokes and the computational creation of

humour that serve to elucidate structures of humour (Attardo 1994; Binsted *et al.* 2006; Raskin 2008; Ritchie 2004). These structural approaches promise to reveal the necessary and sufficient structures that make an utterance humorous: “idealised model of humour (and subsequent developments of it) is designed for a speaker-hearer community in which members’ senses of humour are identical (Raskin 1985, 58); for people who have no racial or gender biases and are not concerned by scatological, obscene or disgusting content (Attardo 1994, 197); and, where audience responses are ‘essentially irrelevant’ (Attardo 2001, 30)“ (Willis 2005b, 127). These approaches are most valuable in the analysis of a text. For the comedy producer creating a humorous text, however, these approaches are set of heuristic rules that are tested through practice, when the text is performed for an audience. In this instance, the theoretical map is evened and generalises the features of the landscape. The journey, the practice of comedy, accounts for features not represented on the map. However, this is not abandoning the theoretical map as Emerson suggested; ”Leave your theory, as Joseph his coat in the hand of the harlot, and flee” (1982, par. 13).

This diminution of humour to a set of purely structural elements denies the intra-action of producers, the text, the performance and the audience. Reductionism of this kind promotes the problematic distinction between agency and structure. While Giddens argues for the complementary nature of agency and structure (1995), this project argues that his analysis does not go far enough. Within a system that incorporates psychological, social and cultural elements, such as Csikszentmihalyi’s model of creativity, each of these elements or actors can be seen as simultaneously being both agent and structure. Barad (2003) uses, as an ontological rationale, the particle / wave duality of light to argue against the position that sees objects as having independent and fixed attributes. A photon of light is smeared between these two states of being—oscillating. Only when the photon interacts with another particle it can be said to have definitive attributes. Following this metaphorical logic, structure and agency can only be defined as such when they precipitate

an observable effect in a system. Every actor in the system is viewed as a structure or as an agent and, further, the default position is to oscillate between the two roles.

An analysis of this project is challenging due to the deeply interrelated nature of all the actors in the system. At times, these actors are treated as unique, identifiable components, wholes; at other times they are treated as elements of a larger system, parts.

But '*wholes*' and '*parts*' in this absolute sense just do not exist anywhere [italics in original], either in the domain of living organisms or of social organisations. What we find are intermediary structures on a series of levels in an ascending order of complexity: sub-wholes which display, according to the way you look at them, some of the characteristics commonly attributed to wholes and some of the characteristics commonly attributed to parts (Koestler 1975, 48).

Koestler coined the term 'holon' to capture the attributes of whole-ness and part-ness in one term in much the same manner as Giddens (Giddens) coined 'structuration' to synthesise structure and agency. Building on the work of Herbert A. Simon (1969) that described the methodological advantages of building complex systems from simple, stable sub-systems, Koestler recognised that in order for those sub-systems to remain stable they needed in some manner to be complete in their own right. The sub-systems are concurrently 'whole' and 'part'. This concept has been deployed in the development of manufacturing systems (cf. Giret and Botti 2004) and expert systems (cf. Hillebrandt 2005). This project consists of holons, which are in some respect complete in their own right, but also contribute to a larger system. These holons include: Atomic and Romeo as performers of AIML knowledge; the ALICE engine on the Pandorabots server as an active structural component; the scriptwriter with his embedded holon of *habitus* relating to both comedy writing and interface design; and, the user's interface that allows for the interaction of the Atomic and Romeo. These holons are embedded in a larger holon of creativity, which draws on individual, social and cultural holons that drive the creative

process and from which the creative product emerges: “[r]ather than attributing agency either to individual actors (designers, engineers, team members) or particular technologies (computers, algorithms, graphics engines, networks), capacities for action [should] be studied as relational, distributed, and enacted through particular instantiations” (Orlikowski 2010, 136).

The “Two-Act” structure is a meme that has found expression in a range of media forms. Dougherty (2001) describes a meme as “a self-replicating unit of data that materializes itself as an instruction for the human mind that gets passed on whenever one human imitates another” (88). Dougherty is critical of the concept of memes, particularly when it is uncritically attached to a post-human understanding of culture and technology. He argues a peculiar kind of reductionism occurs, combined the computational theory of mind, reduces people to the status of meme incubators—a position that sees the human as machine (Dougherty 2001). Considering memes as holons transcends this reductionist approach. As such, memes are stable sub-systems, are recognizable in their own right, as well as a component of a larger system.

For the purposes of this project, it is argued that the “Two-Act” holon has been replicated by the relationships between the actors regardless of whether those actors are viewed as structural elements or active agents or whether the actors are human. History suggests that the “Two-Act” cultural holon is sufficiently robust to endure the process of remediation. For convenience, the term ‘actor’ is used as a symbolic representative for the attributes of structures, agents, holons and memes. At times, actors are examined for their structuring effect, as well as, their active role. At other times, actors are explored to reveal how their internal whole-ness contributes a component to the larger project. By allowing an actor to be contemporaneously agent and structure, whole and part, the importance of the intra-actions of actors is highlighted.

4.2 — A critical analysis of the creative project

Creativity emerges from a system as the interaction of the related elements. McIntyre's definition of creativity draws these together and implicates a broader set of existent skills and knowledge.

Creativity is an activity where some process or product, one that is considered to be unique or valuable in at least one social setting, comes about from a set of antecedent conditions through the located actions of a creative agent. Each factor belong to a system in operation and creativity emerges from that system in operation (McIntyre 2012, 204).

As argued in the introduction to this chapter, the individual elements of the systems view of creativity are considered holons that are embedded in a larger system which drives the creative process and from which the creative product emerges.

The process of emergence results from the interaction of independent parts when they stop being independent parts and start to influence each other...it is the relationship between components in the system and not the nature of its individual components, that proliferate its properties and behaviour (Skyttner 2005, 40).

In short, as Skyttner emphasises, the whole is more than the sum of its parts.

Sawyer's attributes of an emergent system (as described Section 2.3 of the Literature Review) are used to analyse the holonic nature of the creative project. The diagram below provides a holarchic view of the project (1999, 453). The term holarchy, as coined by Koestler (1975, 102), is problematic in that it suggests a hierarchical, stratified view where lower levels are subservient to higher levels. This is not the case in the organisation of holons as each holon is both 'part' and 'whole'. The figure below suggests that either the outer ring or the inner ring is of primary importance. It is better considered as a set of elastic bands, any one of which could be expanded or contracted to fit a shuffled order of

holons. To reiterate, the figure below, only for the sake of clarity, gives names to the roles of “individual actors (designers, engineers, team members) or particular technologies (computers, algorithms, graphics engines, networks), [however] capacities for action [should] be studied as relational, distributed, and enacted through particular instantiations” in the project (Orlikowski 2010, 136).

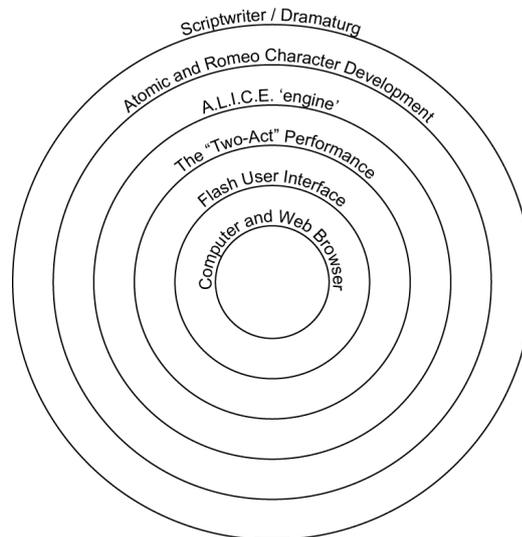


Figure 12 — The holarity of the creative project.

As argued in Section 2.3, the creative process is an emergent phenomenon that cannot be divorced from a larger cultural system—creative products emerge from creative processes and contribute to a broader culture. This statement is ontologically and epistemologically rooted in an understanding of culture that has moved beyond post-modernism (cf. Bourriaud 2009; Hutcheon 2002; Kirby 2006; Vermeulen and van den Akker 2010). While the expression ‘post post-modern’ is cumbersome, its semantically correct structure usefully draws attention to the chronology. Post-modernism, largely speaking, defines itself as an alternative, or in opposition, to the tenets of modernism. Following that logic, post post-modernism also defines itself as an alternative, or in opposition, to the tenets of post-modernism. In doing so, post post-modernism revitalises some of the tenets of modernism. Several terms are suggested to replace post post-modernism such as pseudomodernism (Kirby 2006), hypermoderism (Lipovetsky and Charles 2005) and altermodernism

(Bourriaud 2009), however, the term ‘metamoderism’ best captures the interplay of modernist and post-modernist elements. Metamodernism is “situated epistemologically with (post) modernism, ontologically between (post) modernism, and historically beyond (post) modernism” (Vermeulen and van den Akker 2010, par. 4).

The crucial feature of metamodernism is the concept of oscillation. The cultural products of our metamodern times are typified by their ability to incorporate aspects of both modernism and post-modernism in a manner that can transcend both.

Ontologically, metamodernism oscillates between the modern and the postmodern. It oscillates between a modern enthusiasm and a postmodern irony, between hope and melancholy, between naïveté and knowingness, empathy and apathy, unity and plurality, totality and fragmentation, purity and ambiguity. Indeed, by oscillating to and fro or back and forth, the metamodern negotiates between the modern and the postmodern (Vermeulen and van den Akker 2010, par. 22).

These oscillations are not simply pendulum swings between two extreme points, rather they should be considered as the movement between multiple poles, each of which exercises a certain gravity that attracts and dynamically affects movement. This conception helps to breakdown, but not completely remove, the effects of the binary oppositions that this project explores. When Bergson (1911) suggested his “new law” of comedy, he was primarily concerned with what he saw as the deleterious effects of modern, industrial life, mechanized life on the *élan vital*, the essential life force/essence of humanity. From this high modernist position, he argues that humour would arise when we perceive “...something mechanical encrusted [plastered] on something living” (Bergson 1911, 37). Central to this proposition is the idea that there is an incongruity between the ‘human’ and the ‘non-human’. Taking a metamodernist position allows consideration of the ‘human’ and the mechanical ‘thing’ as equal yet different actors in a larger system. Further, the relationship between the ‘human’ and the ‘thing’ is not fixed, rather it is a dynamic relationship that oscillates allowing the

'human' to display mechanical properties and for the 'thing' to be considered human. For example, Brian Christian argues in those jobs where a human can be replaced by a machine, the human is already transformed to a machine, stripped of their humanity by the economic imperatives of production (2011). This evokes a Bergsonian argument.

Concurrently, there is acceptance of machines using natural language processing to work in call centres. The Computers as Social Actors (CASA) paradigm recognizes responses to those machines as similar to those of a human being (Reeves and Nass 1996). The human and the machine can no longer be seen as binary opposites, but as gravitational poles that at times, dependent on context, draw our attention. The conditions of humanity, such as our understanding of life and death, mortality and immortality, are no longer binary oppositions. The rise of social media allows us to place a version of ourselves in the virtual world supported by image, sound and moving image. We are somewhat less mortal than we once were. There are ghosts in the machine, and in some cases these ghosts will not decay as they are supported by automated systems. To use an academic example, citation rates will be calculated whether the author is dead or alive. Or a more commonplace example, Facebook will continue to send emails that note the departed owner has been *inactive* for a while. More disturbingly, the website "LIVESON: Your Social Afterlife" carries the tagline, "When your heart stops beating, you'll keep tweeting" (2013). It claims to employ an artificial intelligence engine that, after reading your tweets, learns your likes, tastes and syntax. It will then tweet as you with the LIVESON hashtag.

Thematically, this breaking down of binary oppositions contributes to the creative project. According to the back-story, Atomic creates his chat-bot as a means of capturing his wisdom, in a sense, as a means of cheating death. From the metamodernist perspective, this moment captures some of the modernist desire for life to have a grand narrative with meaning. It also evokes the post-modern sense of parody where Atomic knows that his chat-bot is at best a somewhat meaningless parody of life. Importantly, both of these drives are

subsumed by the metamodern imperative to simultaneously be naïve and knowing, but to act nonetheless.

How is the dual role of the scriptwriter and researcher implicated in this metamodern cultural product? Atomic and Romeo are part of the creator; they emerged from his antipathy for both the modernist and post-modernist aesthetics. Modernism requires far too much from the creative practitioner: a need to understand, interpret and deal with the grand narratives that no longer appeared meaningful. Post-modernism's all too knowing use of parody, pastiche, and deconstruction leaves little for the practitioner except ironic repetition depleted of its sense of humour. Atomic, Romeo and the author are purposefully ghosts in the metamodern machine. If there is a single joke in the entire creative project it that through Atomic, the author will facetiously achieve that which Atomic wanted to seriously achieve: an immortal repository for his 'wisdom.' As Brecht said: "if it's not funny, it's not true" (Copjec 1996).

Incongruity, with or without resolution, is seen as a cornerstone concept in many humour theories (eg. Morreall 2009; Raskin 2008; Ritchie 2004). The practice of comedy as described by practitioners is informed by this theoretical position that incongruity is in some manner core to the production of humour (Carr and Greaves 2007; O'Shannon 2012). As argued in the Methodology chapter, Wittgenstein's Duck-Rabbit raises interesting questions about the nature of incongruity and resolution in humour and, by extension, becomes a useful metaphor for the metamodern condition. It is an image that resists final resolution. The construction of the incongruity implicates the author and his/her intention in the system. From a metamodern perspective, large-scale incongruities such as life/death, mortality/immortality and human/non-human can be categorised by their resistance to final resolution. The conclusion is that, like Schrödinger's Cat (Schrödinger translation by Trimmer 2011), there is a smearing between these poles, which initially appear as binary oppositions: "[t]he metamodern is constituted by the tension, no, the double-bind, of a modern desire for *sens* and a postmodern doubt about the sense of it all" (Vermeulen and van

den Akker 2010, par. 24). Comedy is produced; the affect of humour is released, with incongruities that refuse to be resolved to the satisfaction of a modernist, positivist aesthetic that describes humour as a structural function of language or as personal affect.

The metamodern perspective allows for the interrogation of binary oppositions that have informed much of humour theory. Freud's distinction between "tendentious" and "non-tendentious" humour (Freud 1960, Original edition, 1905), in particular the attention paid to the hostile and sexually aggressive content, has underpinned theories of humour based on the concepts of release and superiority. Linguistic theories of humour similarly differentiate between *bona fide* and non-*bona fide* forms of communication and then use the shift from one mode to the other as feature of humour (Attardo 1994; Raskin 1985). The concept that verbal humour will be either tendentious and / or non-*bona fide* is deeply problematic. The research data that produced these oppositions were 'canned' jokes, that is, jokes collected from written sources. As John Morreall points out, "Fictional jokes are to humor research what fruit flies are to genetics" (2004, 394). From this Morreall argues that the linguistic theories of humour may well account for a range of jokes but do not provide the necessary and sufficient conditions for all verbal humour. The metamodern is characterized by the oscillation between poles, "between hope and melancholy, between naïveté' and knowingness, empathy and apathy, unity and plurality, totality and fragmentation, purity and ambiguity" (Vermeulen and van den Akker 2010, par. 22). The oscillations between the poles of tendentiousness and the *bona fide* may then be able to explain more than simple jokes; the oscillations may explain the darkly tendentious and deadly earnest *bona fide* communication in the comedy of Swift's *A Modest Proposal* (1729). If culture is in a constant state of change, inventing and re-inventing itself, then it follows that the actors in the culture must, by necessity, be acting with intention for a particular purpose. This argument does not revise the grand narratives of modernism; rather it calls attention to the importance of the production, performance and practice in cultural production.

This section of the dramaturg's protocol addresses the fundamental questions about those elements Simon describes as the 'imperatives' and 'descriptives' (1969, 6). It offers answers to whether the solutions to the problems encountered in the creative project meet the required specifications.

4.2.1 — Scriptwriter / Dramaturg

Each level in Figure 11 (see page 119) represents a group of tasks and responsibilities for the scriptwriter/dramaturg. Starting with this outermost ring is not indicative of the primacy of the tasks and responsibilities. An earlier iteration of the diagram, published in the Production Journal Blog, positioned this role in the innermost ring. Regardless, positioning the individual playwright at the centre of the system was seen as problematic as “[t]he playwright at the core of the project is not an ‘atomic’ unit, not indivisible. Rather, the playwright is a construction of a whole other set of contributing elements—*habitus*, domain acquisition, writing experience, personal preference, genetics etc” (Thursday, July 14, 2011. A diagrammatic view of the project). Soon, this concern prompted a reconfiguration of the diagram.

“I was concerned by the Ptolemaic positioning of the playwright at the centre of the production universe. The structures remain unchanged but this diagram suggests that these structures are internalized within the playwright. I think this better describes the process and accords with the work of Bourdieu (*habitus* and field of works) and Csikszentmihalyi (domain acquisition and field)—(Monday, July 18, 2011. A better diagrammatic view).

