Evaluating the Constructivist Potential of the multimedia Software “Stage Struck” in Drama education.

Susan Mansfield
199224473

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Department of Science and Mathematics Education.
The University of Melbourne.
Abstract

This project compares the educational aims of the designers of the educational title “Stage Struck” with those of two separate groups in the process of learning and teaching; namely the aims of teachers and students. This method of comparing the observations of two key stakeholder groups with the objectives of the designer is part of an instrument proposed by Squires and McDougall (1994) called the Perspectives Interaction Paradigm. This instrument diverges from traditional models of software evaluation in that it has encompassed multiple points of view in the determination of whether a piece of software is useful in educational environments. This project hypothesizes that the Squires/McDougall approach shows how software can be utilized in ways that can be complimentary or contrary to the intentions of designers. It is for this reason and the multi-pronged method of data collection that the instrument is considered a more appropriate tool for the project than other evaluative checklists. “Stage Struck” has been chosen because a number of items in the education literature indicate clearly articulated aims that the software be used in a manner befitting constructivist approach. Using interviews with two teachers and observations of two students within the scope of the controlled setting, this project will identify where and why aims are transformed/modified and how the expectations of the educational merit of “Stage Struck” correspond or fail to correspond.
Declaration:

This is to certify that:

(i) the thesis comprises only my original work towards the Master of Education

(ii) due acknowledgement has been made in the text to all other material used,

(iii) the thesis is less than 100,000 words in length, exclusive of tables, maps, bibliographies, and appendices.
CONTENTS

Introduction........................................p.5
Literature Review..................................p.8
Methodology.......................................p.23
Results............................................p.29
Discussion........................................p.51
Conclusion........................................p.60
Appendix A..........................................p.64
References.........................................p.71
CHAPTER ONE

INTRODUCTION

"Today we are seduced by the promise of the gods of new technology, yet we are afraid that if we embrace them our traditional way of life will be destroyed. Ought we as artists and teachers, reject the advances of new technology? Or should we embrace the new technologies, welcoming the transition from old to new". (Martin-Smith et.al 1995, p.143)

Evaluating the constructivist potential of multimedia software, “Stage Struck” in Drama Education.

This thesis examines the educational merits of “Stage Struck”; a multimedia package designed for Drama Students of secondary school age, using an instrument known as the “Perspectives Interaction Paradigm” (Squires and McDougall, 1994). The following analysis draws upon contributions from stakeholders including the designers, teachers, and two students who have been recruited to use the software. More specifically the analysis compares the views of any two different stakeholder groups in relation to “Stage Struck”. The intention is to gain a broader picture of whether this particular program is suitable for creating a constructivist approach to Drama classroom activities.

Another aim of the project is to reduce speculation about the outcomes of using this or similar software by the approach chosen. By providing a structured evaluation process for software using the compared aims and expectations of teachers, students and designers, it is expected that this will be achieved. The study also provides, as Squires and McDougall (1994, p.119) suggest, a sound theoretical basis for discussion that focuses on educational aspects of software use.
WHAT IS “STAGE STRUCK”? 
“Stage Struck” is a multimedia product, which involves a virtual tour of Sydney’s Opera House that provides opportunities for a range of educational activities, especially those activities relevant to the drama classroom. It invites the user to investigate stagecraft elements and to examine their own abilities in this area. It allows the user to gain an understanding of what drives the choices that theatre professionals often have to make. “Stage Struck” also invites the user to navigate the backstage workspaces, and roles of Australian theatre workers. By exploring the Green room and clicking on profiles of industry gurus, the user is able to gain an insight into the personalities behind the current and past theatre scenes in Australia. Additionally it offers a window to the history and geography of some of the most famous theatre spaces in the country.

The constructivist philosophy for learning appears to be an intrinsic facet of “Stage Struck”, and the developers of the software indicate in writing about the constructivist approach was an important feature that they intentionally built into the software (Wright et.al. 1998). Wright et.al. cite proponents of constructivism such as Seamour Papert when they describe the design of “Stage Struck” as an attempt to support the ideas of constructivists.

BROAD AIMS AND SPECIFIC QUESTIONS
This study is important because it draws attention to the fact that there are new educational tools available for Drama teachers and students to use. These tools including “Stage Struck” were devised with a specific educational framework in mind, namely constructivism. But designers have suggested that software such as this program can also be used in contexts that do not subscribe to the aforementioned framework as a useful introduction to the world of drama for uninitiated students, and for the development of generic skills.
The broad aim of the project was to raise awareness of the use of technology in the Drama classroom, in the hope that more teachers will experiment with unconventional teaching tools, such as “Stage Struck”. Another objective is to demonstrate that when used in a constructivist classroom, the software will enable learning about the theatre to a good effect.

My research questions address what the specific objectives of the designers were, in respect to the use of the software and whether a constructivist framework for learning or another framework is evident in how the software is designed and used. The enquiries also delve into what the term “constructivism” might mean in the context of this software, and whether teachers who use “Stage Struck” recognise or apply a constructivist paradigm to learning/teaching when using this software. Furthermore this project has addressed teachers’ beliefs on the matter of whether the software helps them to achieve their objectives for teaching and learning and it encompasses the aspects of Drama teaching/learning that might be affected through the introduction of a of “Stage Struck” into the classroom. Additionally the questions probe into how students interact with the software when given an open-ended task; and whether students intuitively adopt constructivist roles and tasks that a constructivist design suggests they should.