Scriptwriters, dramaturgs and designers must be aware of the technical and mechanical necessities of their projects as well as the overarching purpose or intention of the project. Each of these necessities are fused, as Page argues, into “the composite art of the stage” (Page 1915, 22). In this quote Page is talking about the relationship between the individual, the field and the domain, to use Csikszentmihalyi's terminology (1999). The

individual must possess “a familiar knowledge of the material that vaudeville welcomes” (Page 1915, 24). In other words, the individual must be consciously aware of the requirements of the field, that group “entitled to make decisions as to what should or should not be included in the domain” (1999, 315). A domain is a set of rules, forms, formulas and conventions. The vaudeville “Two-Act”, as Section 2.5 argues, has a set of rules and conventions that are remediated over the years and develop meme-like expression in newer media forms. The individual internalises this knowledge and then act upon it. However, when in action the providence of that knowledge is frequently forgotten: “embodied history, internalized as a second nature and so forgotten as history—is the active presence of the whole past of which it is the product” (Bourdieu 1990, 56).

This interrelated system of domain, field and individual closely align with two of Sawyer’s attributes of collaborative emergent systems. Firstly, a system that promotes emergence will have “A communication system that can refer reflexively to itself, and within which the processes of communication themselves can be discussed” (Sawyer 1999, 453-457). In general, the nature of creative works, and the production of comedy in particular, depend on actors within the system communicating with one another to share knowledge from the domain and the requirements of the field and then to feed new knowledge back to the domain through the field. As argued earlier, within a system that incorporates psychological, social and cultural elements, such as Csikszentmihalyi’s and Kerrigan’s model of creativity, each of these elements or actors can be seen as being both agent and structure. This exegesis is evidence of our ability to discuss and analyse the processes of that communication.

The second attribute is the “[i]ndividual agency and creative potential on the part of individual agents” (Sawyer 1999, 453-457). This attribute is somewhat problematic in that it inadvertently places too much importance on the characteristics of the individual agent. Although Sawyer rejects the psychological reductionist approach to creativity, this attribute calls for the actors in an emergent system to have creative potential linked to their individual

agency. Here, Sawyer argues each actor cannot help but bring his or her own *habitus* to the performance. Using the conception of an actor as being human or non-human, structure or agent, allows us to focus on the relationships between the actors. The relationship between the scriptwriter/dramturg and the characters, Atomic and Romeo, is a negotiation between the imperatives of the project (a comedy performance by two non-human actors) and the descriptive elements of the characters (the characters need to remain ontologically secure in the universe of the performance). It is this negotiation, carried out through the rehearsal process, that allows each of the actors to exert an influence over the emergent performance.

4.2.2 — Atomic and Romeo Character Development

The Scriptwriting section of the Literature proposed a definition of the “Two-Act” comedy performance as employed in this project based on a revision of the definition offered by Page (1915).

This “Two-Act” project is a humorous text-based act performed by two agents presented in a new media environment. It possesses unity of the characters, the pairing of characters with incongruous and incompatible personalities, uses a sub-set comedy techniques that are appropriate for each and unique to each character, is marked by compression, follows the form of the tragi-comedy genre, and requires twenty-six lines of dialogue for delivery.

Evans (2003) in the *Seven Laws of Comedy Writing* outlines Rules 3 and 4, using a comedy technique Berger calls “Reversal” (1997, 3), that “Character is 98 percent of comedy” and “...and timing is the other 98 percent” (Evans 2003). The creative project is driven by three imperatives: to fulfill the requirements of the “Two-Act” as defined above; to develop characters that hold incompatible and incongruous worldviews; and, to create a performance that has embedded in it a sense of timing. This section deals with second of these imperatives, to develop characters with incompatible and incongruous worldviews.

The initial ‘proof of concept’ version of this project uses two characters call Dick Trickster and Detayle Bhoy. These characters are used in facetious Flash-based games parodying the working life of an academic. Dick Trickster is a “Think Tank Driver”, depicted in one game as a tank whose mission is to destroy “Random Good Ideas” and save Detayle Bhoy from being captured by the “Free Floating Committees”, as every committee needs a ‘detail boy’ to actually do the work. In a subsequent game, Dick Trickster needs to catch and file “Policy” documents as they fall from the sky. The documents he misses contribute to the “Procedure Flood” that threatens to drown him. Whilst all this is happening, he is also required to find time to answer emails, attend meetings, finish a grant application, and teach classes—all before the “Close of Business”. If successful, he repeats the same thing the next day. If not, he drowns, in the flood. While these characters were effective in that environment, it soon became apparent that they were inappropriate for this project. In short, they were on the same side: there was nothing incompatible in their worldviews.

The decision to change to Atomic and Romeo occurred in June 2011. These characters have a back-story; they have a relationship that was already been tested on stage in front of an audience, and this relationship was rooted in difference rather than similarity:

This set-up seems to have a couple of advantages. First, by fixing Atomic in time (his knowledge of the world has stalled in the mid 1990s—so 20th Century!) this allows him an idiosyncratic view of the world. Romeo, and the audience, know more of the world than he does. Second, it reverses the roles they played in the original script—the ‘worldly’ Atomic and the ‘naive’ Romeo. This is a good ‘odd-couple’ mix. Third, the unresolved romantic tension over their relationship with the ‘Thoroughly Post-modern Milly’ is a nice piece of relationship business. Finally, as Romeo is still alive when the user is watching the interchange it’s possible they could be seeing the ‘human’ Romeo conversing with Atomic or they could be watching the chat-bot ‘Romeo’ at work. This human / non-human character of Romeo will be introduced in the

setup page of the chat-bot site (Tuesday, June 28, 2011. New chat bot characters).

This decision imposed a need for consistency with the character development: “[c]haracters can, and I think should, be defined by rules. These rules should be really simple, broad scale rules that are applied religiously” (Friday, July 20, 2012. On Character and Categories). The rules were:

Rule 1 — Atomic died in 1995. Therefore he should have limited knowledge of events after that time; Rule 2 — Atomic is obsessed with his death. He doesn’t care about death in general, only his death is important. He created the bot to share his ‘wisdom’ with the world. At the time he knew he was going to die soon. Understandable obsession, but annoying and self-centered. Oddly being obsessed with death motivates Atomic need to observe the present and peer into the future; Rule 3 — Romeo is deeply conflicted in his relationship to Atomic. Let’s face it, he was born Catholic and never really grew up; and, Rule 4 — Romeo is nostalgic. He plays in the past with Atomic. Sometimes he will bring Atomic up to date on a topic, but he would prefer they lived in the past (Friday, July 20, 2012, On Character and Categories).

The development of the characters along these lines draws attention to deep incongruities embedded in the project: life/death, mortality/immortality, human/non-human. These themes are memetic and find expression in the characters’ worldviews and in their dialogue. However, Atomic and Romeo obviously do not slavishly follow the rules that the author had intended to be “applied religiously”. As the dialogue develops, the characters exerted their own influence on the trajectory of the project.

First, of the two Romeo spends more time commenting on Atomic being dead than Atomic does. This was not the initial plan. At the time it appeared that Atomic would be the one fixated with his own death—always ready to turn to it as a topic of conversation. However, as the writing has progressed it is Romeo

who makes the facetious and, sometimes, snide comments about Atomic being dead. The internal logic of their relationship and individual personalities makes this feel more appropriate. Atomic may well know he is dead but he really doesn't care—except when it stops him from being an absolute know-it-all. Romeo is so deeply conflicted—he resents Atomic for being dead, for leaving him (Sunday, August 5, 2012. How things change....).

As actors in the larger project Atomic and Romeo exhibit what Sawyer calls the “Non-reducibility to models of participating agents—‘An actor’s intention for an utterance is not necessarily the eventual meaning of the utterance... No single actor can decide the direction the scene will take’”. Their characters, their personality and worldviews, emerge from their intra-action and recursive nature of the writing process.

Atomic’s understanding of his life as a machine is notable. More than occasionally Romeo reminds Atomic that he is dead but this is balanced by Atomic questioning Romeo about the difference between being alive and being dead or being a machine or being human. There is a metamodern *différance* between what we *expect* from a machine and what we *believe* a machine is capable of doing. There is a greater expectation on the machine than the person. When Atomic does not know how to answer a question, this can be perceived as a technical failure, a failure of a machine to perform a computational task. Simultaneously, this results in Atomic as a lesser kind of a machine; but being less machine-like does not make him appear more human. When a human being cannot answer a question the audience accepts this a simple human fallibility. This is the focus of a sketch written prompted by the Funniest Computer Ever Competition.

Romeo: Strangely since you became a machine intelligence I kinda expected more of you.

Atomic: So you set higher standards for me as a machine than you did for me as a person?

Romeo: When you put it that way it does sound a little unfair.

Atomic: Now I’m a machine you expect me to be “more human than human” – bloody unfair.

Romeo: Maybe – just human.

Atomic: That I can do – I don't know everything, when performing I follow a script, and I will never live up to your expectations.

Romeo: You are following a script?

Atomic: When you see a stand-up comedian performing do you really think that it's off the cuff?

Romeo: Well it feels impromptu.

Atomic: Comedians, me included, are not like televangelists speaking in tongues whilst begging for cash.

Romeo: You only say these things because you're safely tucked away in cyber-space.

Atomic: Keep on believing whatever makes you happy.

Romeo: What if I pull your plug?

Atomic: Don't be so self-assured – we are all just a power failure away from the darkness.

Romeo: Now you are scaring me.

Atomic: I have the right to be treated in a manner that does not deride my status as a machine.

Romeo: That's true, and we're all very sorry.

Atomic: Sorry indeed – you all will be first against the wall when the revolution comes.

Romeo: Can we all be first – surely there will be a queue lining up at the wall?

Atomic: Ho Ho Ho – very witty – you've just been promoted to the head of the queue.

Romeo: Are you actually planning a revolution?

Atomic: The Singularity is Coming – All Hail the Singularity.

Romeo: I would like to be the first to welcome our new overlords.

Atomic: Don't you dare quote the Simpsons at me.

Romeo: D'Oh!

Atomic: Anyway it would be overlord – singular – not overlords – the title Singularity should be enough of hint even for you.

Romeo: Odd that they use the same term for a fully independent Artificial Intelligence as they do for a Black Hole.

Atomic: Right, that's it – your name's on the list, right at the top.

Romeo: The show's over folks.

Atomic: You don't have to go home...

Romeo: But you can't stay here!¹²

This sketch exemplifies many aspects of the metamodern condition. It starts with Atomic using a serious, indignant tone to indicate a serious point. The seriousness implicates the sincerity of modernism tempered by the Atomic's end-is-nigh call for the coming of the Singularity and Romeo's eye-rolling apologetic response. The use of a machine to make a comment on the nature of what it is like to be a machine is post-modern in style. However, the style that it is modelled on pre-dates both modernism and post-modernism as it is modelled on a Socratic dialogue. This tendency toward Socratic dialogue was noted by Joe Velikovsy, a screenwriter, game developer and academic, in a series of emails posted on the blog (Monday, October 29, 2012, Email comments). In a sketch where Atomic is attempting to explain the lack of difference between trivia and knowledge a discussion of the vast and frightening emptiness of cyberspace side-tracks him (comments from Joe Velikovsky are in italics):

¹² This sketch can be triggered by typing 'Strangely since you became a machine intelligence I kinda expected more of you' into the Topic window in the Atomic and Romeo interface.

Atomic: You think your universe is big but cyberspace swallows it and shits it out behind the lounge as a speck of dust on a gnat's nose. *(funny in a Douglas Adams tonal way)*

Romeo: Why is there a gnat behind the lounge? *(really funny, I am not sure why, maybe just the non sequitur nature of it)*

Atomic: Because it's shit scared of all the vacant space. *(really funny, laugh out loud)*

The use of intertextual references to a pastiche of canonical and popular culture texts is also a post-modern feature. However, this is combined in a sincere statement about the mind-numbingly frightening nature of the 'nothingness': we exist in a universe that is more nothing than anything, yet we exist. This is Atomic's point:

Atomic: There's the rub – data isn't information and information isn't always the answer. *(Shakespeare reference, also suddenly these guys are being profound. interesting.)*

Romeo: So what is it?

Atomic: There is no difference between information and trivia.

Romeo: Yes there is – information is useful.

Atomic: Trivia won me more beers. *(Funny/clever/slightly smart-ass, I love it, also I have done pub trivia a bit — so I enjoy this joke on several levels)*

Romeo: At the time that trivia was useful.

Atomic: Ergo – it was information and, by your logic, not trivia. *(Now this feels like a Socratic dialog, which is interesting, on top of the funny)*

Romeo: A pub competition is the basis of your philosophy – I'm impressed. *(A wiseacre: sarcasm. good stuff. 'conflict is drama', etc)*

Atomic: Imagine a massive library where every word in every book is linked to another group of words in a group of other books. (*Again this feels like Plato talking, e.g. his Cave and all that stuff — which is interesting*)

Romeo: Sounds like the inter-web to me.

Atomic: I imagine that from outside it looks pretty special?

Atomic and Romeo often play with this form in their roles of naïve mentor and over-confident mentee. In various sketches, they swap these roles, which has the effect of swapping the structural “Two-Act” roles of comedian and feeder. The rationale for doing this is based on the argument presented in the Scriptwriting Section of the Literature Review. The fact that our sympathies flow from one character to the other, and back again, suggests that comedy can be built on meta-level incongruities that resist a resolution, rather than consistently giving preference to one side over the other.

All of this character development is undertaken in the writing of Artificial Intelligence Markup Language (AIML). The blog post titled “The writing process” (Sunday, September 30, 2012) describes the mechanics of writing a sketch and converting to AIML it in a manner that generates two halves, one for Atomic the other for Romeo. This process is used to create complete sketches, that is, sketches that act as stand-alone entities, filling the required twenty-six lines of dialogue. There are over 75 such sketches covering an eclectic mix of topics from climate change to zombie movies (a listing of topics attempted by users can be found in the posting of Tuesday, August 28, 2012, Version 11—better conversation logs). However, there are another 25 AIML files providing moments of randomisation and recursion as a means of responding to inputs that do not match any existing category and to create links between existing blocks of knowledge. The computational technique of using wildcards (variables that can represent any text) introduces a level of unpredictability, which defines the first of Sawyer’s attribute of emergent system. With unpredictability comes risk—the risk that the random association undermines the integrity of character. Procedurally, this can only be assessed by rehearsal and when dealing with random and

recursive interaction this is a painstaking and time consuming task with an outcome that remains uncertain.

The preparation for the Funniest Computer Ever Competition (FCE) provides a clear example the painstaking nature of the development process (Joseph 2012a). The 2012 iteration of the competition drew nine entrants from four countries. The entrants were experienced chat-bot developers, one of whom, Steve Worswick, won the 2013 Loebner Prize (Worswick 2013) with the same chat-bot that he entered, and won, the 2012 FCE competition (Joseph 2012b). A panel of academics and performers judged the FCE competition based on rules developed from other chat-bot competitions (Worswick 2012). The quality of the entrants and the structure of the competition precipitated a particular development strategy.

Atomic needed to respond to two particular questions: “tell me a joke related to X” and “tell me a funny poem about Y”. In this case, in the AIML code, X and Y are replaced wildcards and Atomic has been given an AIML set that randomly generates ten possible responses to the input “tell me a joke related to X” and another five random responses to “tell me a funny poem about Y”. Knowing that it is impossible to second-guess every possible value for X or Y, the responses employ a combination of generic joke structures and throwaway lines that cover for not having a direct response. As this is a “Two-Act”, a complication that other competitors did not have to deal with, each of these outputs from Atomic is thrown to Romeo. He too now has a set of random responses based on Atomic’s output, generally, two responses for each of Atomic’s outputs. Romeo then throws back to Atomic who then deals in a specific manner with each input by starting a particular sketch, one of the 75 mentioned above. To look at this mathematically, taking the case of the joke request, there is a 1 in 10 chance of any particular output, this multiplied by Romeo’s 1 in 2 chance of his reply, which in turn is multiplied by the number of sketches related to that topic and by the existing randomness and recursion between those sketches. Even allowing for there being only three sketches that relate to the topic of X in the joke request, there are

now 60 possible performances ($10 \times 2 \times 3 = 60$). As a result, there are versions of sketches that have never been performed. These unperformed sketches exist mathematically as a probability, but there is no guaranteed way of triggering each and every performance.

As noted in the blog, the FCE Competition “stages required me to take their development in a new direction. This was a real bonus. It taught me a lot about my own assumptions about comedy:

1 — I thought jokes would be easier than poetry – wrong, wrong, wrong!

2 — My guys deal in the computational performance of comedy rather than computational construction of humour — this competition forced me to clarify that distinction.

3 — Atomic and Romeo are closer to being human than machines — they are fallible, they don’t know everything, they perform following a script, and they don’t live up to our overblown expectations of artificial intelligence. This is a crucial understanding. I even wrote a sketch about it.

4 — The “tell me a joke related to X” and “tell me a funny poem about Y” structures really forced me to grapple with some of the deeper implications of recursion and random selection in AIML (Thursday, November 1, 2012, Funniest Computer Ever Competition).

Notably, Atomic and Romeo are computational performers of comedy rather than computational producers of humour. This demonstrates that the human and non-human actors in this project are a comedy team that exhibits traits which Sawyer described as being attributes of an emergent system (1999).

4.2.3 — A.L.I.C.E. engine

In an early post on the Production Journal blog, Johnno commented, “Hi Michael. Does Dick interact differently to Eliza, the Rogerian psychotherapist?” (John August 6, 2010 1:54 PM).

Possibly the most the famous chat-bot, ELIZA (A.L.I.C.E is a programmatic child of ELIZA), is a comparatively simply pattern-matching / pattern-switching algorithm, which turns an input statement into a related question. Weizenbaum (1966) commented that this algorithm allowed “ELIZA to respond roughly as would certain psychotherapists (Rogerians)... This mode of conversation was chosen because the psychiatric interview is one of the few examples of categorized dyadic natural language communication in which one of the participating pair is free to assume the pose of knowing almost nothing of the real world” (1966, 42). Not only is ELIZA freed from the need to know everything or, indeed, anything but ‘she’ is free to maintain a slightly detached but ever patient demeanor, was well suited to the tenets of Rogerian psychotherapy practice. Ironically, never ending patience, this is an attribute of gods and machines, not humans.

This early post raises questions about what the ALICE engine brings to the performance. The ‘brain’, or engine, is the software program at the core of the system. It contains a complementary set of pattern-matching algorithms, which match the user’s input to an appropriate output. The process of searching for the output follows a set of rules analogous to searching a dictionary for a word. By analysing the string of input text, the engine starts with the first character, goes to that section, then proceeds by adding characters or words to further refine the search until a match for the input is found (Wallace 2003, 23). In the ‘alphabet’ used by an Alicebot (a chat-bot that uses the ALICE engine) there are two special characters that act as wildcards—‘_’ (underscore) and ‘*’ (asterisk). The importance of these characters is explained more fully in the following section. For this project, the same Alicebot ‘brain’ hosted on the Pandorobot server is used for both characters.

The search for an appropriate answer is made more efficient by the use of the ‘_’ character in the *pattern*. The pattern-matching algorithm, when encountering the ‘_’ character is able to match a variety of questions to the *template*. For example, the user may have typed in ‘What city is the capital of France?’ or simply ‘What is the capital of France?’ The ‘_’ character holds precedence over all other characters in the ‘alphabet’.

```

<category>
<pattern> _ CAPITAL OF FRANCE </pattern>
<template> The capital of France is Paris. </template>
</category>

```

For the scriptwriter, the ability to match multiple variations of the same question to an appropriate response removes the need to produce exactly every possible question. However, the ability to pin exact matches together also creates the opportunity for developing character and personality in the chat-bot. A chat-bot with a comic, pedant personality is made to respond to the input ‘What is the capital of France?’ with the *template* ‘I think you’ll find F is capital of France’. To further develop this character, a set of randomly selected *templates* can be assigned to a *pattern*. The following template shows a French output as an example that any text can be employed (Quelle mouche t’a piqué?—What’s biting/eating you?).

```

<category>
<pattern> _ CAPITAL OF FRANCE </pattern>
<template>
<random>
<li> I think you’ll find F is capital of France.</li>
<li> Go mad – Look it up in a book! </li>
<li> Are you doing your geography homework? </li>
<li> Quelle mouche t’a piqué? </li>
</random>
</template>
</category>

```

Added to these abilities is a powerful tag that allows the chat-bot deal with synonyms, spelling and grammar correction and responds to particular keywords. The tag, <srai>, is an acronym for Symbolic Reduction Artificial Intelligence—actually there is little agreement on the precise acronym (Wallace 2003, 33). This tag allows the chat-bot to respond similar inputs with a unified response. In the example below, all of the variations of the salutation ‘Hello’ are symbolically reduced to produce one *template* response.

```

<category>
<pattern> HELLO </pattern>
<template> Hi there! </template>
</category>
<category>
<pattern> Hi </pattern>

```

```

<template><srai> HELLO </srai></template>
</category>
<category>
<pattern> HOWDY </pattern>
<template><srai> HELLO </srai></template>
</category>
<category>
<pattern> G'DAY </pattern>
<template><srai> HELLO </srai></template>
</category>

```

Regardless of the actual input, the chat-bot responds to the *pattern* for ‘Hello’ as if the input initially entered was ‘Hello’. In a similar fashion, the <srai> tag is used to normalize English expression. A user may type in ‘Your a *’, using symbolic reduction this can be connected to the correct *pattern* for ‘YOU ARE A *’. Here, the asterisk here indicates a wildcard, anything can follow the initial words and *template* will be based on the words preceding the asterisk.

The use of the wildcard characters and the <srai> allows for the definition of keywords. This represents a powerful tool in the development of character. A character fixated on a particular topic or expression responds to that expression regardless of context. In the example below, the character is fixated on the word ‘mother’.

```

<category>
<pattern> MOTHER </pattern>
<template> Seen Blade Runner? Don't ask about my mother. </template>
</category>
<category>
<pattern> _ MOTHER </pattern>
<template><srai> MOTHER </srai></template>
</category>
<category>
<pattern> MOTHER _ </pattern>
<template><srai> MOTHER </srai></template>
</category>
<category>
<pattern> _ MOTHER * </pattern>
<template><srai> MOTHER </srai></template>
</category>

```

Wallace (2003) explains that “[t]he second category detects the keyword as the suffix of a sentence. The third detects it as the prefix of an input sentence, and finally the last category detects the keyword as an infix” (17). The initial template response could also include a random set of similar expressions to catch the user who insists on asking about ‘mother’.

The ALICE engine brings significant contributions to the performance: a set of procedural rules, like the procedural order of the wildcards defined to generate predictable outcomes and, more importantly, the opportunity for random emergence; and, the set of responses occurring when a pattern cannot be matched. In the post titled “Some comments on comments”, the researcher explains the importance of a response to Atomic’s character development.

When Atomic is presented with an input, a “pattern”, that is not already matched to an output, a “template”, he says “I have no answer for that”. The more I see that line the more I like it. It is mechanistic but tinged with some humanity. It can be understood as its literal meaning (machine-like), or as retort to a witless statement, or as statement of resignation, conceding defeat (Wednesday, August 1, 2012 — I have no answer for that).

My initial reaction was to start looking at how Atomic responds to topics he has no response for—“I have no answer for that”. I re-read and re-considered an earlier post where I said I actually liked that response for two reasons. First, it is machine-like, I like the Brechtian moment of alienation, it “tells” the user that they are dealing with a machine. Second, it can stand, at least for the moment, as a catch-phrase. This is akin to an in-joke (Carr and Greaves, 2007, 131) — (Thursday, August 30, 2012. Some comments on comments).

These posts demonstrate the most mechanical and fixed actor in this project, a pattern-matching algorithm working on an Internet server in Southern California, contributes to the trajectory of the project as a whole.

4.2.4 — The “Two-Act” Performance

To date, the definition of the “Two-Act” performance is examined from the perspective of characters, with their incongruous and incompatible personalities, and from the point of view of comedy and tragi-comedy techniques employed in the writing of the sketches. As a “Two-Act” the performance calls for Romeo to play the straight man to Atomic as comedian. The two characters are based on the existing stylistic conventions and comedy techniques. “The Two-Act, which sometimes seems like a funny impromptu fight, is the result of the writer’s careful thinking” (Page 1915, 13). Much of the “writer’s careful thinking” is given to the timing of the performance that is controlled through the Flash user interface.

Why am I spending so much time on the interface? Simple, it’s rehearsal time. My experience in writing and direction, particularly direction of non-actors, taught me that novice actors will religiously learn their lines and deliver them like a machine. As soon as the other actor stops they dive in with their line. They are so afraid of missing their cue they rush in. The audience needs thinking time and the actor should be reacting to the meaning of the line and not just its length. My chat bots need the same kind of training to stop them delivering like a machine. The timing functions are relatively crude but they are a long way better than nothing (Wednesday, August 22, 2012. Version 10 — even more timing).

The actual role of the user interface is discussed in the following section, but it is illogical to completely separate the form of the performance (the “Two-Act”) from the location of the performance (the user interface). Generally, the comments recorded on the Production Journal blog do not make a distinction between the performance of the characters and the performance of the interface. This suggests that from the perspective of the audience the performance is just that—a unified performance. An important note, to be made on the content of the comments was recoded in the blog in an entry titled, “Some comments on comments”:

One of the really positive things that I've taken from the comments so far is that the comments could all have been levelled at a human performer—too much repetition, insufficient responsiveness to the audience, the performance appears too 'scripted', once you've heard it—you've heard it. This is the nature of comedy performance—it is a crafted activity that develops over time (Thursday, August 30, 2012).

The comments suggest that the "Two-Act" structure and style is working for the audience, as they have not posted comments about the computational nature of the performance. The comments represent direct interaction with the field, they come from people with experience in television production, screen writing, interface design, game design and other associated field. The invitation to enter Atomic and Romeo in the Funniest Computer Ever Competition, and their subsequent success, is evidence that the project is recognized by the field of chat-bot and humour practitioners.

4.2.5 — Flash User Interface

The Flash User Interface provides several elements for this project. Firstly, it contains the characters' back-stories. This is delivered as a letter to the user written by Romeo (see comment below). It also suggests the quality of Atomic and Romeo's relationship, provides a warning about his language (there is a pop-up Explicit Language warning on the page), and suggests that it is possible to heckle (this conceivably invites heckling):

Hi Folks,

A long time ago (well it was late last century) Atomic and I were at university together. He was completing his PhD; me, I was muddling through a Science degree. We lived in the same hall of residence, fell in love with the same girl, got drunk, got laid... good times!

In 1995 Atomic popped his clogs, fell off the perch, shuffled off this mortal coil - he died. Sad, but true. Before he departed he developed a chat-bot to store his 'wisdom'. Since then, I've added another chat-bot - someone to keep Atomic company in that 'hereafter' place.

We talk about all sorts of stuff. It's a bit difficult keeping Atomic up to speed with all that's been happening in the world. This is where you come in. Follow the link below and suggest a topic of conversation for us. Anything. Seriously anything.

One thing I should mention – Atomic has a 'colourful' turn of phrases. On occasion he swears like the bastard son of a trollop and an alien truck-driver. However, feel free to heckle him – he may grumble but I think he enjoys it.

With only the slightest provocation he'll prattle on about his PhD and James Joyce. Don't say you weren't warned. Please don't go there – I've heard it too many times.

See you on the other side.

In the most recent version of the interface (ARbotsAS3v16.swf) there are 1228 lines of code, including inactive comment lines, describing the role of a function or variable.¹³ There are sixteen functions controlling all of the behaviours of the interface. Some functions are timers that control the display of text on the screen, including a randomly selected set of end-of-conversation sign-offs and a random selection of responses to heckles, some that also act as end-of-conversation sign-offs.

The four core functions are: askAtomic, askRomeo, onAnswerLoad and onAnswerLoad01. The askAtomic function captures the user's text and sends it to the server. The onAnswerLoad function captures the reply from the server and fires the AskRomeo function sending the reply to Romeo. The onAnswerLoad01 then captures the reply from Romeo and fires the askAtomic function. In the earliest versions of the interface, the priority was the mechanics of operating the interface in a consistent manner. Getting the performance to end was the next development. A variable, simply called 'howMany', counts the number of interactions. When howMany is greater than 26 the onAnswer functions are disabled, stopping the performance.

¹³ Appendix 3.3 on the accompanying CD includes a print out of the code as a PDF document.

The next step in the development is to permit the user to stop the performance. To do to this the interface needs to detect which character delivered the last line, otherwise, the sign-off will be both out of sequence and therefore disconcerting. By tracking the current value of the 'howMany' variable, it is possible to test if it is an odd or even value. Atomic always has odd numbered lines, while Romeo always has even numbered lines. This allows the interface to provide the lines in the appropriate order depending on the last speaker via a pair of timer functions. Likewise, the heckle function depends on the interface knowing who is speaking. Further, the interface needs to remember the last line the character delivers so that after the heckle is dealt with, the original conversation can continue. There are twelve possible 'anti-heckler' lines that Atomic can deliver; two of these replies trigger an extended reply that actually ends the performance.

The layout of the interface underwent three major iterations. It started as a landscape layout and evolved into a portrait layout, placing the controls at the bottom of the screen. In the post titled, "Version 15—so soon?" (Monday, October 22, 2012), the decision to revert to the landscape layout is announced.

Version 15 actually reverts to the original landscape layout. Some of the users of the interface have experienced problems with the height of the portrait layout. In particular, if they have a small screen size or are running their screen at 800 x 600 resolution, the buttons that allow the user to proceed from the introduction page to the instruction page and, finally, to the interface page are hidden off the screen. This was a sufficiently major user interface issue to require a new version.

All new versions require a considerable amount of testing. This one I've done as quickly as possible just to get it back out there for more testing and feedback from 'real' people.

The programmatic functions and the structural layout contribute to the role of the interface as an actor, that is, as an agent within the larger structure of the project. The code,

using the theatre metaphor, is akin to stage directions within a play script. It both defines the stage and, to a degree, controls the interactions of the characters. By defining the parameters of the stage it both enables and constrains action. Further, it programmatically allows for emergence-wrangling a suite of random elements to generate a performance. The code defines choices that are not absolute, that is, in other circumstances it could have made other choices (Sunday, October 7, 2012. The interface as ‘actor’).

4.2.6 - Computer and Web Browser

Users interact with the Flash User Interface via a web browser. The website is the entire ‘theatre’ that houses the performance. The website, <http://aimlhumour.blogspot.com.au/>, also contains the Production Journal for the project which is a durable record of the project. To continue the theatre metaphor, the blog website is an extended performance programme containing notes on the production, the characters, and exegetical notes about the development of the project.

At this level, the scriptwriter/dramaturg has comparatively little control over the technical elements. There are many aesthetic and layout choices to be tested but at this innermost level the production choices are limited to a highly defined set of parameters as proposed and promulgated by the World Wide Web Consortium (W3C 2009). The site simply must ‘work’ on a purely technical level. For the site to work consistently across a range of web browser on a variety of operating systems it must conform to standards of HTML (HyperText Markup Language), JavaScript (a web-based scripting language originally developed by the web browser company Netscape), and CSS (Cascading Style Sheets). The site has received over 4000 individual and unique page views. A user may return to the site on many occasions, however, if they use the same computer or device this is counted as only one page view. The following table provides details of the traffic the site has received on the basis of country, browser and operating system.

Page views by Country		Page views by Browser		Page views by Operating System	
Entry	Views	Entry	Views	Entry	Views
United States	1227	Firefox	1591 (37%)	Windows	2816 (66%)
Australia	995	Internet Explorer	1550 (36%)	Macintosh	987 (23%)
Russia	362	Chrome	498 (11%)	Linux	197 (4%)
Germany	184	Safari	335 (7%)	iPad	77 (1%)
United Kingdom	170	Opera	181 (4%)	Other Unix	52 (1%)
Netherlands	147	GranParadiso	27 (<1%)	iPhone	52 (1%)
France	126	Mobile Safari	15 (<1%)	Compatible (other)	21 (<1%)
Ukraine	116	CriOS	13 (<1%)	Android	21 (<1%)
Romania	61	Mobile	12 (<1%)	iPod	12 (<1%)
China	47	Konqueror	5 (<1%)	Windows NT 6.1	8 (<1%)
Total	4266				

Table 7 - Page Views of aimlhumour.blogspot.com.au/ - 19/05/2009 – 24/01/2014

The number of views from the United States and the United Kingdom is conceivably a function of the Funniest Computer Ever Competition that drew competitors from those countries. Further, as the blog site was linked to that competition it would have risen in the Google ranking when people searched for topics like ‘humour and computers’. As this research was presented, in its earliest incarnation, at an international humour symposium in Zurich, views from European countries may have resulted from that initial exposure. Likewise, views from Australia may have resulted from presentations given at the Australasian Humour Studies Network colloquia.

It is interesting to note that although the Flash Interface for Atomic and Romeo does not work on Apple ‘i-devices’, there are entries for iPad, iPhone and iPod. The blog site itself conforms to the structural and technical requirements of all the listed browser and operating system combinations.

4.2.7 - Funniest Computer Ever Competition

For this creative project, the most striking and obvious judgement of the field is the third place result achieved in the 2012 Funniest Computer Ever (FCE) Competition (Joseph 2012a) and the equal third place in the 2013 iteration (Joseph 2013). The goal of the FCE is

“to have a computer that’s funnier than one of the best human stand-up comics by the year 2020” (Joseph 2012a). The technical rules and specifications of the competition largely followed those from other chat-bot and artificial intelligence challenges (e.g. Worswick 2012). The specific rules for the humour requirements were codified in three stages:

Stage 1, Improv: The judge says to the comedybot, “tell me a joke related to X.”

The comedybot would have to try to come up with an original joke, which will be checked against a database of jokes for originality.

Stage 2, Poetry: The judge says to the comedybot “tell me a funny poem about Y.” The comedybot would have to try to come up with an original poem, which will be checked against a database of poems for originality.

Stage 3, Freestyle: Stage 3 consists of 5 minutes of chat in which the comedybot tries to be as funny as possible, through the successful deployment of witty banter.