The underlying hypothesis of the thesis is based upon the researcher’s prior knowledge of the software when it was used in what has arguably been described as “optimum conditions”. This situation included access to appropriate resources and facilities, while using it with students who liked Drama. The hypothesis tested here is that the software “Stage Struck” would fulfil the objectives of designers, teachers and students when used in constructivist settings. Related to this aim is to determine that the use of the software in constructivist environments does indeed enable students to become more active and cooperative problem solvers by providing opportunities to build their knowledge representations. In addition to these objectives this thesis has been embarked upon with the notion that students will be able to construct multimedia artefacts on the platforms that “Stage Struck” presents, which are also useful in learning about drama.
LITERATURE REVIEW

"Culture creates the tool, but the tool changes the culture. Participants in the culture appropriate these tools from their culture to meet their goals and thereby transform their participation in the culture." (Duffy and Cunningham, 1996, p.180)

OVERVIEW

The literature within the field of computers in the Drama/Theatre studies classroom represents a body of work in its infancy, with the most relevant, current contributions coming from predominantly Australian writers such as Hilary Bland (2000), Kim Flintoff (2001), and Robin Pascoe (2000). The literature surrounding the topic of constructivism and the use of technology is a more extensive, international, pool of work that coincides with the recent theatre studies and computer material. This review examines the papers of a number of writers working in the above fields, as well as papers from the designers of the specific piece of software in question: “Stage Struck”.

Some of the issues relevant to the thesis that these writers of the literature surveyed include: the objectives of the software designers, the use of the software as a teaching tool, the perceived benefits for students in using multimedia within a framework of constructivism, and the rationale behind some teachers declining to adopt current technologies as classroom tools. Some of the studies included are written from the perspective of the Drama educator, and primarily include their experiences with the new technologies. Other inclusions come from University studies, and acknowledgments from outside bodies, which have recognised the educational potential of “Stage Struck”. Amongst these offerings are also segments of academic research into the use of technology in constructivist environments.

According to Jonassen, Howland and Moore (2003), learning technologies that follow a constructivist framework are those, which are constituted by any
environment or set of activities that "...engage the learners in active, constructive, intentional, authentic and co-operative learning" (p.11). Rob Wright, John Hedberg and Barry Harper (1998), designers of "Stage Struck", have seen the principles of constructivism as harmonious counterparts to the process of creating instructional technology. Their belief in the possibilities and strengths of this association led them to create the program "Stage Struck", based around these tenets (Wright et.al. 1998, http://www.ascilite.org.au/conferences/wollongong98/asc98-pdf/wrightedbergharperolb.pdf).

"Stage Struck", is a multimedia virtual world, set in the Sydney Opera house, which simulates backstage roles of theatre workers. It invites the user to adopt these roles and learn about the theatre through the activities they participate in. According to Barry Harper (1999), one of the designers of "Stage Struck", the package also '...showcases contemporary companies' performances, processes and people, and provides theatres and tools with which to direct scenes' (http://www.ilrt.bris.ac.uk/alt-e99/speakers.htm).

Created for the National Institute of Dramatic Art, in conjunction with the University of Wollongong, "Stage Struck" was grown in the nursery that had produced some other noteworthy pieces of educational software such as "Exploring the Nardoo", and "Investigating Lake Iluka". This birthplace was the Interactive Multimedia Learning Laboratory situated within the Faculty of Education at the University Of Wollongong. The aforementioned pieces of software, much like "Stage Struck", have been designed with constructivist principles in mind.

"STAGE STRUCK" – DESIGNERS INTENTIONS
The designers of "Stage Struck"; Rob Wright, John Hedberg and Barry Harper published a paper on-line in 1998 declaring the motives behind "Stage Struck’s" construction. Their writing deals with the program’s roots in constructivist methods of learning' and despite its title; "Learner Construction of Knowledge: Using “Stage Struck” to develop a performance"; it does not clearly delve into the refinement of production skills. According to Wright et.al. (1998), the program’s objectives were as follows: "to: reveal the diversity and range of the
performing Arts in Australia; Inspire learners with excerpts of Australian productions; encourage participation in the performing Arts; discover theatrical creativity through the creation of a scene; explore and learn about backstage elements and processes; and explore some of the roles and career paths of the performing arts” (1998, p.673).

Wright et.al. (1998) cite Duffy and Cunningham (1996) when suggesting that the latter authors’ ideas formed the conceptual backdrop for “Stage Struck’s” genesis. The pedagogical goals which the “Stage Struck” environment is said to embody include: “...All knowledge is constructed: All learning is a process of construction ... Knowledge is context dependant, so learning should occur in contexts to which it is relevant...Learners are distributed, multi-dimensional participants in a social-cultural process” (Duffy and Cunningham, 1996, cited in Wright et.al. 1998).

In a personal email sent to the researcher, which included information that was sourced from working documents for “Stage Struck”, Rob Wright identified the core audience for the software as being “…secondary school students aged about 15 years.” However the documents also indicated that the product “…should appeal to a wide range of Australians as an introduction to the performing arts” (Rob Wright, Wednesday October 10, 2001, rwright@uow.edu.au ).

These documents also highlighted the intention to increase participation in the performing arts, which was believed could be enhanced through the incorporation of computer technology, such as “Stage Struck”. It stated that “Computer technology provides the opportunity for many Australians, particularly students who do not have direct access to theatre, to be inspired by real performances, processes and artists, and perhaps for the first time have the chance to create their own performances” (Wright, Wednesday October 10, 2001, rwright@uow.edu.au ).

Wright et.al. (1998), specified that features included in the program such as the tutorial rooms and virtual performance stage as being “…designed to support learners in construction of their performances and in trying out a range of
performance ideas.” They state that these areas “...contain a range of construction tools for performance creation...” (p.676).

The designers have stated that there are features within the program that enable the social aspect of learning, namely the “facility to share files between learners or represent an individual constructed performance and interpretation to other students located within the same classroom or across the internet”(1998, p.674). The ability to work collectively is one of the basic assumptions of constructivism, as listed by Duffy and Cunningham (1996) that is built into the program (Wright et.al. 1998, p.674).

Barry Harper (co-designer of “Stage Struck”, 1996) concluded, after examining results of research conducted by the Apple Classroom of Tomorrow...program (which focused upon the changes that can occur to teaching and learning, through access to technology) that multimedia programs designed for educational uses enhanced: project work, interdisciplinary activities, group work, cooperative learning, extension learning and opportunities for “…students to make choices, and a different philosophy of teaching. It also involved less structure, less teacher presentation, and elimination of worksheets” (1996, p.5).