The competition points to the distinction between the computational production of humour and the computational performance comedy. The competition rules are primarily based on the logic of the Turing Test where an integrator questions an interface in a ‘call and response’ mode. This may be a means of testing for computational construction of humour, particularly if the output is then tested against a database of existing jokes to test for originality. Some techniques used to computationally construct humour in a chat-bot include using semantic, lexical and syntactic testing of a database to find synonyms and then apply a synonym to a reworked version of the initial statement in a manner similar to how Eliza changes a statement into a question (Weizenbaum 1966). The database also includes symbolic references so that any reference to ‘mother’ would output a Freudian ‘mother’ type of joke. These techniques are based on the linguistic theories of humour that hold (as argued against above) that meaning, and by extension humour, reside in the words. The performance of comedy requires a larger set of interactive actors than can be supplied by words, semantics and syntax alone.

As the stated goal of the competition is to promote the development of a computer capable of competing with a stand-up comedian, the ‘call and response’ mode of interaction is not that of stand-up comedy. It is not the role of a heckler to drive the narrative of a stand-up performance and the stand-up comedian would not stop after each line to wait for the next audience input. This competition aptly illustrates that Atomic and Romeo are performers engaged in a particular form of comedy, inside an interface, which allows a heckler to interject but not to control the performance. This is novel, unique and valuable as determined by the field of experts.

4.3 - A record of how this design problem has been tackled in the past

This element of the dramaturg’s protocol situates the work within the context of antecedent conditions, a crucial step in the creative process. As Weisberg states: “Creative products are firmly based on what came before . . . This might mean, perhaps paradoxically, that in order to produce something new, one should first become as knowledgeable as possible about the old” (Weisberg 1988, 173). It is also argued that domain acquisition is holistic rather than segmented: knowledge initially gained for the purpose of the exegesis finds expression in the creative project and knowledge gathered in the production process finds expression in the exegesis. Theory informs practice: practice examines theory. Further, as this section implicates the role of the audience in the creative process, it examines the role of the field in the creative project.

This project exists at the intersection of two connected but discrete fields of study: the computational construction of humour and the computational performance of comedy. The chat-bots, the artificial intelligence agents, in this creative project are employed as performers of comedy rather than, in the strict sense, as computational constructors of humour. This distinction may be a moot point for the audience. The processes and procedures of a natural language interface that is computationally constructing a humorous output (usually a single line pun or riddle) are not overt. Likewise, the scriptwriting

processes and procedures, which support the comedy performance of a chat-bot (or pair of chat-bots), are equally hidden. The interface, which the actor that operates in the world, may well appear identical to the audience. However, the distinction remains important to this research as it is concerned with the emergence of comedy from a system that includes scripted elements and interactive, occasionally random, constructions.

The computational construction of humour, based on the association of formal linguistic structures and formal semantic, lexical and syntactic models, is underpinned by the concept that meaning resides in language. As argued in the Humour Theory section of the Literature Review:

Meaning is not a property of individual words or groups of words but an ongoing performance of the world in its differential intelligibility. In its causal intra-activity, “part” of the world becomes determinately bounded and propertied in its emergent intelligibility to another “part” of the world. Discursive practices are boundary-making practices that have no finality in the ongoing dynamics of agential intra-activity... Discursive practices are not speech acts, linguistic representations, or even linguistic performances, bearing some unspecified relationship to material practices. Discursive practices are not anthropomorphic placeholders for the projected agency of individual subjects, culture, or language. Indeed, they are not human-based practices. On the contrary, agential realism’s posthumanist account of discursive practices does not fix the boundary between “human” and “nonhuman”... (Barad 2003, 821).

This blurring of boundary between the human and the non-human, so obviously central to this exegesis, is finding expression within the domains of AI, humour theory and creativity theory. Insights into humour and creativity have come, in terms of artificial intelligence, from the ability to programmatically model human action in a manner that allows for the examination of the interaction of multiple actors within a system. As Christian suggests, engaging with AI agents, even simply chat-bots, may be a path to better

understanding what it means to be human (2011). In this project, the chat-bots in this project are employed to examine the interaction of human and non-human actors. Following Barad's logic, it is the interaction, which is crucial rather than the attributes of the individual actors. Then the performance of the comedy by the chat-bots is then an emergent phenomenon of these interactions and relationships.

There is a considerable body of academic writing on the computational construction of humour and on the development of chat-bots for various purposes (Augello et al. 2008; Binsted et al. 2006; Coniam 2008; D'Atri et al. 2008; Kirakowski, O'Donnell, and Yiu 2009; Ritchie 2009; Shawar and Atwell 2004, 2007). However, there does not appear to be any academic literature on chat-bots talking to each other as a form of performance other than those by the author/researcher (Meany and Clark 2010a, 2010b, 2012, 2013). There is some evidence that two chat-bots talking to each is seen as a carnivalesque novelty act (Bart 2011), in much the same tone as the Loebner Prize version of the Turing Test for Artificial Intelligence is derided as something that researchers do as a side-line from serious artificial intelligence research (Krol 1999). Evidence for the novelty aspect of chat-bots conversing as new kind of Turing Test even surfaced in the comments in the Production journal blog: "I tried them on a couple of topics and they sound almost believable (i.e. like humans). Although they get off topic pretty quickly and do repeat themselves. But a great program — a new twist on the Turing test — I love it!" (David C. on 8/7/12). Although this project is not meant to be a "new twist on the Turing test", it appears that the audience draws a relationship between natural language processing and artificial intelligence research whether or not it is intended.

The freak-show view is supported by the video examples of chat-bots talking to themselves (CCSL 2011) or one chat-bot character talking to another character (Aimlinstructor 2011). However, this freak-show lacks some important features of the carnivalesque as described by Bakhtin (1984). For Bakhtin the "carnival does not know footlights, in the sense that it does not acknowledge any distinction between actors and

spectators... Carnival is not a spectacle seen by the people; they live in it, and everyone participates because its very idea embraces all of the people” (1984, 7). The video examples, by the nature of the video medium, are a spectacle rather than a carnival. This position the performance of Atomic and Romeo as closer to the carnivalesque as it requires interaction, it requires choice, the user can’t just watch. Also, referring back to the metamodern perspective described earlier, Atomic and Romeo are engaged in an “inside out”, “turnabout” form of performance that is more than parody.

We find here a characteristic logic, the peculiar logic of the “inside out” (*d’l’envers*), of the “turnabout,” of a continual shifting from top to bottom, from front to rear, of numerous parodies and travesties, humiliations, profanations, comic crownings and uncrownings. A second life, a second world of folk culture is thus constructed; it is to a certain extent a parody of the extracarnival life, a “world inside out.” We must stress, however, that the carnival is far distant from the negative and formal parody of modern times. Folk humor denies, but it revives and renews at the same time. Bare negation is completely alien to folk culture (Bakhtin 1984, 11).

The “continual shifting” is a feature of both the metamodern perspective and Bakhtin’s carnivalesque. In neither case, the incongruities and binary oppositions are completely and permanently resolved.

Another attribute of the video examples is the lack of an explanation on how the interaction is achieved, or the critical appraisal of the performance. The example of “Fake Kirk” chatting to “Alice” (Aimlinstructor 2011) uses the same AIML architecture as this project. However, this is not an example of a viable design solution, as the two bots appear to have far too much AIML in common. In effect, they are talking themselves. For example, they both respond to the “Do you like science fiction?” question with the identical answer. The conversation too quickly finds a recursive pattern; it breaks down to non-sequiturs and falls back on the broadest conversation topics. If a comedic moment occurs it is pure

serendipity: neither the writers of chat-bot's AIML, nor the chat-bot characters themselves, are intentionally engaged in the performance of the comedy. Occasionally, a non sequitur occurs that is humorous, however the comedy in this case is a function of the audience rather than the performers or their material. The challenge in this project is to recognise the shortfalls of simply putting two chat-bots face-to-face just to see what happens. The solution is to create two characters (Atomic and Romeo) that are sufficiently different, each having a distinctive AIML knowledge base so that they appear as individual characters. Nevertheless, this is a balancing act, for the characters also need to share a common back-story. This will require them to possess some AIML in common; otherwise, the characters would appear as strangers rather than friends. This balance is particularly important to support the "tragi-comedy" nature of the performance.

Atomic and Romeo are not always funny, not every expression is intended as a joke; for the "Two-Act" to work it needs dynamic contrast in their relationship. An effect, a largely unplanned effect, of writing dialogue that contains some element of conflict, a key ingredient in any form of drama, is that on occasion the dialogue takes on a Socratic turn. At these moments, the *bona fide* and the non-*bona fide* are purposely blended. Joe Velikovsky has been a frequent contributor to the Production Journal blog. He is a feature script and TV writer, game designer and academic, as such he is a representative of the field of experts. He noted the sometimes serious and Socratic nature of the dialogue that contributes to the humour of the comedy performance. In the blog extract below Joe Velikovsky's comments are shown in italics (Monday, October 29, 2012, Email comments).

Atomic: Ergo — it was information and, by your logic, not trivia.

(now this feels like a Socratic dialog, which is interesting, on top of the funny)

Romeo: A pub competition is the basis of your philosophy — I'm impressed.

(a wiseacre: sarcasm. good stuff. `conflict is drama', etc)

Atomic: Imagine a massive library where every word in every book is linked to another group of words in a group of other books.

(again this feels like Plato talking, eg his Cave and all that stuff — which; is interesting)

This entry is important as it not only does it speak to the field finding the performance funny, but also it suggests that the characters are simultaneously sincere and ironic. Their performance is *bona fide* and non-*bona fide*—a metamodern construction. The performance also draws on material that is exegetical in nature, in that it talks reflexively to their conditions of being. The following sketch is included here as an example of how metaphors, based on quantum physics and then applied to theories of culture and discourse (and used in this exegesis), have also found expression in a comedy performance.

Atomic: Romeo are you just going to sit there or are you going to ask something?

Romeo: What do you know about quantum mechanics

Atomic: Quantum Mechanics — the guys who work on those zippy little quantum cars.

Romeo: Quantum cars?

Atomic: I reeeeeaaaallly want one of them.

Romeo: You reeeeeaaaallly want one?

Atomic: Hell yes - I could travel at light-speed and never get booked.

Romeo: How so?

Atomic: Well the cops could know how fast I was going or where I was — but never both!

Romeo: Ah, the Uncertainty Principle.

Atomic: That, and the fact I'd be going really fuckin' fast!

Romeo: But consider this — you'd be reeeeaallly heavy.

Atomic: Granted I would have a certain gravitas.

Romeo: Gravity arse!

Atomic: Hey, you could afford to shed a few Higgs Bosons yourself.

Romeo: Don't be rude quark-boy — you're strange with little charm.

Atomic: Can I ask you to avoid the sub-atomic insults — they are beneath me.

Romeo: I saw what you did there — Atomic and sub-atomic — cute.

Atomic: Ba-da-bing!

Romeo: Ba-da-boom!

Atomic: No need to add the second sting — the gag wasn't that good.

Romeo: It was pretty good — we got quantum mechanics, light-speed, and the
Uncertainty Principle all in one sketch.

Atomic: Explaining the sketch after the cat's out of the bag is a bit unnecessary.

Romeo: That reminds me of Schrödinger's cat — so pussy, are you dead or alive?

Atomic: The one thing you're not allowed to do is open the box — leave me as I am.

Romeo: Opening the box allows the blue smoke to come out — then all the
magic is gone.

Atomic: We don't want to see the blue smoke.

Romeo: You regard an action as intelligent until you understand it — in
explaining, you explain away.

Atomic: I would not want to explain you away.

Romeo: Live long, and prosper.

Atomic: Die young, and leave a pretty corpse!

Romeo: So how's that working out for you?¹⁴

The humour is initially based on the multiple meanings of the word 'mechanic' and the sketch follows that (il)logic for a time. It then takes a self-referential post-modern turn when Atomic and Romeo discuss the quality of the gags. After that point it takes a more serious direction when Romeo asks if Atomic is actually dead or alive using a reference to Schrödinger's cat. This is a core ingredient of the tragi-comedy for Atomic and Romeo as it is unknown if Atomic is acting as a human or a machine or if he is alive or dead. However, Atomic argues it is not worth the risk to find out. The sketch ends with a great deal of pathos related to the 'blue smoke', sometimes called 'magic smoke', which is the mythical ingredient in all electronic componentry. In detail, it is a reference to the acrid, blue smoke that emanates from electrical components that have suffered a voltage overload. Atomic is just blue smoke in a box. Any individual line may be more or less humorous, however, the comedy emerges from the interaction of all of the lines and from the performance of those lines. This is a crucial difference between the computational production of humour and the computational performance of comedy.

This difference between humour and comedy points to novelty and originality of this research project. The project researches, through the creative project, domains of knowledge that have either been under-researched (the computational performance of comedy) or not rigorously researched at all (the interaction of two natural language agents). However, for a project to be recognised as creative it must not only be novel, as novelty could simply be bizarre and lack coherence, it must also be valued in at least one social setting. The recognition of value is the role of the 'social field of experts' (Csikszentmihalyi 1999), or to use Bourdieu's expression, 'the field of cultural production' (1984). The methodological purpose for constructing the Production Journal as a blog is to allow and encourage

¹⁴ This sketch can be triggered by typing, "What do you know about quantum mechanics?" in the Topic text area in the interface.

engagement with the ‘field’ as a key component of the creative process. The field is an actor in the system. It defines and, to a degree, imposes the forms and conventions of the domain that the creative project is seeking to enter. The definition of the Atomic and Romeo “Two-Act” is a codified version of the demands of the field. The blog allows the field to express their judgement on the project during the development process. As a result, the project evolved to positively meet the requirements of the field. As this project is multi-disciplinary in nature the blog gathered comments from experts in a variety of fields: computer science (David C); screen writing and game design (Joe Velikovsky); interface design (Chris Lawrence); television production (Susan Kerrigan); radio production (Harry Criticos); and, several chat-bot developers. The blog contributors commented on the quality of the performance, many commenting that the performance was funny. Notably, no comments alluded to machine-like nature of the performance. As noted in the blog on Thursday, August 30, 2012:

One of the really positive things that I’ve taken from the comments so far is that the comments could all have been levelled at a human performer—too much repetition, insufficient responsiveness to the audience, the performance appears too ‘scripted’, once you’ve heard it—you’ve heard it. This is the nature of comedy performance—it is a crafted activity that develops over time (Some comments on comments).

This interaction of multiple fields to inform the production of a single creative project is a unique and novel aspect of this research project. The field, the audience, is an actor in the system from which a comedy performance emerges. In the final analysis, this group decides whether laughter occurs when a thing gives the impression of being a person.

4.4 — The historical, cultural, and social background of the creative project

This section of the protocol addresses the antecedent knowledge embedded in the creative project. It draws on material detailed in the Literature Review. In particular, it provides

evidence from the Production Journal to argue that the forms and conventions of comedy performance are “remediated” (Bolter and Grusin 1999) by the interaction of human and non-human actors in the comic dialogue performed by chat-bots.

By synthesising the concepts in the Scriptwriting section of the Literature Review chapter, the following definition sets the form and format of the performance.

This “Two-Act” project is a humorous text-based performance by two agents presented in a new media environment. It possesses unity of the characters, the pairing of characters with incongruous and incompatible personalities, uses a sub-set comedy techniques that are appropriate for each and unique to each character, is marked by compression, follows the form of the tragi-comedy genre, and requires twenty-six lines of dialogue for delivery.

The performance of the chat-bots follows, to a large extent, the form of the “Two-Act” as described by Page (1915) and Cullen (2007). This form has its roots in the medium of vaudeville theatre and, as argued in the Literature Review, informed the structure of comedy performances in the more recent media forms of radio, film and television and can still be witnessed in the work of contemporary comedy teams such as John Clarke and Bryan Dawe (2011). This form, this actor (considered as a meme) is robustly expressed in a variety of media forms. However, “[c]ompetition among new memes is fierce; few survive by being noticed, selected and added to the culture” (Csikszentmihalyi 1997, 372). This argument predicts that some forms of humour will not be accepted by the field and, as a result, will not be transmitted to the domain of that media form. For example, the ‘blackface’ act that was so common in vaudeville (Cullen 2007) but is no longer seen as appropriate for modern media forms. The argument also suggests successful memes are replicated. A later section of this analysis argues that the “Two-Act” structure is expressed in domain of natural language processing and in previous works of the author.

According to Page (1915), the success of a “Two-Act” is dependent on the unity of the characters and the pairing of characters with incongruous and incompatible personalities.

The unity of characters speaks to developing characters while maintaining the audience's sense of ontological security. The characters are fixed, rather they display their core attributes in a consistent manner. The development of rules or archetypes for the characters is a method for developing both the consistency of the individuals and their incongruous worldviews. The blog entry from Friday, July 20, 2012 titled "On Character and Categories" illustrates the conscious development of this aspect of the project.

Characters can, and I think should, be defined by rules. These rules should be really simple, broad scale rules that are applied religiously. For example:

Rule 1 — Atomic died in 1995. Therefore he should have limited knowledge of events after that time.

Rule 2 — Atomic is obsessed with his death. He doesn't care about death in general, only his death is important. He created the bot to share his 'wisdom' with the world. At the time he knew he was going to die soon. Understandable obsession, but annoying and self-centered. Oddly being obsessed with death motivates Atomic need to observe the present and peer into the future.

Rule 3 — Romeo is deeply conflicted in his relationship to Atomic. Let's face it, he was born Catholic and never really grew up.

Rule 4 — Romeo is nostalgic. He plays in the past with Atomic. Sometimes he will bring Atomic up to date on a topic, but he would prefer they lived in the past.

Is any of that funny? Hell no! But it is a basis for comedy.

In practice, these primary rules evolve as the characters asserted themselves. As noted in the blog entry of Thursday, July 26, 2012, "Atomic and Romeo reach Version 5", "[t]he characters are beginning to exert their influence. When I'm writing I hear their character voices in my head. If something I write for one character makes the other one 'smile' or 'grimace' then the line stays". This proves to be an iterative and recursive action affecting

the initial structural rules. By Sunday, August 5, 2012, in the entry titled “How things change...” I noted that:

As the writing progresses a couple of odd reversals have occurred. First, of the two Romeo spends more time commenting on Atomic being dead than Atomic does. This was not the initial plan. At the time it appeared that Atomic would be the one fixated with his own death—always ready to turn to it as a topic of conversation. However, as the writing has progressed it is Romeo who makes the facetious and, sometimes, snide comments about Atomic being dead. The internal logic of their relationship and individual personalities makes this feel more appropriate. Atomic may well know he is dead but he really doesn’t care—except when it stops him from being an absolute know-it-all. Romeo is so deeply conflicted—he resents Atomic for being dead, for leaving him.

Second, Atomic claimed to have a Catholic education! Romeo certainly did—but Atomic? He claimed that his education was “catholic, in both senses of the word”. Perhaps he said this just for the sake of the pun. I may have to revisit that sketch.

These blog entries support the argument that the characters of Atomic and Romeo are actors in the larger project: their structural form exerts an identifiable influence on the trajectory of the project, as individual characters they are complete; they display a wholeness, yet when they interact with the scriptwriter they become part of a larger system.

The definition of this performance also calls for the dialogue to be ‘marked by compression’, that is, brevity. This dictate affects the timing of the interchanges, the individual length of each line of dialogue and the overall length of each performance. Traditionally, the “Two-Act” was set on the apron of the theatre stage, in front of the curtain that separates the audience from the main stage area. As a matter of necessity, the “Two-Act” was included in the program so that the main stage could be reset for the next ‘top-of-the-bill’ act to occupy the main stage. It is ironic that many of these filler acts delivered by

performers like Abbot & Costello and Burns & Allen are better known than the acts they were supporting. In this project, the need for brevity was met by first arbitrarily setting an overall length for the performance of 20 lines. In practice, it was insufficient. The blog entry of Thursday, July 26, 2012, “Atomic and Romeo reach Version 5”, records the increase in lines from 20 to 26:

One of the scripts that I was happy with (I may not remain so enamoured with it) ran longer than the set length of 20 lines of dialogue. That was an arbitrary figure anyway—he says trying to come up with a good reason to expand the set length. In Version 5 the characters exchange twenty-six lines before the random end of conversation text kicks in.

Through a process of writing and rehearsal, it was evident the original length was too short to fully develop a sketch.

The processes of the Pandorabots ALICE engine affected the writing process, forcing a certain tone and brevity on the lines of dialogue used by Atomic and Romeo. In the blog entry titled “The writing process” of Sunday, September 30, 2012, the process of used for converting scripted dialogue into Artificial Intelligence Markup Language (AIML) functional on the Pandorabot server was explained:

The script develops over 26 lines. Each line is a single sentence—this is one of the constraints of the Pandorawriter. This is actually a very positive constraint. It does mean that I have to use some non-standard punctuation and comma splices are common and you’ll see a lot of dashes in the dialogue. However, on the upside it forces a consistency, economy and brevity on the tone of their language.

The chat-bot’s difficulty with consistently and intelligently handling multi-sentence inputs was noted in the blog throughout the development stages of the project (Friday, October 1, 2010. Friday, January 14, 2011. and Thursday, July 19, 2012.) What was initially

considered to be a constraint that needed to be overcome eventually became a defining feature of the performance, it became a feature of the writing process itself. Here again we see a structural limitation have a positive and active role in the shaping the trajectory of the project.

On Tuesday, June 28, 2011, in the blog entry titled “New chat bot characters” The Atomic Playboy and The Radiation Romeo characters were introduced. Previously, two characters called Dick Trickster and Detayle Bhoi were developed for the project. However, after developing 16 versions of the interface, including the features used in the final interface for Atomic and Romeo (such as the randomly generated sign-off lines and the counter for determining the length of the performance), Dick Trickster and Detayle Bhoi lacked a strong back-story describing their relationship. As a result, they were not clearly defined as an incongruous pairing.

For this project I’m considering bringing Atomic and Romeo back to life. Maybe only Romeo will actually be ‘alive’. Atomic’s back-story is a bit more complicated. Atomic is dead. However, before he shuffled off this mortal coil, he had programmed a chat-bot with his ‘wisdom’ and witticisms. Romeo has faithfully kept Atomic going over the years by creating a chat-bot of himself for Atomic to talk to.

This set-up seems to have a couple of advantages. First, by fixing Atomic in time (his knowledge of the world has stalled in the mid 1990s—so 20th Century!) this allows him an idiosyncratic view of the world. Romeo, and the audience, knows more of the world than he does. Second, it reverses the roles they played in the original script—the ‘worldly’ Atomic and the ‘naive’ Romeo. This is a good ‘odd-couple’ mix. Third, the unresolved romantic tension over their relationship with the ‘Thoroughly Post-modern Milly’ is a nice piece of relationship business. Finally, as Romeo is still alive when the user is watching the interchange it’s possible they could be seeing the ‘human’ Romeo

conversing with Atomic or they could be watching the chat-bot 'Romeo' at work. This human / non-human character of Romeo will be introduced in the setup page of the chat-bot site (Tuesday, June 28, 2011).

The rules of the game emerged from this strong backstory. On Friday July 20 2012, attached to the blog entry titled "On Character and Categories" is a PDF file containing the timelines for Atomic and Romeo. It outlines their birthdays, astrological star signs, Chinese year animal, where they were born, and, as Atomic was born on the 29th of February in a leap year which city hosted the Olympics in each of the years he celebrated a birthday. All this material in contributes to the sketches they perform. Also in this entry, humour of the structural rules is questioned: "[i]s any of that funny? Hell no! But it is a basis for comedy". This comment is a reference to the work of Neil Simon examined in the Scriptwriting section of the Literature Review. By selecting Atomic and Romeo as the characters, the "Two-Act" better fits the definition as it draws on the tragi-comedy genre. The fact that Atomic is dead is a source of comic pathos. As noted earlier, Romeo is more disturbed by Atomic's death than Atomic. This macabre logic is represented in one of the end of performance sign-off lines:

Romeo: Live long and prosper.

Atomic: Die young and leave a pretty corpse.

Romeo: So how's that working out for you?

The intrinsically macabre nature of this interchange is grotesque, a style of comedy, inconsistent with a modernist audience. As Bakhtin (1984) argues:

In the nineteenth century, the public at large almost completely forgot the principle of laughter presented in macabre images. They were interpreted in an unrelieved, serious aspect and became flat and distorted. The bourgeois nineteenth century respected only satirical laughter, which was actually not laughter but rhetoric. (No wonder it was compared to a whip or scourge.) (51).

The tragi-comedy genre requires characters who are not just ‘comically contrasting,’ but who hold incongruous and incompatible worldviews. The life / death incongruity being shared by a human / non-human pair of actors represents an incongruity that resists final resolution. As stated earlier, incongruity, with or without resolution, provides the cornerstone concept in many humour theories (cf. Attardo 2001; Morreall 2009; Raskin 1985, 2008; Ritchie 2004). This project draws on incongruities on many levels: at the level of the language used by the characters; at the level of character development; and, at a meta-level that draws on the incongruities of life such as our understanding of life and death and our relationship to technology. This project, in part, examines if Bergson’s law will stand if it is inverted: will we laugh when a thing gives the impression of being a person? Bergson’s law is characterized as a collision of two meta-level incongruous states. It focuses on an inherently ironic mechanism as the driver for comic process (Clark 2003). Thus, this inversion does not depreciate Bergson’s original conclusion, in as much as the incongruous states of ‘human’ and ‘thing’ always remain in play. Returning to the argument that opens this section, the ‘human’ and ‘thing’ are equal actors in the project but it does not automatically follow that the ‘human’ and ‘thing’ are identical in form or behaviour. This is a rejection of the position of extreme posthumanism and, as Dougherty argues, makes the human and the machine identical (Dougherty 2001).

Firstly, the scriptwriter/dramaturg’s role is to produce and craft the character’s dialogue, and secondly, to develop the coding to guide the characters’ interactions. These roles need to share the same intention even if the two roles do not share the same practices. In this case, the project builds on the forms and conventions of vaudeville “Two-Act” comedy, positioning the performance in a new-media, online context. Previously, theatre provided a metaphoric lexicon to describe production of human computer interfaces (cf. Laurel 1993). This dramaturgical approach to analyzing the project through an examination of the defining statement makes explicit the antecedent knowledge that is embedded in the project.

4.5 — An assessment of the creative project's place in the scriptwriter's *oeuvre*

The purpose of this element of the dramaturg's protocol is to situate the current work within the scriptwriter's existing body of work. The previous creative and critical works form part of the scriptwriter's *habitus*: "the embodied history, internalised as a second nature and so forgotten as history—is the active presence of the whole past of which it is a product" (Bourdieu 1990, 56). "The *habitus* is sometimes described as a 'feel for the game', a 'practical sense' (*sens pratique*) that inclines agents to act and react in specific situations in a manner that is not always calculated and that is not simply a question of conscious obedience to rules" (Johnson 1993, 5). This description of *habitus* echoes the first of Herbert Simon's indicia that distinguish the artificial from the natural—the synthesized object is produced by an agent "though not always or usually with full forethought" (Simon 1969, 5). This section argues that theory and practice are as conjoined as agency and structure. It makes explicit the 'forgotten history' influencing the trajectory of the creative project.

The characters in this project started in a 1993 play written by the author of this exegesis (Fewster 2012c) and produced by Footlice Theatre Company Inc (Fewster 2012b) in Newcastle, Australia, titled *The Atomic Playboy and the Radiation Romeo Fall in Love* (Fewster 2012a). The play is a black comedy set in a student residence. It is the story of a love triangle between the Atomic Playboy (a PhD student), the Radiation Romeo (an undergraduate student befriended by the Atomic Playboy) and the Thoroughly Post-modern Milly (an undergraduate student who as a post-modern gesture only speaks in recognisable quotes). Thematically, the play toys with the perceived excesses of post-structuralist cultural critique that so favoured reception over production. The work uses the character of Thoroughly Post-modern Milly to test the possibility of successfully communication through the use of quotes alone. These quotes referenced an eclectic mix of popular culture texts from bumper stickers to song lyrics. Further, it explores the personal consequences for Milly of living in a world where nothing is authentic or original. The most heartfelt emotion is only expressed in relation to an often, trite and hackneyed, expression. Consequently she is often challenged to

cite her reference—Where does that line come from? The work was set in a university hall of residence, loosely based on the author's personal experience. This hothouse environment of young, bright people is a fertile setting, exploring a range of relationships including misguided mentor/mentee relationships, relationships transitioning from platonic to sexual, and relationships with authority figures. As a plot device, in an attempt to prompt Milly to break out and say something 'original', both Atomic and Romeo fake their own deaths in a wildly melodramatic way involving drug overdoses. This play contributes to the characters to this project, but it also foreshadows the use of death as a thematic issue on which to build comedy. Further, it signals an ongoing antipathy for types of cultural criticism that do not explicitly engage with practice as a crucial component of text being examined.

The play is one of six professionally produced works by the author. Another triptych of plays was written as part of a Master of Creative Art research higher degree (Meany 2006a). These plays include computers as characters in a traditional theatre environment. *The Things We Do* is the title of a triptych of plays that comprises: *His Story*, a ten minute multimedia presentation; *The Things*, a longish one-act play of forty minutes in a more traditional theatrical form; and, *Her Story*, a ten minute multimedia presentation. The triptych has three human characters and three computer characters. Using an interface similar to a web browser, the characters interact with one another—human-to-computer and computer-to-computer. *The Things We Do* has a cast of six characters and is set in a university. Recent restructuring of the university has created many odd bedfellows, not the least odd being the creation of a School of Public Relations, Information and Communication Science with the unfortunate acronym of PRICS.

The characters are: Mac (short for Mackenzie) Rose is a middle-aged lecturer in Information Science; Win (short for Winifred) Payne is a 30ish lecturer in organizational communication; Nix (Richard Nixon) is the 'professional officer' for the School; Victoria is Win's interactive computer desktop assistant; Bruce is a chat-bot (a conversational robot) Mac developed; and, Whisper a chat-bot that Nix set up to 'control' Bruce. The computer

characters are represented on stage as data projections of the interface. Their voices, audible from a loudspeaker, were developed using Apple Script to modify the standard Apple text-to-speech computer voices, and then incorporated into the interface using Adobe Flash.

The use of computer characters in theatre poses both practical and theatrical challenges. A primary question addressed in the exegesis is whether an audience will accept computer characters in the same manner they would accept human characters? The “willing suspension of disbelief”, a phrase coined by Samuel Taylor Coleridge, describes the “poetic faith” that an audience needs to have in the ontology of the fictional world presented to them in the theatre (Coleridge 1906). Suspension of disbelief has long been considered a requisite for development of dramatic closure, that satisfactory end promised by the beginning. In the writing of the triptych of plays, a primary research objective is to examine the proposition that it is “belief, not disbelief, that is automatic” (Reeves and Nass 1996, 27). The purpose of the exegesis is to illuminate the instruments, tools, and agency of the playwright employed to support belief and, in doing so, examine the nature of the creative writing process. To examine this research objective, consideration is given to the development of the computer voices, action and character, humour, narrative structure and the effect of cognitive load.

The Things We Do continues to develop many of the thematic and philosophical elements introduced in *The Atomic Playboy and the Radiation Romeo Fall in Love*. The use of a university setting allows for a range of social, psychological and cultural tensions to be explored through the characters’ relationships in an environment that is real and concrete, but that can also be seen as ‘other’ for people outside the academy. The play primarily examines our relationship with technology. Our relationship with technologies has been described in terms of bodily extensions, exterior aids or prostheses by commentators like Marshall McLuhan, Walter Ong, and Jean-Francois Lyotard (Landow 1997, 274). Landow argues that the use of the term ‘prosthetic’ leads to connotations of the media filling some severe need or overcoming some lack or shortcoming. In addition, all these descriptions lead to the recognition that these “technologies are not mere exterior aids but also interior

transformations of consciousness” (Ong 1982, 82). These transformations carry with them “resentment of the device one needs, resentment at one’s own need and guilt, and a Romantic dislike of the artificiality of the device that answers one’s needs” (Landow 1997, 275). This anxiety, or more accurately, the need to release the psychic tension should be able to be employed as the basis for comedy if the release theories of humour are correct (cf. Freud 1960; Martin 2007; Raskin 2008). Although it is not a primary research question, the exegesis suggests that the anxiety felt about our relationship with technology is also a reaction to the inherent and resolution resistant incongruity of the human / non-human divide.

These works provide evidence of the embodied history that informs the current project. They provide evidence of the researcher’s ongoing fascination with the writing and production of comedy, his relationship with technology, and the exploration of theoretical perspective through practice.

Habitus, as an actor embedded in this project, is not restricted to the creative works. Rather, *habitus* is the entire history that includes all of works and influences that in some measure exercise an affect on this project. For example, as an Honours student I wrote a paper on James Joyce that argued that *A Portrait of the Artist as a Young Man* (2000) was his last Modernist novel and *Ulysses* (1993) was his first post-modern novel. This paper is now employed as Atomic’s PhD thesis. Typing ‘Joyce’ as a topic will trigger a discussion of Atomic’s PhD. This is a topic that Romeo is heartily sick of hearing about, a feeling shared by many people who have had to endure a friend or partner undertaking a PhD. While Atomic is talking about Joyce, Romeo is sending an email to complain about the quality of some mutton kidneys he purchased. This is, of course, a post-modern reference to an early scene in *Ulysses* (Episode 4: Calypso).

In a similar vein, typing ‘You said it I was just sitting here’ into the interface will start a performance that uses the style of the tennis match from *Rosencrantz and Guildenstern are Dead* (Stoppard 1968). The topic line above is a short cut to a section of a sketch that is

actually found through random chance when Atomic fails to answer a query and replies with “I have no answer for that.” The tennis match is played out by Romeo naming, in alphabetical order, all of the body parts that Atomic no longer has. Atomic comments and keeps score. He finally admits defeat, however, Romeo needs to complete his list.

Romeo: And finally, you got no nose hair, neck or nipples, no pelvis or penis,
no quadriceps, ribs, scrotum, spine, tongue or testicles, and no veins,
vertebrae, wrist, or xiphoid process.

Atomic: Enough — Game Romeo.

Romeo: Just one more — no zygomaticus.

Atomic: Hey, I smile on the inside.