When addressing the earlier contributions from the team at Wollongong, “Investigating Lake Iluka” and “Exploring the Nardoo”, Harper, Squires and McDougall (2000) have noted the progression amongst the packages and have found through researching the effectiveness of the latter program, that this (and by inference “Stage Struck”) is a hybrid simulation which incorporates symbolic simulations and experiential simulations in order to address “constructivist issues” (p.126). These issues include: “complexity, credibility and ownership.” They argue that “Exploring the Nardoo” is an exemplar of how these issues can be overcome, by providing clearly articulated activities to enable students to manage complexity. Learners also adopt management roles to gain a sense of ownership, and the provision of an interface, which mimics a real life work setting, adds an atmosphere of authenticity (2000, pp.126-127).

In their conference paper, Wright et.al.(1998) had identified their previous intentions to design software which “…supports active learning...”, (another
constructivist tenet.) Examples of the strategies they implemented to further these aims included “flexible digital tools”, which they argue support the “…exploration, collection and reprocessing of information…” (p.675) They go on to describe the experiential aspect of “Stage Struck” as being designed to enable student access and experimentation with “…numerous set design elements that range from more literal pieces to abstract, construction styles” (1998, p.675).

WHY CONSTRUCTIVISM?
Wright and his fellow developers (1998) have acknowledged Harel and Papert (1991) as two inspirations for pursuing a constructivist educational philosophy, by highlighting the fact that these esteemed scholars have spent much time investigating active learning environments, wherein learners have been given the opportunity to adopt a more ‘active position of the teacher/explainer rather than the passive recipient of knowledge; and in the position of designer/producer rather than consumer of software” (cited in Wright et.al. 1998 p.41). Papert (1993), advocated the idea of constructing one’s own knowledge, rather than having it transmitted from teacher to student, describing this process as “powerful” (p.104).

There has been an observable paradigm shift in theories of learning over time from a behaviourist, through a “weak artificial intelligence approach” according to Atkins (1993, in Harper, Squires and McDougall 2000) and finally reaching a “constructivist” paradigm (2001). Recognising the scope of constructivism, these authors have asserted that this philosophy can unleash the optimum potential of information technology to be fulfilled in educational settings (2001, p.117).

A constructivist paradigm, according to Jonassen, Howland and Moore (2003), is a revolutionary framework for teaching which entails much upheaval for the way schools and classrooms (those using technologies) are run in general (p.13). The idea is that teachers have to relinquish some of their authority, as purveyors of knowledge, in order for learners to manage their own learning, develop conceptions, and construct their own meanings etc. The aforementioned theorists advocate that teachers effectively shift roles “...from dispensing
knowledge to helping learners construct more viable conceptions of the world” (2003, p.13).

An advocate of constructivism in the Drama classroom and Drama lecturer, Stephen Schrum (1999), suggests “The Instructor wants to change from being the sage on the stage to the guide on the side”. According to Schrum the approach to instruction ought to be a move away from traditional didactic lectures towards a more collaborative learning tactic. He highlights the role of computers in this technique for learning/teaching, stating that while they are useful tools for more conventional lecture presentations they can also facilitate learning in a more collaborative manner. In this way “…students work together actively to discover information rather being passive recipients of information” (Schrum, 1999, p.54).

**CO-OPERATIVE LEARNING**

The suggestion of Duffy and Cunningham (1996) that cognition may be socially and culturally situated is not without precedent. Rogoff (1994) believed that ‘learning occurs as people participate in shared endeavours with others, with all playing active but often asymmetrical roles in socio-cultural activity” (p.209, cited in Duffy and Cunningham, 1996, p.176). They extend this assertion by stating that the process of thinking is always interwoven with “socio-cultural constructions”. This is due to human modes of expression, (i.e. Language) being mediated through signs that are shared within a particular cultural context (1996, p.177).

In their discussion of constructivist learning as possessing a social nature Jonassen et.al. (2003) suggest that knowledge is “co-constructed” and that “learning communities” that are bonded by the common goal of creating multimedia artefacts, find that these exercises are extremely potent in terms of the quality of learning that they yield (2003). The other generic skills that are accrued in the process of group work, they argue, make the experience worthwhile. Things such as “…the development of interpersonal relations and community identity…” are manifested throughout the process of learning in this manner (2003, p.53).
CONTEXT DEPENDANT
Duffy and Cunningham (1996) have acknowledged the context dependant nature of learning according to a constructivist perspective. They discuss constructivism with a more balanced view of the philosophy, as if it were just another paradigm of learning.

"The Constructivists...view...learning as the activity in context... Rather than the content domain sitting as central, with activity and the 'rest' of the context serving as a supporting role, the entire gestalt is integral to what is learned" (1996, p.171).

Jonassen et.al. (2003) follow this idea of learning in context by arguing that "Learning is a dynamic interaction with learners and their environments..." and that "...learning is the residue from direct perception of an action on the environment by the learner..." (p.44). They have also suggested that learning environments and multimedia simulations regularly possess problem or project-based attributes, whilst enveloping the learner within multimedia environments. They contend that it is the simulation of "real-world contexts" within the multimedia virtual worlds that enable learners to solve problems (2003, p.47). Jonassen et.al. (2003), use "Exploring the Nardoo" (Corduroy, Harper, Hedberg & Wright, 1998) as the exemplar of their notions about multimedia environments and their problem solving capacities. It is the problem solving aspect of multimedia packages that, if the learners accept the responsibility of self-directed learning, can lead to a sense of ownership, consequently making the learning more meaningful and the environment more motivating space in which to learn (2003, p.49).

INTENTIONAL LEARNING
It is argued by Jonassen et.al (2003) that if learning occurs in simulated multimedia environments, the interactive nature of the medium demands a more intentional approach on the part of the learners. They assert that if learners are contextually situated in a learning environment, it is more probable that they will adopt a sense of ownership of the problems, which they are to solve within the "problem space". According to these authors this scenario assists learners to, "...not only interpret the problem and its context, but also to internally
represent the problem and to test their representations by manipulating the problem and observing the environment’s response” (Jonassen, 2001, p.59).