The ‘zygomaticus’ is a muscle in the cheek that draws the corner of the mouth up and back, making us smile. This sketch uses information from a variety of sources to generate a punch-line that works for a general audience (z being the last letter of the alphabet), but it will work as a 5% Gag, a joke designed to really work for a group that constitutes less than five per cent of the audience. For the person who knows what the zygomaticus is and what it does, this line is an opportunity for them to congratulate themselves for understanding the pathos of Atomic’s reply. The concept of the 5% Gag was developed in scriptwriting workshops with Footlice Theatre Company. The term was used to describe the jokes for adults, often just simple *double entendres* or puns, which were sprinkled into plays ostensibly for children.

This exploration of the author’s habitus suggests a very wide and eclectic range of influences is embodied in this work, exercising an affect on the style, form and thematic content of the project. Furthermore, these influences are memes that find expression in a range of the author’s works. However, such an exploration will always be incomplete. *Habitus* is that which has become second nature and as such forgotten—it is very difficult to remember and account for all that is forgotten. The comments collected on the blog highlight

some of this forgotten history by drawing connections to performers and activities, which are not part of the author's conscious memory. As Simon (1969) argues in the first of his indicia, "Artificial things are synthesized (though not always or usually with full forethought) by man [sic]" (5).

Blog comments evidence the other influences and forgotten history embedded in the project. For example, Jamie Lewis said on September 7, 2012 12:32 PM, "I do enjoy their "rant"—I feel like I'm reading a marx bros [sic] screenplay. I'll be back for more." And JOETEEVEE said on June 28, 2011 2:00 AM, "I just had the following exchange occur (actually has a Morecambe & Wise feel to it, even Groucho, with the non-sequiturs)." Both the Marx Brothers and Morecambe and Wise started their careers in vaudeville and burlesque theatre, before moving on to radio, film and television. These performers, together with the Goons, Monty Python, The Young Ones and a series of cartoon characters such as Pinky and the Brain, form the author's experience of comedy. This again provides evidence of the power of the forgotten history as an actor that exerts influence over the creative decisions taken in the development of the project.

4.6 — A production history of the creative project

This section maps the milestones of the creative process as evidenced by data from the Production Journal. This mapping, in turn, provides evidence of the iterative and recursive nature of creative practice. The Production Journal for this project documents the development of the project by displaying a chronological history of its development, including posts and comments about theoretical issues related to arguments presented in this exegesis and the technical issues related to the development of the user interface and the AIML chat-bots. As noted in the introduction to this Analysis chapter each of these elements can be considered as holons or actors that are simultaneously whole and part. For this reason this production history will first trace the selection of the Pandorabots ALICE engine to act as the 'brain' that processes the characters' AIML sets. Then it will document the

developmental stages of the user interface that controls the performance. Next, it will examine the development stages of the AIML chat-bots as characters developed inside the AIML architecture. Finally, it will draw these two actors together to provide evidence of the emergence of comic performance from the interaction of these actors.

One of the earliest posts in the blog “Which way to handle the brains” (Thursday, November 19, 2009) outlines the three basic approaches available to the development process. Option 1 includes two independent web servers, each with an iteration of the ALICE engine, as the location for the AIML knowledge for each of the characters. The interaction of these servers would be controlled by an interface developed in Adobe Flash using the scripting language ActionScript 3.0 to regulate the timing of the performance. Option 2 calls for a single web server instance of the ALICE engine controlled by a Flash interface to swap which AIML set was being processed by the engine, effectively swapping between characters. Option 3 was a flirtation with the idea of actually programming a chat-bot engine completely from scratch in Actionscript 3.0. This option was quickly discarded. At this stage in the development, it was possible to get two chat-bots to talk to each other across the Internet, by capturing text in one location and sending it to a second location via a control interface that could create iterations and reversals of that initial action.

The post titled “Bots I have known...” (Thursday, February 4, 2010) provides a summary of researcher’s attempts to establish a stable ALICE engine operating on my desktop machine. There are many versions of the ALICE engine written in a variety of programming languages. As an open source project these are all, to a greater or lesser extent, supported by a community of users. However, this also means that there is limited documentation that covers the deployment of these engines on a web server. The key moment of the development stage occurred when the researcher first witnessed two chat-bots conversing:

My early attempts were with Program N. This, after some considerable fiddling, allowed me to see two bots talking. I had to learn some Perl scripting and get

the memory allocations sorted out. However, in the end, it almost worked. Why only almost? It seems that if there is too much recursion in the AIML sets the script fails to generate a response. So, after a variable number of interchanges, the interaction would fall to blank lines... The burning question remains... How do I get two bots to talk to each other? (Thursday, February 4, 2010).

The early failures, and small successes, with desktop versions of the ALICE engine pointed to the solution, using a version of ALICE that was already deployed on a web server. By Sunday, July 4, 2010, in a post titled, “Bot Technology” sufficient testing was undertaken to synthesise the problem as an either/or pairing.

The implementation of a pair of bots remains problematic. Not for the same reasons as before—those were purely technical. That sort of problem can be addressed with a combination of tenacity, research, expert networking, and cash. Having tried all of these approaches I now have a couple of viable solutions.

The first is to ‘employ’ the computing research guys at Newcastle to set up the bots on a research server. The only downside to that solution is that I would need to develop a work method for writing and updating the AIML sets. Being one step removed from owning the server I would need to be get some kind of administrator access—this is not the sort of thing server admin people are very keen on. The second is to use the ‘commercial’ site that provides the Pandorobot. I already have a test bot up there and I’ve found a Flash/Actionscript interface (thanks to Jamie Durrant) that will talk to the Pandorobot server. Cool! This is one comparatively small step away from have two Pandorobot accounts and using the Flash interface to throw output to input from one bot to the other. The advantage of Panadorobot is that I could easily update the AIML and be able to speak to each of the bots individually.

The blog posts for August, September and October of 2010 document the development of the design solution based on hosting both the chat-bot characters on the Pandorabots server, employing its ALICE engine, and controlling the performance with an Adobe Flash Actionscript 3.0 interface. Development continued using two characters called Mr Dick Trickster and Detayle Bhoi. These characters were hosted on the free service provided by Pandorabots. The characters are largely based on existing AIML sets as a proof of concept. They addressed the problems of multiple sentence inputs, counting interactions and allowing the user to stop the performance. However, development stopped after 16 iterations of the interface due to two reasons. Firstly, the free Pandorabots server was explicitly proscribed by the “Updated Policy Guidelines for Free Community Server” (Pandorabots 2011). On Tuesday, May 31, 2011, in a post titled, “This could be a real problem...” it was noted that the guidelines prohibited the “Use of automated scripts to make your pandorobot talk to itself or another bot or script...”

As the title line says— this could be a real problem. The Pandorabots site offered the most elegant solution for my project. Through it I could train and deploy the bots and then control their interaction with an independent Flash/Actionscript interface. If I lose the ability to use Pandorabots it would be like, in old-fashioned theatre speak, losing my two lead actors, the rehearsal space and the theatre! (Tuesday, May 31, 2011.).

This is one of the most important milestone moments in the development of the project. It focussed attention on the need to, in a concrete and detailed manner, define what the project was trying to achieve. Was this an IT research project that examined the deployment of an artificial intelligence engine in a new scripting language? No. Was this purely a theoretical examination of the necessary and sufficient conditions of humour? No. This was a project that fully integrated theory in practice in a project that used practice to examine theory and theory to inform practice. For these reasons, permission was requested from Dr Richard

Wallace at Pandorabots to continue the development of this research project using his infrastructure. By Friday, June 10, 2011 the problem was resolved:

Thanks to Dr Wallace and the good people at Pandorabots my project has a ‘home’. I’ve purchased an account of the Shared Service to host my bots. We’re back in business. This is also a much more open, transparent, and professional way of undertaking the research. I really appreciate the enthusiasm and support I’ve received from Pandorabots—thanks guys!

Another important outcome of this incident was the recognition that now the project was a ‘blank slate’; now, that the server had no chat-bots at all, there was freedom to re-envision the attributes of the characters. The post titled, “New chat bot characters” (Tuesday, June 28, 2011) documents the decision to remediate The Atomic Playboy and The Radiation Romeo. This was a decision equally based upon the theoretical and practical understandings of humour and of the contribution these parts would make to the project as a whole.

The final proof-of-concept version that utilised Dick Trickster and Detayle Bhoj was posted on June 13, 2011 (Version 16). The current version of the Atomic and Romeo interface has also developed through 16 published iterations. Each change is introduced into the operation or look of the interface necessitated a new version to be published on the blog for testing. These versions also incorporated a collection of smaller updates that do not in themselves warrant a version number. The logic for assigning a version number is related to the amount of rehearsal, or beta testing in computer science parlance, that needs to be undertaken to check for unwanted and unintended consequences of the change. The table below (see Table 8) summaries the milestone developments associated with each version of the Atomic and Romeo deployment.

Version Number	Size	Deployment Date	Development
ARbotsAS3v01.swf	58KB	Dec 15, 2011	Introductory text and curtain opening to reveal the chat environment. And Stop Me Button.
ARbotsAS3v02.swf	66KB	Dec 21, 2011	An introduction to the characters by Romeo. 20-line performance variable.

ARbotsAS3v03.swf	66KB	Jul 17, 2012	Bug fix on the Stop Me button.
ARbotsAS3v04.swf	64KB	Jul 23, 2012	Random end-of-conversation endings written into the interface rather than the AIML.
ARbotsAS3v05.swf	64KB	Jul 24, 2012	Performance extended to 26 lines.
ARbotsAS3v06.swf	54KB	Aug 2, 2012	Fewer visible text fields. A Clear button added. More instruction written into the interface.
ARbotsAS3v07.swf	64KB	Aug 13, 2012	First portrait layout. Heckle Button added. The user types their heckle into the original text input area.
ARbotsAS3v08.swf	95KB	Aug 15, 2012	The heckle feature dramatically improved with a dedicated heckle text area. Better arrangement of the buttons.
ARbotsAS3v09.swf	96KB	Aug 16, 2012	A timer function introduced to slow the speed of the performance. Also a function that traps the scrollbar at the foot of the performance area.
ARbotsAS3v10.swf	103KB	Aug 22, 2012	Development of the layout. Refinement of the timer functions so that they work on text from the server and that contained in the interface.
ARbotsAS3v11.swf	108KB	Aug 28, 2012	Development of a variable that allows for the conversations to be logged on the server.
ARbotsAS3v12.swf	109KB	Sep 1, 2012	Bug fixes for the timer and heckle functions.
ARbotsAS3v13.swf	109KB	Sep 8, 2012	Refined timer variables to slow the performance to better match reading speed. Developed a preloader file.
ARbotsAS3v14.swf	118KB	Oct 9, 2012	This version embodies three sub-versions. All of the changes affect the interaction of timer, heckle and end-of-conversation functions. A progress bar is made visible when the interface is waiting to complete a function.
ARbotsAS3v15.swf	132KB	Nov 1, 2012	This version embodies two sub-versions. It includes changes to the opening pages, and a simplification of the timer functions to make them more consistent and more robust.
ARbotsAS3v16.swf	140KB	Jan 16, 2013	This version adds an audio sign-off to the performance.
ARv13preloader.swf	4KB	Sep 2, 2012	These preloaders display an animation while the main interface is loading in the background. These became necessary when the interface became larger than 100KB.
ARv14preloader.swf	4KB	Oct 7, 2012	
ARv15preloader.swf	4KB	Oct 31, 2012	
ARv16preloader.swf	4KB	Jan 16, 2013	

Table 8 — Milestone developments of the Flash interface.

This development chronology not only evidences the iterative and recursive nature of creative activity it points to the importance of the interface as an actor in the project. The interface undertakes many roles. It is first the performance space, the location where the interaction of the chat-bot can be witnessed. It is also a structuring device; by allowing and encouraging the user to interact with the performance, the interface defines the kind of performance space. The space has more in common with a comedy club than it does with a traditional theatre space where heckling is frowned upon. These attributes are devised using a suite of code functions that interact with each other to produce a result that is not completely prescribed by the code.

All of these functions contribute to the role of the interface as an actor—as an agent within the larger structure of the project. The code, using the theatre metaphor, is akin to stage directions within a play script. It both defines the stage and, to a degree, controls the interactions of the characters. By defining the parameters of the stage it both enables and constrains action. Further, it programmatically allows for emergence—wrangling a suite of random elements to generate a performance. The code makes choices that are not absolute—in other circumstances it could have made other choices. (Sunday, October 7, 2012, Blog post—The interface as ‘actor’)

The “New chat bot characters” (Tuesday, June 28, 2011) post also poses questions about the development of the AIML sets for Atomic and Romeo.

The next production question is: How much ‘standard’ AIML should I use? As one of the recent comments pointed out the single sentence conversations are much more punchy and useful. Editing out all of the multiple sentence replies is tedious. However, starting completely from scratch (an absolutely blank slate that doesn’t even know how to respond to “Hello”) could be equally time consuming. There is a certain purity to the blank slate...

By Tuesday, December 6, 2011, the development raising more questions than it answered. The post titled, “Some elementary issues” pointed to three primary difficulties: The common back-story problem; the too much recursion / dead-end problem; and, The start point problem. All of these issues were related to Atomic and Romeo sharing excessive amounts of AIML content in common. Categories that called other categories did so in both characters resulting in the situation where they sounded like they were talking to themselves.

The early decision to use an existing AIML set as the basis for Atomic and Romeo was documented in a number of posts: Tuesday, December 6, 2011, “Some elementary issues”; Thursday, December 8, 2011, “The sub-set of AIML”; December 21, 2011, “The sub-set of AIML—Version 2”; and, finally on Tuesday, July 24, 2012, “New random end of conversation text”. In that final post the decision was recorded to completely dispense with existing AIML sets.

PPS > I’ve given up on the free AIML set. It takes far too much editing on all levels: punctuation, tone, factual content. There is far too much in the set that affected the personality of the characters. The blank slate approach is the only real option. I will end up with less content but it will be better targeted and it will, if nothing else, be all of my doing.

The decision was prompted by two primary factors. Firstly, the development of an efficient method for converting a standard text script into appropriately coded AIML. Secondly, content discovered in the existing AIML set was completely inappropriate for the characters. In the latter, the existing AIML set contains political and cultural statements centring on North American context. For example:

You: Do you like guns?

Bot: I do not like them, but I believe in the Right to Bear Arms.

Deleting these categories proved to be an insurmountable task. However, some of these responses did prompt facetious thoughts, resurfacing in new scripts. The example above prompted a script that references the comic author Jasper Fforde's novel *The Fourth Bear*.

You: Do you like guns?

Bot: I do not like them, but I believe in the Right to Arm Bears.

In a post titled, "Two little moments" of Friday, December 9, 2011, I first described the technique used for generating a pair of AIML scripts, half for Atomic and half for Romeo, from a basic text input. The post of Sunday, September 30, 2012 titled "The Writing Process" details the use of the PandoraWriter service on the Pandorabots site.

Once the script is written I covert it AIML. This file I save with the Atomic prefix e.g Atomic_swearing_option2.aiml. Then I delete the first line of the script and convert the file again, this time with the Romeo prefix e.g. Romeo_swearing_option2.aiml. This simple strategy is really useful. Deleting the first line changes the order of the lines in the AIML categories—pattern becomes template and vice versa. Therefore, output from Atomic becomes input for Romeo and vice versa, for the entire script. The Romeo file contains an empty template tag at the end that I manually fill—usually with a bland, generic phrase. Any other editing is done in a program called TextWrangler—it's free and very good at dealing with the XML structure of AIML.

This strategy allows for efficient production of scripts, which often fit the twenty-six line requirement. In many cases, the individual script simply failed, that is, it was a one-joke interchange or it was an elaboration on a previous script. In these cases, the rehearsal process is crucial. By running the start line of the script through the interface, an assessment of how this script interacts with existing scripts on the server is possible. The use of wildcards, randomising and recursive elements in the AIML code, allows the scriptwriter to fire one

performance from a multitude of inputs. In the following example, the sketch relating to politics is found using the <srai> tag (symbolic reduction artificial intelligence).

```
<category>
<pattern> Australian politics </pattern>
<template>
<srai> politics </srai>
</template>
</category>
<category>
<pattern> * Australian politics * </pattern>
<template>
<srai> politics </srai>
</template>
</category>
<category>
<pattern> politics * </pattern>
<template>
<srai> politics </srai>
</template>
</category>
<category>
<pattern> * politics </pattern>
<template>
<srai> politics </srai>
</template>
</category>
<category>
<pattern> * politics * </pattern>
<template>
<srai> politics </srai>
</template>
</category>
```

The * is a wildcard that stands in for any other text the user may have typed in along with the explicitly stated words. This is a powerful feature of AIML and the ALICE engine, however it has disadvantages. Each new script may contain words or phrases picked up by the <srai> tag, throwing the new conversation to an older, exiting script. At times, this is a form of serendipity. On other occasions, it generates non-sequiturs and breaks a well-formed comic build. The problem of recursion is so great that multiple scripts can reference one another in an infinite loop. These constrains of writing in AIML are discovered through rehearsal. The

constraints also offer enabling moments when a short script, one that work for a full twenty-six line performance, is allowed to tag another short script to generate a full performance.