**AUTHENTIC LEARNING**
Sembill and Wolf (2001) argue that Interactive Multimedia provides a great medium for simulating authentic problems that may be found in the everyday routine of a profession (p.35). Similarly, Harper, Squires and McDougall (2000) advocate the potential of simulations by suggesting that this environment provides “…credible opportunities for learning…” wherein the learner is able to “… explore the behaviour of systems, environments or artefacts…”(2000, p.117). Examples of institutions which utilise simulations as authentic learning modes to certify learners with professional skills, have been provided by Jonassen et. al. (2003) As evidence they suggest that : “…pilot training for nearly every airline in the world is supported by multimedia simulations” (p.47).

**ACTIVE LEARNING**
The view of the learning process that was promoted by Jerome Bruner (1971) places emphasis upon the activity of the learner, as key stakeholder, in the course of education. In particular Bruner advocated “discovery learning” whereby an issue was raised, and the learner worked towards discovering, or gleaning an understanding of the issue (cited in Duffy and Cunningham, 1996, p.174). Concurring with this perspective, Duffy and Cunningham (1996) have asserted that within the diversity of interpretations about what constructivism is, there is some consensus upon the active nature of constructing knowledge. While referring to constructivists Duffy and Cunningham have said “…they…seem to be committed to the general view that (1) learning is an active process of constructing rather than acquiring knowledge, and (2) instruction is a process of supporting that construction rather than communicating knowledge”(1996, p.171).

Similarly Jonassen et. al. (2003) have described the use of multimedia in a constructivist classroom to be akin to the palette and canvas of an artist, in that use of this tool assumes the intellectual authority of the learner ( p.54). “The learner controls the multimedia selecting various affordances of multimedia for
their ability to represent their thinking," (2003, p.54). In line with this perspective, Jonassen et. al.(2003) borrows from Gibson's (1979) direct perception theory, emphasizing the active role of learners. According to this theory meaning is made in the process of doing something, in an environment that is significant to that action. It is a matter of "...interpreting cues from the environment and acting on them" (2003 p.55).

**CONSTRUCTIVE LEARNING**

The suggestion that multimedia programs used in the context of a supportive constructivist classroom can operate as tools to facilitate knowledge construction, was made by Jonassen et. al. (2003). They argue that this is the case due to the functions that learners perform in order to build their knowledge. These things include: interpreting, organising and designing their own personal knowledge. "Multimedia provides different formalisms for representing learner's knowledge engaging a different set of critical cognitive skills (Jonassen, 1998, p.60). Sembill, and Wolf (2001, p.75) propose that it is the system inherent in hypermedia, which enables the learner via hyper-links, to navigate between linked multimedia information, such as text, pictures, sounds etc., and to overcome a "passive consumer role". So in effect by following links between nodes of information, in an associative, non-linear structure, learners are creating their own knowledge construction.) In terms of the "Discovery learning" capacity of constructivism, Duffy and Cunningham have asserted that the principles behind this idea are to enable learners to learn, and to do so independently. This "Learning to learn" includes "... the ability to ask questions, evaluate one's strategies, and develop answers to questions in the content domain..." (Brown et.al., 1993, cited in Duffy and Cunningham, 1996, p.182).

Yet Jonassen et.al. have argued that educational technology is only useful in the classroom when used as a tool. They contend that learning with technology, rather than from technology, is the only effective implementation of these tools in the classroom (2003, p.11). They further suggest that the equivocal and inconsistent nature of results across research into the success of multimedia applications in the classroom is due to the "assumptions that researchers have made about the learning processes engaged by multimedia" (2003, p.53). They
go further by stating that the choice of whether multimedia should be used to ‘…learn from, learn in, or learn with…’ The learner depends on the assumptions you make about the manner in which learners should engage with the software (2003, p.53).

Barry Harper (1996) has used the constructivist framework as presented by Jonassen and Reeves (1996), to draw some conclusions about cognitive tools such as computers. He suggests that they can assist learners to “organize, restructure and represent what we know” (Harper, 1996, p.4). Furthermore Harper’s interpretation of the research findings of Jonassen and Reeves (1996) suggests that: the effectiveness of cognitive tools will be at optimum level when used in conjunction with learning environments that already employ constructivist methodologies. According to Harper, the summary of the research also suggests that cognitive tools enable learners to formulate their own knowledge representations, and that they also facilitate a level of reflective thinking that is deep enough to result in meaningful learning. Similarly it concludes that problem-solving tasks situated in realistic contexts provide the ideal conceptual backdrop for cognitive tools to be applied (1996, p.4).

**“STAGE STRUCK” FROM A TEACHER’S PERSPECTIVE**

Hilary Bland (2001), a Drama teacher and advocate of “Stage Struck”, claims the designers’ objectives have been met. (p.13). Her personal experiences with the software and subsequent paper, “Does the Use of Multimedia Technology have any relevance to the Drama Teacher?” (Bland, 2001), on the topic have been based around classroom practice within a Victorian state high school.

In agreement with this testimony, a teacher participant in a formative evaluation “Stage Struck” (which was conducted by the developers) praised the product by stating "Stage Struck” has possibilities for experimental and experiential Drama teaching and learning strategies and its focus on Australian Theatre is to be commended" (Wright et.al. 1998, p.678).

Bland (2001) suggested that use of multimedia technologies in general within a classroom setting invokes constructivist principles of learning. She also sees the multiple opportunities for students to participate in multimedia activities to
accompany more orthodox performance tools. It is her contention that through the construction of multimedia bi-products, students embrace constructivist methods of learning. She cites Jonassen (after Gordon 1996) to substantiate her claims “Learners develop critical thinking skills as authors, designers and constructors of knowledge and learn more in the process than they do as recipients of knowledge…” (p.13, 2001). Bland believes that this constructivist perspective is a fairly commonly used approach within Drama work, and it is consistent with the emphasis of Drama’s outcomes placed upon the process rather than the product (2001,p.13).

She adds that tools like “Stage Struck” are a great information resource, allowing the Drama teacher to assume the role of a generalist, and providing students with highly specific material, at their fingertips, should they require it. Bland sees the role of teacher in these instances to be one of “enabler” rather than “expert” for, she adds, the latter title is out of place in a constructivist classroom (p.13, 2001).

THE PLIGHT OF DRAMA TEACHERS

The notion of acting in cyberspace is examined by Nina LeNoir (1999), who has suggested that cyberspace offers a new medium for the “exploration of imagination”, or a new “most tempting” stage on which to act (p.176). However she also questions what is lost and gained through the incorporation of technology into the long-standing tradition of Drama, which dates back to the ancient Greeks, in the 4th Century BC. Specifically she delves into the question of how the “psycho-corporeal reality” of the body “…in space and time [is]...translated through technology and interactivity…[to produce]...cyberspace performance” (p.176)?

Kim Flintoff, (1999) a teacher of Drama who has special interests in drama and new media, also explores these notions by recognizing that “Cyberspace, with its apparent offerings of vicarious and disembodied experience, poses challenges to the field of Drama Studies”. This is due to the fact that “Classroom drama traditionally presupposes the physical and the verbal, focusing heavily on role” he goes on to suggest that “…in virtual reality these presuppositions are cast in a new light” (http://come.to/dramawest ).
In this same vein, some teachers have indicated that they are concerned about the territory which computer technology will inhabit. Kym Andrews (2001) suggests that the objectives that you have for technology have to be clearly linked to the Drama exercises that you have planned. "...we don't want to compromise the practical nature of our subject - those kinaesthetic, aesthetic experiences that make drama unique - to sit our students in front of computers the way they are in most of their other subject areas" (p.15).

Hilary Bland (2001) asserts that multimedia should not become the focus of Drama, usurping the role of conventional Drama "tools" such as body, voice, and imagination, but rather suggests that it's role should be a tool to "motivate and enhance both the learning process and outcomes for all students" (p.14). Alistair Martin-Smith and Belarie Hyman Zatsman (1995) are academics, experts in the field of Drama teaching and co-designers of interactive drama based software "The Gates of Troy", have also warned against forgoing the corporeal experiences of drama (p.143). According to these authors who are all advocates of computers in the Drama classroom, the way to avoid straying into dangerous philosophical territory, is to ensure the role of the computer technology is always clearly linked to the Drama objectives. Government guidelines have stipulated as much in their publications; they recommend: "worthwhile computer-based activities: - Are linked to other contexts, - Have a clear focus or purpose, - Are effective in terms of the learning outcomes" (p.29, Queensland's "Guidelines for the Use of Computers in Classrooms" Guidelines cited in Andrews, p.15, 2001).

However some authors working in the field of Drama and Theatre Studies have drawn parallels between representation on the stage and representation in virtual worlds, and have demonstrated that simulations such as "Stage Struck" have a relationship with Drama, which transcends the obvious content issues. Martin-Smith et. al. (1995) have suggested that the possibilities offered through virtual worlds, invite the user to extend the already established relationship between representation and reality found in Drama (p.143).
Robyn Pascoe (2001) has argued that according to research, teacher attitudes to technology can impact upon the ways in which arts students learn. Finally, drawing on past experience, he acknowledges that students will bring their technological tools with them, regardless of teachers’ preparedness for change (p.4).

**HOW DO MULTIMEDIA PROGRAMS SUCH AS “STAGE STRUCK” ENABLE STUDENT LEARNING?**

Kim Flintoff’s (2001) Drama Australia conference paper illustrated the potential for computer technology to serve as a motivational tool, or enabling device to entice alienated or marginalized students to participate in Drama activities. He highlighted the benefits of virtual worlds to provide alternative spaces for student interaction, where physical and social limitations would not prohibit participation in drama activities (2001, p.10) This ideal of inclusiveness is a point which Kim Andrews has addressed when she considered the possible impact of using computers to bridge the divide between students of differing abilities, interests, age-groups, genders, cultural/ethnic backgrounds, and economic circumstances, by catering to their individual needs. She went on to assert that geographically remote students could be included by the use of communication technologies (2001, p.15).

Robyn Pascoe (2001) has developed the idea that by channelling the enthusiasm students have for technology, and using the language that the modern-day student is familiar with, the dramatic mode is expanded to include the lexicon of computer-aided theatrical devices, and thus “Technology is enhancing the repertoire that drama students have of creating, exploring, expressing, communicating, and performing their ideas” (p.5).

However despite the apparent abundance of advocacy material for "Stage Struck" found by users of the program, there were also some criticisms drawn by usability testers, which cast the whole question of software evaluation into question. According to Wright et.al. (1998) "...the professional reviewers ....did not seem to understand that the product had to involve elements of inherent motivation... In particular the measurement of intrinsic interest in a product is [was] not attempted..." (p.678).
So this fact poses the question of whether all software evaluation criteria are appropriate for reviewing educational form and content of all programs across the curriculum, and whether programs of an exploratory or creative nature require some amendments to be made to ensure the evaluation is fair.

Squires and McDougall (1994), acknowledge the process of assigning classificatory frameworks to evaluating broad range of software applications is inherently flawed. They suggest that the criterion whereby the material is judged ought to be specifically tailored to suit the kind of approach that the designers will employ and the context in which the software will be applied. They believe that the selection of software needs to account for: teacher/student/designer interactions, activities sponsored by the program, explicit or implicit design of learning processes, curriculum related issues, and not just general useability functions (p.112).

Yet while highlighting the importance of the whole matrix of interactions in their work "Choosing and Using Educational Software" they also identify that the interaction between student and designer to be the most critical in the process of assessing the potential of software to enhance learning (Squires and McDougall, 1994, p.87).
CONCLUSION
The above literature suggests many educationally valuable connections between multimedia and constructivist educational methodologies. Some are arguing that this is especially appropriate and applicable to the Drama/Theatre Studies Classroom. More specifically some literature points to how multimedia has already been introduced to good effect, and how “Stage Struck” in particular is designed to follow constructivist objectives.