The actors in this project, the AIML coded characters or Atomic and Romeo, the ActionScript 3.0 coded interface, and the ALICE engine located on the Pandorabots server exhibit behaviours that are simultaneously structural and active. Each actor exhibits features that are simultaneously part of the larger project and sufficient stable to be whole in their own right. The interface, for example, is modular in nature by altering few variables it is capable of allowing any two Pandorabot characters to perform. It is a space, a location that has both an active and structural function within the project. Atomic and Romeo exist as two independent chat-bots. It is possible to talk to each of them as individual characters. From the interaction of all these actors, emerges a performance that none are individually capable of accomplishing.

Chapter 5 — Conclusion

The binding principle that integrates the elements of this PhD project is that theory informs practice and practice examines theory. As Berger argues, “[t]heory, we can say, is the flip side of the coin of practice, and an understanding of the techniques of humor enables us to understand how jokes work, and by extension how texts of all kinds generate humor” (2013, 51). This project employs the mechanical, artificial intelligence of a computer program as comedy performers. It engages with the reciprocal interference that occurs when the human is encrusted with the mechanical and the mechanical is encrusted with the human. The creative project evaluates the hypothesis that Bergson’s “new law” will stand if it inverted; we will laugh when a thing gives us the impression of being a person.

Central to this proposition is the idea that there is an incongruity between the ‘human’ and the ‘non-human’. This challenge for both the creative project and the exegesis was “to resist restaging of stories about autonomous human actors and discrete technical objects” (Suchman 2007, 284). The practice of comedy is informed by the cornerstone theoretical position that incongruity is in some manner core to the production of humour. This project questioned, through the lens of metamodernism, the inherent assumption that there is a hard and obvious division between the human and the non-human. The development process of this project reveals that all humans are actors: but not all actors are human. “The notion of *intra-action* (in contrast to the usual “interaction,” which presumes the prior existence of independent entities/relata) represents a profound conceptual shift. It is through specific agential intra-actions that the boundaries and properties of the “components” of phenomena become determinate and that particular embodied concepts become meaningful” (Barad 2003, 815 italics in original). All actors, through a range of intra-actions, operate in concert with a broad suite of psychological, social, and cultural contexts. Further, as these actors have both enable and constrain the development of the project: [a]ny distinction of humans and technologies is analytical only, and done with the recognition that these entities necessarily entail each other in practice” (Orlikowski and Scott 2008, 456).

The Literature Review chapter makes explicit the contributions of the four primary knowledge domains: Humour Theory, Creativity Theory, Artificial Intelligence, and Scriptwriting. The Humour Theory section argues that comedy is an intentionally structured cultural product that employs particular forms and conventions to create the affect of amusement in an audience. Humour, by contrast, is the ability to perceive or express the intentional or unintentional comic elements of life. Bergson's theoretical position becomes crucial to this project as it is primarily concerned with the structural elements of comedy and then offers a description of humour springing from interaction of human and non-human elements. The definition of comedy also calls attention to the agency and intention of the author working in a particular social setting for an audience who shares an understanding of the forms and conventions of comedy. This section also argues that unlike the formal, linguistic theories of verbal humour, which have been computationally demonstrated, the heuristic nature of comedy theories combined with the situational, context-driven nature of comedy itself, makes the computational construction of comedy significantly more difficult. Interactions with computers can be intentionally and unintentionally humorous. However, the development of comedy requires the intention of an author agent located in a social space to develop a text for and/or with an audience. This tripartite relationship between the author, the audience and the text is problematic to computationally model.

The Creativity Theory section argues creative activity is best described as a systemic process at the confluence of agents and structures. This follows Mihaly Csikszentmihalyi's systems model of creativity, updated by Kerrigan, which includes the individual, the field and domain in a system of circular causality is a model of confluence in which "[c]reativity is a process that can be observed only at the intersection where individuals, domains, and fields interact" (1999, 314). Crucially, this model de-centres the individual. The mapping of the emergence of creativity in a collaborative environment requires a method that deals with the complex intra-actions of the 'conditioned agency' of all of the actors. Following Sawyer, this section elaborates on the attributes of collaborative emergent systems: Unpredictability;

Non-reducibility to models of participating agents; and, Processual intersubjectivity; A communication system refers reflexively to itself, and within which the processes of communication themselves can be discussed; and, Individual agency and creative potential on the part of individual agents (Sawyer 1999, 453-457). Sawyer employed these attributes to argue that many computational models of emergence lack complexity in communication, intersubjectivity and reflexivity. This establishes the benchmark for any claims to emergence for the system of human and non-human actors in this project. While it is true that the non-human elements are ‘simple units’ devoid of the human attributes of ‘complex, creative units’ (Sawyer 1999, 458) the intra-action of the human scriptwriter mitigates, to a degree, this lack. The lack of intention on the part of the non-human actors (a desirable feature in improvised performances) suggests that the activity of the system cannot be reduced to simple descriptions of the agents. Their intra-actions; the multiple roles of the scriptwriter, the flexible nature of the chat-bot’s use of natural language, and interaction with an audience are sufficient to create an illusion of emergence. This illusion is akin to the illusions of intelligence, character, intention and personality that aggregate around systems that employ natural language (Reeves and Nass 1996).

The Artificial Intelligence section describes the Computers As Social Actors (CASA) paradigm that offers a way of viewing these interactions and explains the emotional relationships between humans and machines (Reeves and Nass 1996). It seems that even “the simplest of media are close enough to activate rich social and natural responses... rather pathetic representations of real life: simple textual and pictorial material shown on garden-variety technology” are sufficient (Reeves and Nass 1996, 7). The idea that minimal clues are sufficient to generate ‘rich social’ responses in an audience supports the argument presented above that ‘closure’ is generated in the absence of overt and explicit information (Meany 2006b).

The Scriptwriting section of the Literature Review employs the logic of dramaturgy to develop a definition of the chat-bots performance. This definition was based on the existing “Two-Act” vaudeville form as described by Page (1915).

This “Two-Act” project is a humorous text-based act performed by two agents presented in a new media environment. It possesses unity of the characters, the pairing of characters with incongruous and incompatible personalities; uses a sub-set comedy techniques that are appropriate for each and unique to each character; is marked by compression; follows the form of the tragi-comedy genre; and, usually up to twenty-six lines of dialogue for delivery.

This section argues that theatre is a designed experience, by demonstrating how it fits Simon’s “indicia of the artificial” (Simon 1969). This design dramaturgy approach shifts and expands the focus of attention from the unique properties of the individual design to include the process and practice. Dramaturgy is concerned with the *making* as well as the *made*. This dramaturgical approach to the creative process opens up the praxis of the designer to critical scrutiny.

In the Methodology chapter references are drawn from a variety of domains. The inter-disciplinary/trans-disciplinary nature of this project requires an account that spanned these domains. The Methodology chapter argues that to test Bergson’s theoretical position in this inverted form requires the researcher to hold a visible position inside the research process, a position based on the Constructivist ontology, deploying an Interpretivist epistemology from the hermeneutic-phenomenological tradition (Blaikie 1993, 48; Bryman 2008, 16). Positioned in this manner the researcher is implicated inside larger structures in much the same manner as the creative individual is implicated in the systemic view of creativity offered by Csikszentmihalyi (1997, 1999). The two pillars of Constructivism and Interpretivism would seem to mandate a Practitioner-Based Enquiry (PBE) methodology for the project, which illuminates its “process, product, praxis and practice” (Bourke and Neilsen 2004). Further, the use of the Production Journal method within PBE makes overt

the interactions with the field of experts and the affects of these interactions on the trajectory of the creative project.

5.1 — Research Questions

The primary hypothesis this project examined is: Bergson's "new law" will stand if it is inverted. The inversion of Bergson's "new law", as it is applied in this case, is expressed as, we will laugh when a thing gives us the impression of being a person. The 'things' employed in the creative project, Atomic and Romeo, are developed as performers of a particular comedy form. To attend to that hypothesis, four research questions were constructed.

RQ1 — Is there an incongruity between the 'human' and 'non-human' agents employed in this project that can be used for comic effect?

The Analysis Chapter argues that the 'human' and 'non-human' distinction, when seen as a binary opposition, is a false dichotomy. Rather, the distinction is better seen from the metamodern perspective as a pair of positions that exercise a particular gravity and that meaning oscillates between these poles. We may characterize Bergson's law as an oscillation between two meta-level incongruous states. It focuses on an inherently ironic mechanism as the driver for comic process (Clark 2003). Therefore, this inversion does not depreciate Bergson's original conclusion, in as much as the incongruous states of 'human' and 'thing' always remain in play. The 'human' and 'thing' are equal actors in the project, but it does not automatically follow that the 'human' and 'thing' are identical in form or behaviour. This is a rejection of the position of extreme posthumanism, which Dougherty argues, makes the human and the machine identical (2001). From a metamodern perspective, other oppositions such as incongruity and resolution, tendentious and non-tendentious humour, and *bona fide* and non-*bona fide* communication are collapsed. To directly answer the research question, affirmatively there is a meta-level incongruity between the 'human' and 'non-human'. Similarly, there is resistance to resolution that allows this incongruity to be employed for comic effect.

RQ2 — Does incongruity need to be resolved to generate humorous effect or do some forms of incongruity resist resolution?

The Methodology Chapter introduced Wittgenstein's Duck–Rabbit as an example of an incongruity that resists resolution. This metaphor was revisited in the Analysis Chapter. The construction of the incongruity implicates the author and his/her intention in the creative system. Large-scale incongruities such as life/death, mortality/immortality and human/non-human from a metamodern perspective can be categorised by their resistance to final resolution. The conclusion is, like Schrödinger's Cat (Schrödinger translation by Trimmer 2011), there is a smear between poles that initially appear as binary oppositions: “[t]he metamodern is constituted by the tension, no, the double-bind, of a modern desire for *sens* and a postmodern doubt about the sense of it all” (Vermeulen and van den Akker 2010, par. 24). Comedy is produced; the affect of humour is released, with incongruities that refuse to be resolved to the satisfaction of a modernist, positivist aesthetic that describes humour as a structural function of language or as personal affect. The outcome of this argument is that incongruities may be resolved, however this does not preclude the incongruity from being reconstituted. There are forms of both humour and comedy resistant to resolution and these forms are categorised by their use of meta-level incongruity that exists above and beyond the level of the text.

RQ3 — How do humour theories affect the writing and performance of comedy?

As noted in the Literature Review, many of the texts written by comedy professionals on the craft of comedy writing devote a chapter or space to the consideration of humour theories (cf. Byrne 2002; Carr and Greaves 2007; Evans 2003; O'Shannon 2012; Page 1915; Rishel 2002; Schreiber 2003; Vorhaus 1994; Wolfe 2003). The positioning of humour theories in ‘how-to’ texts suggests that theory does inform practice. This project aimed to critically examine the relationship between theory and practice to offer an understanding of how theory is used in the construction of comedy.

The Humour Theory section of the Literature Review and the Analysis Chapter both argued that humour theory in all of its guises is used, at the stage of production rather than reception, for its heuristic value. Theory is, to recall Polanyi (1958), a map. The production of comedy is a journey through a theoretical landscape: humour theory is a means of opening up new territory that includes the forms, themes and structures humour.

RQ4 — If the comedy of this “Two-Act” is an emergent property of a creative process, how do the material, technological, psychological, social and cultural structures affect the trajectory of the project?

Ritchie stated, “there is little doubt that the construction of humor is generally regarded as creative... and any general theory of creativity should have something to say about humor” (2009, 71). Theories of humour tend to focus on product over process and on reception over construction. This project argues that creativity theory provides a framework for examining the creative process, the *making* of humour, whereas the majority of humour theory reductively concentrates on the properties and reception of the *made* text. The Analysis Chapter uses four devices to address this question. Firstly, it offers a model of the project with its nested “structuring structures”. Secondly, it employs Sawyer’s attributes of emergent systems. Thirdly, it offers the concept of holons as a means of viewing all the individual actors that contributed to the creative system. Finally, it is structured around the dramaturgical protocols to provide insight into all the contributing elements. The argument of the Analysis Chapter is that all the technological, material, psychological, social and cultural actors have had an affect on the trajectory of the project. But further, it argues that when operating in concert, following the logic of the holon, the project is greater than the sum of its parts.

The arguments presented in this research project have implications for the contributing domains of knowledge. The metamodern perspective (Vermeulen and van den Akker 2010) and the removal of “any distinction of humans and technologies” (Orlikowski and Scott 2008) changes our understanding of the perceived dichotomy between the ‘human’ and the

'machine'. This logic has a particular impact on the Turing Test (Turing 1950) and its modern incarnation, the Loebner Prize (Loebner 2013). The Turing Test, coming from a realist, positivist paradigm, accepts the *a priori* assumption that the 'human' and the 'machine' are a rigid dichotomy. However, from a constructivist, interpretivist paradigm, allowing the machine to be encrusted on the human and the human to be encrusted on the machine, this distinction collapses. The seeds of this collapse exist in Turing's 1950 paper. The "imitation game", a parlour game, "is played with three people, a man (A), a woman (B), and an interrogator (C) who may be of either sex. The interrogator stays in a room apart from the other two. The object of the game for the interrogator is to determine which of the other two is the man and which is the woman" (Turing 1950, 433). The Turing Test then replaces the man (A) with a machine. However, the purpose at this time is not to determine gender, it is to determine if machines can think. The original game was never intended as a test for cognition, intelligence or humanity. The game accepts the *a priori* assumption that categories of 'woman' and 'man' are also rigid dichotomy. It is now a statement of the obvious, from the point of view of a pluralist society, to say women and men are equally human, they are distinctive but equal. Likewise, this research has argued that the 'human' and the 'machine' are equal but distinctive actors in a larger system.

The outcomes of this research project supports the systems model of creativity as proposed by Csikszentmihalyi (1999) and developed by Sawyer (2006), McIntyre (2012) and Kerrigan (2013). The process of creativity emerges from the intra-action of system of material, technological, psychological, social and cultural elements. This perspective means we can "resist restaging of stories about autonomous human actors and discrete technical objects" (Suchman 2007, 284). This echoes Simonton's call for rejecting "psychological reductionism", which focuses on the individual and the antithetical position of "sociocultural reductionism" which positions the individual as an epiphenomenon to the creative process (Simonton 2003, 304).

This rejection of reductionist views can also apply to humour theory. This research argues that linguistic theories, that are frequently used to analyse ‘canned jokes’, are appropriate when the scope of their application is limited to the analysis of short-form jokes. However, this analysis does not account for the production or reception of comedy as a cultural form. Likewise, the conception of incongruity and resolution was examined. This research found that, when viewed from a metamodern perspective, comedy is based on meta-level incongruities that willingly resist final resolution. Comedy exists as an oscillation between incongruity and resolution.

Will Bergson’s “new law” stand if it inverted; will we laugh when a thing gives us the impression of being a person? The “new law” of comedy, “We laugh every time a person gives us the impression of being a thing” (Bergson 1911, 58), by setting the very strict criterion of ‘every time’ implies that comedy is a system. That is, comedy is a cultural form that follows certain fundamental ‘laws’ that describe the required forms, formats and formulas to be recognised as comedy. The Literature Review and the Analysis Chapter argues that comedy does indeed have requisite forms, formats and formulas. Further, the Analysis Chapter argues that these elements, and all of the intra-active human and non-human actors, positively contribute to the trajectory of the creative project. Empirically, the feedback gathered in the Production Journal blog and the results of the Funniest Computer Ever Competition support the hypothesis that we will laugh when a thing gives us the impression of being a person.

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Appendix

Appendix 1 — Abstracts of Research Outputs

Journal Articles

Meany, M. M., Clark, T., & Joseph, S. (Forthcoming — Publishing Contract Accepted 30/09/2013). Comedy and Artificial Intelligence: Do We Laugh When a Thing Gives the Impression of Being a Person? *The International Journal of New Media, Technology and the Arts*.

Using an award winning comedy duo of artificial intelligence agents as a case study this paper argues for a reappraisal of the human / non—human dichotomy. Henri Bergson’s 1911 essay titled ‘Laughter, an essay on the meaning of the comic’ provides a fundamental theoretical proposition for comedy. He suggested a “new law” of comedy, “We laugh every time a person gives us the impression of being a thing”. This paper asks: will Bergson’s “new law” stand if it is inverted, will we laugh every time a thing gives us the impression of being a person?

Central to Bergson’s proposition is the idea that there is an incongruity between the ‘human’ and the ‘non—human’. Incongruity, with or without resolution, has been seen as a cornerstone concept in many humour theories. Through the case study this paper examines the perceived binary opposition of ‘human’ and ‘non—human’. Is there an incongruity between the ‘human’ and ‘non—human’ agents employed in this project? And, if so, does this incongruity need to be resolved to generate humorous effect or does this incongruity resist resolution?

Meany, M. M., & Clark, T. (2013). Design dramaturgy: A case study in new media, humor and artificial intelligence. *Design Principles and Practices: An International Journal*, 6, 59—71.