In this review is a great deal of material that supports the constructivist approach is taken from authors who are also the designers of the software “Stage Struck”. The sentiments expressed by these authors are an indication of the principles that they were following when developing the software and their intentions in how the software might be used in the Drama classrooms and by Drama students. This thesis will develop the notion that the intentions of important stakeholders involved in the use and design of the software in educational settings are an important element in its evaluation. The thesis aims to fill the gaps here by providing a more comprehensive and fairer approach to examining the effectiveness of the software.
CHAPTER 2
METHODOLOGY

PURPOSE OF THE STUDY
This thesis examines the ways in which Drama teachers and students might use "Stage Struck" as a teaching/learning tool and compares these findings to the constructivist objectives that its designers intended. The study provides a structured evaluation of the "...educational aspects of software use..." (Squires and McDougall, 1994, p.119) by teachers and researchers alike.

Two teachers were interviewed as a part of this process and the results compared with designers intentions. Two school aged students also participated in this study to examine if their interaction with the software fulfilled the designers constructivist objectives.

The intention of conducting a study in this way was to focus upon educational concerns and avoid focussing this software evaluation on "technocentric" discussions of the programming expertise, interface design, or other technical features of the design. It is hoped that the approach taken here is more considerate of the motivations, intentions and purposes of different stakeholders in educational multimedia and therefore provides a more clear indication of the usefulness of a piece of software in educational settings.

METHODS
Qualitative research Methodologies have been employed throughout this study, in terms of Data collection techniques i.e. Interviewing of teachers, and some of the basic data analysis process with the use of semi-fixed grids and open grids. However Squires and McDougall (1994) have provided a framework for evaluating to potential of software in its broader educational context, and after researching the different models of software evaluation it was decided that the paradigm proposed by Squires and McDougall was comprehensive model with which to achieve these objectives. The paradigm was chosen in order that a broad study of the software could be undertaken with an emphasis on how it facilitates teaching and learning. The perspectives interaction model examines
the interactions between three identifiable “actors” that Squires and McDougall classify as the stakeholders in educational software development and use. Squires and McDougall recommend that the interests of stakeholders be compared for interactions in pairs, and from any two stakeholders perspectives, questions about the software be generated (Squires and McDougall, 1994, p.67). These stakeholders in relation to “Stage Struck” include the designers of “Stage Struck”, teachers who have used the software and students who have also been exposed to it. The pairs that are specifically examined in the course of this study have been designer and teacher interaction, and designer and student interaction, with a brief analysis of the teacher/student interaction.

The potential audience of this thesis, namely Drama teachers also played a part in helping to determine what methodological direction was followed. It is hoped that through the use of the perspectives interaction paradigm, which incorporates the ideas and opinions of both Drama teachers and students who have used “Stage Struck”, readers will feel that the study is more relevant to current practice. It follows then that this fact would lend the thesis a degree of validity. This thesis was designed to be accessible to drama teachers. A qualitative study, it was theorized, was more likely to appeal to Drama specialists, as they have been accustomed to the reading/ portrayal of stories, through the written and spoken word. This target audience, it has been imagined, will be less likely to be engaged by a study, which for example, utilises statistical models to convey its message.

In the case of this particular study the designers’ intentions can be gleaned through a close reading of the literature that they have produced regarding the multimedia software born of earlier efforts. The designer/teacher interaction is examined through interviews with teachers’ about their own objectives and what they felt were the purposes of the software. Also investigated were the explicit and implicit forms of assistance that the software provided. Included were support documents and literature accompanying the websites that may have enabled the teachers to gather a better understanding of what designers intended for the software. A further aim of the interviews was to determine if the designer and/or the teachers’ own objectives were achieved, at least in terms of the classroom teachers’ perspective. The designer/student interaction was
examined through an exercise with students to observe and video record students’ overt interactions with the software. This was immediately followed by questioning of the students as to their intentions in relation to these interactions. The exercise used a video capturing facility that recorded computer screen cursor movements as a pair of students navigated around the software. This was combined with audio and video recording of the verbal interactions between the pair of students and the facial expressions of the students as they worked through the software. The findings therein were later compared with the objectives of the designers as indicated in the literature.

This process is significant according to Squires and McDougall (1994) only because teachers and students often don’t follow the intentions of the designers precisely, and tend to use software either subversively or in ways the designers might not have considered. Thus the intentions of the stakeholders may not be aligned to the designers’ intentions, and teachers and students use cannot be evaluated without the intentions behind their operation of the software being made more explicit.

RECRUITMENT OF SUBJECTS.
The recruitment of teachers was a difficult process, as so few teachers use the software within the state of Victoria. Drama Victoria (the state Drama Teachers’ association) was requested to make suggestions about what schools might be using the software. The organisation recommended two schools. One had a teacher on staff that had since ceased to use “Stage Struck” and the other school had a teacher who only used the software intermittently. The second teacher participant was an ex-colleague of the researcher who had been known to use the software in the past. Organisations and other recruitment pathways such as word of mouth could not produce any more subjects, this fact alone accounts for the small sample size. In terms of student recruitment, the researcher was not currently teaching at the time of the proposed data collection, and access to students in schools that were using the software, was restricted by gatekeepers. It was for this reason that it was suggested by an academic within the department that we might obtain the services of her children as participants for the purposes of this study.
Finally two teachers from different schools, regions and situations were interviewed. One school was a Government, co-educational, Senior secondary school, accommodating exclusively years 11-12, in the Eastern Suburbs of Melbourne and the other was in a large, co-educational government school situated in the Northern region of the city. Both male teachers participated in an interview which took up to 40 minutes to complete. Data was analysed by reviewing tape-recorded and transcribed responses, and comparing it to, the designers intentions for the software as found in the literature. The students, one boy and one girl, who were asked to participate are the children of an academic within the department of Science and Mathematics education at Melbourne University. Using one facet of the perspectives interaction paradigm, namely the designer/student interaction, the aim was to examine the software ("Stage Struck") through the students' perspective. Having built up an understanding of what the constructivist aims of the software were, it was desirable to test it the software to find out if it would be a useful tool for a constructivist geared task.

The process of video-supported recall, was used by Jeni Wilson (1992) in her Masters thesis that examined children's metacognitive processing in the field of mathematics. Wilson's approach was adapted to this new situation recording interaction with "Stage Struck": children of secondary school age participated in a simulated exercise which was situated outside of their school and after school hours. Students firstly were given the open-ended aim of exploring the software. While they were doing this, their interactions with the software were being video-taped for the purpose of reflection. Simultaneously their mouse movements were also recorded through a different software package. Then students were given a more specific task of designing a costume with the software for a theatrical production that they had seen. Once this was concluded students were required to reconstruct their learning experiences to the best of their abilities by being shown the video of their earlier exercises working with the software, and throughout each segment of the video, reflecting on the experiences. The syncing of the live interaction with the computer and reaction by the students is a kind of Post-lesson generated recall process that provided a useful tool for analysis.
During the reflection process they were asked to construct a synoptic account of what happened. They were asked at intervals to recount:

- What they did?
- What they thought?
- Other questions relevant to the scope of this study (see Appendix A.)
- And to provide a general commentary on the action.

Wilson has pointed out that the reasoning behind her techniques for collecting and analysing data, which included summarising and patterning, was the idea that she could trace relationships between the data. She used interviews that were tape-recorded and transcribed to compare with other interviews and data sources. This was done in order that she might discern consistency or discrepancies between sources. Video and audio recordings were made in order that interactions between class members might be revisited any number of times after the event (Wilson 1992, p.14). It is for the same variety of reasons that her method has been employed as a part of this project.

**RIGOUR**

The researcher has gathered viewpoints in the process of assessing “Stage Struck”, from significant players in this field. From interviews and the other methods employed in this study, the researcher has built up a picture of how teachers intend to use the software in the classroom, and how they actually do use it. Furthermore, the researcher has examined how the students set about using the software in a constructivist framed task, and analysed the designers’ intentions for the software by their academic papers on the topic.

Wilson attended to the problems of rigour such as validity, generalisability, reliability and objectivity (Wilson, 1992, p.14) by using the following methods that have also been used in this study to establish some level of “truth value”:

1. Triangulation of data sources - which involves “exposing the situation to perceptions of different people” (1992, p.15). In the case of this particular study this included the researcher, and the pairs of subjects in the perspectives interaction paradigm i.e. designer/student and designer/teacher. According to Wilson (1992), this process provides the researcher with an insight into “…the local meanings of actions, as defined from the actors’ point of view” (Erickson, 1986, p.119 cited in Wilson, 1992, p, 15).
2) Auditing: which the researcher conducted by seeking advice and feedback from both the project’s supervisor and colleagues.

ANALYSIS
Analysis of data was conducted through many different methods. Firstly transcription of taped interviews assisted the researcher to become reacquainted with the issues at hand associated with the development of an appropriate grid for analysis. One semi-fixed grid was used to break down the data into comparative chunks. This was appropriate for the data gleaned from semi-structured interviews that the researcher undertook with the teachers. In addition to this, the use of an open grid to encompass broad thematic categories has proven useful in grouping data that was accrued from student interactions. This was due to the more random direction that the second interview took. The use of two separate grids served to keep data organised into categories. For the purposes of comparing data, colour coding was employed to link ideas.

In the analysis of the data the interviews were triangulated, with the post-lesson generated recall data, and with the designer’s intentions as published in the literature. This process of comparison engenders the project with a degree of validity.

ETHICAL CONSIDERATIONS
There were not really any foreseeable risks associated with the nature of this project and the method of collecting data. However all participants and their guardians were acquainted with all details of the project before commencement of their participation, and of their rights to withdraw at any stage of the process.
CHAPTER 3

RESULTS

By comparing the pairs of interactions from major stakeholders with each other, this section will show that the results demonstrate how the explicitly stated theory that underpins the software, namely “constructivism” was an appropriate framework for achieving the aims of the users in satisfying the objectives of the intended educational tasks. For although the users of the software have been divergent in terms of their level of enthusiasm for the software, the variables have included the use of “Stage Struck” in controlled versus non-sympathetic environments. The latter set of circumstances was subversive to the designers’ original intentions and was destined to meet with mixed levels of success. However the findings also include much evidence to support the claim that when used in situations and environments that have similar underpinning educational frameworks for teaching/learning, the software proved to be a successful tool to assist students form their own understanding about the world of the theatre and it’s processes.

STUDENT/ DESIGNER PERSPECTIVE

Students who participated in this study both studied at inner city, restricted entry, single sex, government, secondary schools. They both study Drama outside school as an interest, and were keen participants in the research. One student was a boy and one a girl, both in their early/middle teenage years, who were also siblings. The age group of these subjects is significant as it was suggested by designers that the target audience of the software ought to be approximately 15 years old. This was deliberately complied with in the course of the study. The interview data collected from these participants includes some direct oral responses to questions asked within the reflection process. Other data is based on the researcher’s observations of their behaviour after reviewing the video taped material. Responses were grouped into broad categories such as potential to fulfil constructivist aims such as active, constructive, cooperative, intentional, authentic and context dependent learning. Also general design/ and useability of the program were placed into a category. In addition to these topics
comments were also made about the process of data collection, which include suggestions for the next version of the software.

ACTIVE LEARNING
To begin the interview, students were shown the video of themselves using the software. In this process they were asked about their initial exploration of the program, and furthermore what their early impressions led them to believe the software was devised for. Student A replied “Probably for use in a school for when you are learning about things that were in the theatre.”