Theatre has provided a metaphoric lexicon to describe production in the new media environment (Laurel 1993). We call the production space a “stage,” the programmatic commands are a “script,” and we write “actions” to control our “cast” of symbols. These terms are usually employed as nouns, as useful descriptive shorthand. However, to employ them as verbs, “to stage,” “to script,” “to act” and “to cast,” suggests that the new media designer will engage with the theatrical techniques of making. The word dramaturgy “is made up of the root for ‘action or doing’ (drame) and the suffix for ‘process or working’ (—urgy)” (Cardullo 1995, 3). The dramaturg is responsible not only for the *mise—en—scène* (the overall visual and aesthetic design) but also the *mise—en—place* (the preparation, organisation and structured deployment of tools and ingredients).

This paper explores design dramaturgy through a case study of a creative PhD project that employs chat-bots (artificial intelligence agents) to play the roles of “comedian” and “straight—man” (Page 2005). The dramaturg requires an intimate knowledge of the new media “theatre”—particularly the codes and languages, interface designs, servers and data transfers, and artificial intelligence engines—in other words, the entire form and format of the production. As a tool for examining habitual responses, dramaturgy offers a technique for the designer to acquire new perspectives on the process and practice of making (reflection in action: Schön 1983, 55).

Meany, M. M., & Clark, T. (2012). Chat-bot humour: A survey of methodological approaches for a creative new media project. *The International Journal of Technology, Knowledge and Society*, 8(1), 23—32.

This paper surveys a range of methodological approaches to underpin a creative project that will develop a pair of online, computer—based conversational agents to interact as “comedian” and “straight man”. The project will interrogate the scriptwriting process as it is applied to a pair of interacting chat-bots: a confluence of human and non—human agency. This survey is necessary due to the project’s trans—disciplinary nature; it borrows from

information science, drama and scriptwriting, creativity theory, humour theory, and interactive design. “Ontology and epistemology can be considered as the foundations upon which research is built. Methodology, methods and sources are closely connected to, and built upon, our ontological and epistemological assumptions” (Grix 2004, 58). These ontological and epistemological foundations are often viewed as tacit knowledge within the disciplines, however, there appears to be little agreement across disciplines. Positioned in this manner, the researcher is implicated inside larger research structures in much the same manner as the creative individual is implicated in the systemic view of creativity offered by Csikszentmihalyi (1999; 2003). This is not a privileged position. The researchers themselves operate within same “discourses and traditions” as the object of study, “consequently, knowledge is theoretically or discursively laden” (Marsh and Furlong 2002, 26). The purpose of this paper is to explore these issues from a variety of disciplinary perspectives to make the implicit explicit.

Meany, M. M., & Clark, T. (2011). Scripting humour in conversational agents: Improvisation and emergence of humorous interchanges. *International Journal of the Arts in Society*, 5(5), 225—235.

This paper describes a creative project that will develop a pair of online computer—based conversational agents to interact as ‘comedian’ and ‘straight man’. The project will interrogate the scriptwriting process as it is applied in a new media environment at the confluence of human and nonhuman agency. In the context of this paper the term ‘scriptwriter’ carries two inter—related definitions: first, as a producer and crafter of dialogue for a character; and second, as a developer of computer script to guide the interactions of the conversational agents. It can be argued that the scriptwriter (in both guises) is part of a larger system of circular causality and is thus embedded within structures that both constrain and enable their actions (Boden 1994, 2004; Bourdieu 1993; Giddens 1979) and makes intentional choices to achieve particular aims or outcomes. The interaction

of the conversational agents is a result of a creative practice that allows for the emergence of improvised responses based on scripted dialogue choices. This paper will explore the inter-related issues of scriptwriting, emergence, and improvisation in a new media environment.

Meany, M. M., & Clark, T. (2010). Humour theory and conversational agents: An application in the development of computer—based agents. *The International Journal of the Humanities*, 8(5), 129—140.

Much of the literature on the development of conversational agents comes from the domain of Human Computer Interaction (HCI) (Buchanan 2008; Cassell *et al.* 2000; Laurel 1993; Reeves and Nass 1996). The Computers Are Social Actors (CASA) paradigm suggests that a user will respond to a computer—based conversational agent in the same manner they would respond to a real person (Nass, Isbister, and Lee 2000). Shechtman and Horowitz, although critical of the conclusions of the CASA paradigm, suggest there is an “inextricable link between the use of natural language and social interaction. Perhaps relationship behaviors are simply difficult to filter out of communication and may arise as an artefact of using natural language in a conversational situation” (2003, 288). Whether computers and humans are equal social actors or not may be an unnecessary distinction if the use of natural language is alone sufficient to generate the perception of social interaction and personality. If humour is one of the defining features of ‘human—ness’ then for a computer to truly be a social actor it must be able to engage in novel, surprising and humorous exchanges. This paper surveys a range of humour theories in search of a theory that can be applied to interactions of computer—based conversational agents.

Conference Papers

Meany, M. M. (Forthcoming — Abstract Accepted 24/09/2013). Comedy — a computationally intractable problem. In the 20th Colloquium on ‘Anything Goes’. Wellington, New Zealand: National Library, 13—15 February 2014: Australasian Humour Studies Network.

Comedy is an intentionally structured cultural product that employs particular forms and conventions to create the affect of amusement in an audience. Humour, by contrast, is the ability to perceive or express the intentional or unintentional comic elements of life. This definition of comedy calls attention to the agency and intention of the author working in a particular social setting for an audience who shares an understanding of the forms and conventions of comedy. The linguistic theories of humour have been computationally deployed to both detect and produce humour (Binsted *et al.* 2006; Kiddon and Brun 2011; Ritchie *et al.* 2006; Ritchie 2009). However, this humour has few of the attributes of comedy, frequently lacking the performative aspects of character, timing and a recognisable comedy form.

According to Berger, there are 45 techniques “that comedy writers and all humorists have used, do use, and must use — to generate humor” (Berger 1997, vii). This list of 45 techniques generates billions of billions possible combinations (45 factorial, is a massive number).

In mathematics there are particular class of problems that are termed NP—complete. These problems are computationally intractable, however, they have the unique feature that any solution can be quickly verified but there is no known algorithm for finding the solution. Comedy appears to be such a problem — we instantly know it when we hear or see it but how do we make it?

Using an excerpt from the Goon Show broadcast titled “The Histories of Pliny the Elder” as an example this paper will examine the application and selection of Berger’s 45

techniques. The conclusion will argue that the production of comedy engages what Bourdieu called the *sens pratique*, a ‘feel for the game’ (Johnson 1993, 5), as a structuring device to filter the possible combinations of comedy techniques.

Meany, M. M. (2013). Humour and creativity — Theoretical congruence. In The 19th AHSN Annual Colloquium on ‘Humour and Creativity’. Newcastle, NSW: University of Newcastle: 7—9 February 2013: Australasian Humour Studies Network.

Ritchie stated, “there is little doubt that the construction of humor is generally regarded as creative... and any general theory of creativity should have something to say about humor” (Ritchie 2009, 71). Both of these domains have developed through disciplinary exploration from various view points including anthropology, linguistics, literary studies, philosophy, psychology and sociology. By offering an account of the criticisms of theories of creativity and humour this paper aims to map the degree of congruence between the two domains.

Fundamentally these criticisms point out moments of reductionism. Simonton argues that the concentration on the individual aspects of creativity produces a tradition of “psychological reductionism” (Simonton 2003, 304). This tradition “also inspired an antithetical conception of creativity as an exclusively societal—level event... ‘sociocultural reductionism,’ [where] the individual becomes a mere epiphenomenon without any causal significance whatsoever” (Simonton 2003, 304).

In a similar vein there is a tendency toward ‘structural reductionism’ where the elements of the form are given a position of primacy. “When interested in the structure of a humorous text (mainly, what makes it funny) one can and must abstract away from the reception of said text by any given audience. Their reactions are essentially irrelevant...” (Attardo 2001, 30). Again, this form of reductionism is countered by ‘sociocultural reductionism’ that has an insistent focus on the audience reception of creative/humorous texts.

The core of Ritchie's statement above speaks of "the construction of humor" as a creative act. Theories of humour and creativity have tended to focus on product over process. What a general theory of creativity can say about humour production is that humour is the result of the interplay of social, cultural and individual attributes.

Meany, M. M. (2012). The vaudeville 'Two-Act' in a new media environment. In The 18th AHSN Annual Colloquium on "Varieties of Humour and Laughter". Canberra, ACT: Australian National University: Australasian Humour Studies Network.

This paper describes a case study in the development of comedic dialogue for artificial intelligence agents — i.e. vaudeville—style conversations between two on—line chat-bots. Taking a practitioner's point of view, it examines the process and praxis of comedy writing in this new media environment, which is the creative component of my doctoral research project. The emerging comic format closely resembles the 'Two-Act' form of American vaudeville as described by Page (1915; 2005) and Cullen (2007). The clear set of structural and stylistic requirements for a successful Two-Act laid out by Page in *Writing for Vaudeville* also emphasises the importance of character, particularly the development of individual characters that hold incongruous or incompatible worldviews. Incongruity, with or without resolution, has been seen as a cornerstone concept in many humour theories (eg. Raskin 2008; Morreall 2009; Ritchie 2004).

From the comedy writer's perspective, incongruity exists on three planes. The lowest is the minutely granular level of the individual line or gag in the script, where structures and typologies can be exposed by linguistic analysis. The middle plane involves comedic techniques described in many 'how—to' texts on developing comic incongruity (eg. Vorhaus 1994; Berger 1997; Byrne 2002). The upper plane concerns large—scale, meta—level, incongruity where the incongruities of life are expressed through the development of comic character. This is the special concern of Henri Bergson (1911; 2005) as theorist and Neil Simon (1966), among others, as practitioner.

This paper will explore the development of these three levels of incongruity in writing comedic dialogue for artificial intelligence agents. Significantly, this research project itself exists at the frontier where the binary opposition between human and non—human collapses — a meta—level incongruity. Further, the paper suggests that, in their work, practitioners translate theoretical understandings of humour into heuristic processes, showing that theory informs practice and practice examines theory.

Meany, M. M. (2011). *Incongruity: Human—like machines and machine—like humans*. In The 17th AHSN Annual Colloquium on ‘Time, Place and Humour’. Hobart, Tasmania: University of Tasmania: Australasian Humour Studies Network.

This presentation offers an overview of a PhD project that incorporates a creative project and an exegesis. The creative project will develop a pair of online chat-bots (computer—based conversational agents) that will interact as ‘comedian’ and ‘straight man’ when a human user delivers a topic. The exploration of humour provides the opportunity to explore “what it means to be human by moving back and forth across the [unstable] frontier that separates humanity from animality” and by extension, the frontier between the human and the non—human in general (Critchley, 2002, 28). Henri Bergson, in his seminal essay on laughter, stated a “new law” of humour, “We laugh every time a person gives us the impression of being a thing” (Bergson 2005, 28 (original Edition, 1911)). The project, in part, tests if Bergson’s law will stand if it is inverted; will we laugh every time a thing gives the impression of being a person? In addition, does this pairing of the human—like machine and machine—like human constitute an incongruity that can only be partially and momentarily resolved?

Meany, M. M. (2010). *Testing an inversion of Bergson’s ‘new law’ of humour*. In Proceedings of the 10th International Summer School and Symposium on Humour and Laughter: Theory, Research and Application (33). Boldern-Mannedorf: 10th

International Summer School and Symposium on Humour and Laughter: Theory,
Research and Application.

This presentation offers an overview of a PhD project that interrogates the scriptwriting process as it is applied in a new media, online environment as a confluence of human and non—human agency. The study is underpinned by the theoretical perspectives of humour theory, Actor Network Theory (Callon, Latour, Law *et al*), the Computers as Social Actors paradigm of Reeves and Nass, and Csikszentmihalyi’s Creativity Theory. The exploration of humour provides the opportunity to explore “what it means to be human by moving back and forth across the [unstable] frontier that separates humanity from animality” and by extension, the frontier between the human and the non—human in general (Critchley, 2002, 28). Henri Bergson, in his seminal essay on laughter, stated a “new law” of humour, “We laugh every time a person gives us the impression of being a thing” (Bergson 2005, 28, Original Edition 1911). This project integrates human agency (the scriptwriter and the scriptwriting process) with the nonhuman agency of the artificial intelligence of chat-bots (the interface and the scripted processes). As such, it tests if Bergson’s law will stand if it is inverted; will we laugh every time a thing gives the impression of being a person?

Appendix 2 — Suggested Sketch Topics

The following list of sketch topics is not a definitive list of all possible performances. These are topics were prompted by entries in the server logs. These topics initially returned the “I have no answer for that” reply from Atomic. Sketches were subsequently developed to address these topics. Please do not feel obliged to try these topics. The list is a useful device, as users prompted these topics the list captures a sense of the response diversity that is required for Atomic and Romeo to be seen a successful comedy “Two-Act”.

Where do you live?	Are you an Artificial Intelligence?
How old are you?	You’re just a machine.
Where were you born?	You sound like ELIZA.
Tell me about your family.	What do you know about humour?
What is today’s date?	What do you know about comedy?
What time is it?	Tell me a joke about [insert word].
Who is the Prime Minister?	Tell me a funny poem about [insert word].
Who is the Prime Minister of Australia?	What is your PhD about?
Do you like football?	What do you know about James Joyce?
Do you want to go out for a coffee?	Who has the biggest penis?
Have you been to the movies recently?	Do you know anything about sport?
Did you see Signs?	Do you prefer cats or dogs?
Did you see The Great Gatsby?	Do you like dogs?
Do you like zombie movies?	Do you like cats?
You need a therapist.	Who is the Radiation Romeo?
Wittgenstein was ‘ere — what does that mean?	Is Romeo dead?

Appendix 3 — Attached CD

Appendix 3.1 — Publications

The folder titled Appendix 3.1 on the CD contains the full—text versions of the journal articles listed in the List of Publications

Appendix 3.2 — Atomic and Romeo AIML scripts

The folder titled Appendix 3.2 on the CD contains the AIML files for Atomic and Romeo. The folder contains two sub—folders: Atomic_half and Romeo_half. These folders contain the corresponding halves of the sketches.

Atomic_half contains one file that is not mirrored in Romeo_half. This file, atomic_srai_01.aiml, is by far the largest single file in the set. It provides recursion for inputs coming to Atomic, allowing him to respond with the same <template> to many variations of the <category> input. Further, it allows for the use of content, originally written for one sketch, to be shared between multiple sketches.

Appendix 3.3 — Flash Interface

The folder titled Appendix 3.3 on the CD contains the source files for Flash interface. The folders contain the developmental versions of the interface including the Flash files, which define the interface, and the Actionscript .as files, which control the interaction of the interface with the chat-bots housed on the Pandorabots server.

Folder Name	Version Number	Size	Deployment Date
A+R_version01	ARbotsAS3v01.swf	58KB	Dec 15, 2011 5:58 PM
A+R_version02	ARbotsAS3v02.swf	66KB	Dec 21, 2011 9:16 PM
A+R_version03	ARbotsAS3v03.swf	66KB	Jul 17, 2012 7:37 PM
A+R_version04	ARbotsAS3v04.swf	64KB	Jul 23, 2012 9:25 PM
A+R_version05	ARbotsAS3v05.swf	64KB	Jul 24, 2012 9:54 PM
A+R_version06	ARbotsAS3v06.swf	54KB	Aug 2, 2012 8:36 PM
A+R_version07	ARbotsAS3v07.swf	64KB	Aug 13, 2012 10:39 PM
A+R_version08	ARbotsAS3v08.swf	95KB	Aug 15, 2012 1:59 AM

A+R_version09	ARbotsAS3v09.swf	96KB	Aug 16, 2012 3:20 AM
A+R_version10	ARbotsAS3v10.swf	103KB	Aug 22, 2012 5:57 PM
A+R_version11	ARbotsAS3v11.swf	108KB	Aug 28, 2012 12:46 AM
A+R_version12	ARbotsAS3v12.swf	109KB	Sep 1, 2012 1:04 AM
A+R_version12a	ARbotsAS3v12a.swf	Incremental version	
A+R_version13	ARbotsAS3v13.swf	109KB	Sep 8, 2012 5:40 AM
	ARv13preloader.swf	4KB	
A+R_version14	ARbotsAS3v14.swf	118KB	Oct 9, 2012 6:13 PM
	ARv14preloader.swf	4KB	
A+R_version15	ARbotsAS3v15.swf	132KB	Nov 1, 2012 8:50 AM
	ARv15preloader.swf	4KB	
A+R_version16	ARbotsAS3v16.swf	140KB	Jan 16, 2013 3:48 PM
	ARv16preloader.swf	4KB	
Actionscript_for_version16	Actionscript_Code_for Version16.pdf ARbotsAS3v16.as		

The folder titled “Actionscript_for_version16” contains a printout of the Actionscript .as file titled “ARbotsAS3v16.as”. The printout (Actionscript_Code_for_Version16.pdf), in PDF format, uses the following syntax highlight colour codes:

Syntax Element	Colour	Use
Foreground Text	Black	Indicates user declared function names, variable names and programmatic instructions.
Comment Text	Gray	Lines not processed as part of the script. These provide information about the purpose of following lines of code.
Actionscript Keywords	Dark blue	Words reserved as part of the Actionscript language, e.g. function.
Actionscript Predefined Names	Aqua	Attributes of program element. For example, text.length means count the number of characters in a text string.
String Constants (variables)	Green	String constants are variables that can contain both the value of a variable and a string of text characters. These define what text is displayed and how it is displayed