Students were asked about the pathways they took throughout the software, and whether they felt the choices available to them enabled them to control their own learning. Student A responded by saying “Yeah, well it’s not like you are being forced to learn.” Student B concurred “Yeah, when you know what you are doing.” Relating to the earlier question, they were then asked if they felt some sense of ownership of the process of learning, when they were creating their own pathways through the software. Student A responded “It’s a lot more fun that having someone sit there and tell you “do this, do that…”

The constructivist principle of Active learning, as indicated through the literature, is expressed throughout the testimony of the students agreeing that the degree of user control was high. The data has also suggested that students had ownership of the learning process. The students enjoyed the process of discovering “Stage Struck” by traversing through it’s linked nodes of information, for instance Student A compared the navigation map with touring the program independently. He said “Yeah, one lets you find new things while the other lets you jump to things that you want to go to straight away” and later recommended the process of “letting people choose their own thing”. This point demonstrates that the designers intentions to create “flexible digital tools” to support “exploration, collection and reprocessing of information…” (Wright et.al. 1998, p.675) and enable “…students to make choices” (Harper, 1996, p.5) was successfully achieved.
CONSTRUCTIVE LEARNING

Later when students were experimenting with creating their own scene, they were asked what they thought they were doing in this area. Student A said “Oh, I thought you could make a scene by adding the elements to match the voice track, but I wasn’t quite sure how to make the people move to what they were saying.” So Student A had the initial expectation whilst exploring the scene building area of the software, that they could construct a scene “…by adding the elements to match the voice track…” and whilst he acknowledged that they had found it a little challenging, he also suggested it was due to the fact that they hadn’t used the software before. Student B supported this claim, however she added that it was less of a problem with software manipulation and more of a challenge to match their preconceived creative ideas of what the scene should look and sound like with the options that the program afforded. Despite the minor conundrums that it posed, students still upheld the notion that they had been comfortable with exploring and creating with “Stage Struck” in this area.

The students who were involved constructed a number of items using the program including a scene with dialogue, and a set when they were exploring the software in their own time, and a number of costumes when given the focussed task later on. The idea posited by designers that “Stage Struck” promotes the constructivist aim of active learning with the user is substantiated by the results of the interview and experiment conducted, as learners claimed they had some ownership of the process. Student A had said, “It’s a lot more fun that having someone sit there and tell you ‘do this, do that’. The learners seemed to relish the “active position of ...designer...” (Harel and Papert, 1991, cited in Wright et.al. 1998) that is offered to them while using “Stage Struck”.

Students were then asked to envisage a scenario whereby they were to design the costumes for the school play of “Beauty and the Beast” (which is the production they chose to design for in the designated task). They were asked if would know what to do as a consequence of using the program. The students agreed that it did help to generate ideas for period costumes, and that it would be a useful tool to demonstrate costumes to directors/cast members in order that instantaneous alterations might be made on the spot to the costumes colour, accessories etc. Student A suggested that the time spent in the design process
would effectively be halved because "...you could convey an idea without drawing the whole thing..." In this way consensus might be reached in production meetings before the designs were finalised on paper. It might, he suggested, also serve as an invaluable tool, if the user had difficulty drawing in general. However the students went on to contend that while this program had a foreseeable life in ideas generation for productions that they personally would not rely on it for doing a whole show.

INTENTIONAL LEARNING / PROBLEM SOLVING

Students were later asked about the process of exploring the software and if they had found it to be a worthwhile activity in that during this time they discovered how the program worked. They both agreed that it had been a useful familiarity exercise. The process, it was argued by Student B, was also helpful in gaining an understanding of the drag and drop conventions of the program. When asked whether students had found the method of initiation to be too easy or unchallenging, Student B responded "Not really because we were still trying to work out what we were going to do."

Afterwards students were set a task to “find the costume design facility and use it to design 3 costumes for a production that they had seen before.” They were exploring the backstage functions of the program and they were asked if they remembered what they were doing at that point. They were also asked what they were actually looking for. Student A replied “…something to do with costume, maybe a door to the costume room or costume rack, but basically we just put our mouse over anything to do with a costume and clicked on it and hopefully we’d find it eventually.”

They were asked if they knew that they would find something to do with costumes. They both agreed that this was a given. Then they were questioned as to whether they were annoyed by the costume facility of “Stage Struck” that merely modelled some costumes from previous productions when it was clicked upon. The students found that it wasn’t a hindrance to their enjoyment of the process. Following in this same theme, students were asked if they’d prefer to explore the software more, or be given a greater amount of tasks to complete. Student A responded in this manner “A mixture of both, but I wouldn’t like to
be forced to do tasks the whole time, because you might see something you like in the middle of a task, so I think with a task, you need a bit of time to do your own thing before you move on to the next thing.”

In that same vein the question was “...if you were in a classroom of 25 other kids would you rather explore, or do something more directed?” Student A suggested that exploration would be a good starting point, followed by doing something as a larger group together. However he was quick to point out “...it would be boring if you had just done something while you were exploring and then they set the task of the exact same thing. If we had found the costume thing first and then you set the task of the exact same thing, it would be boring.”

The initial discovery process of the software was conducive to producing results that confirmed “Stage Struck’s” potential to assist with constructivist objectives such as intentional learning or problem solving. Students provided evidence that the course of action assisted in building an understanding of the “drag and drop” conventions that the program utilised to construct stage craft artefacts. Referring to this process of exploration students corroborated the idea that a mixture of both this and directed tasks were their preferred method of working with this program. As Student A said “...you need a bit of time to do your own thing before you move on to the next thing.”

A hypothetical scenario was posed that if the students were working within a classroom situation would they still prefer to discover the program themselves, or would they prefer to do something more structured that was imposed upon them. They responded by pointing out that exploration was still an excellent introduction point, but then doing something as a larger group might follow on. However Student A noted that he could conceivably lose interest if he was set a task he had just completed within his discovery time. Yet he suggested that if the task was the same but the content was different, it would retain its’ value as an exercise.

Student A argued that it was interesting to be given the task in that presented another avenue of the software that he had not previously discovered, however
he contended that the task might be too directed and not give students enough scope to choose an aspect of design which was more suited to their interests. His ideal task for using this program was to alert users to the opportunities that the software provided and enabling them to choose their own pathway through it. Otherwise, he suggested, "...kids might be just stuck in one thing."

Student B maintained that a directed task serves as a gradual initiation to the program yet held, as did Student A, that early exploration was still the best familiarisation technique with the software in question.

**AUTHENTIC LEARNING**

On the topic of authentic learning the Students were posed a scenario whereby they were the hypothetical designers of Beauty and the Beast. They were then asked to reflect upon the process and if, after using the software, they knew what their role as costume designer might entail.

Student B replied, "...it makes you think about the things that they do, like with the costumes and stuff..." To further this topic they were asked about the authentic nature of creating costumes through "Stage Struck", and if they had to design costumes for the real world what that project might entail. Student B proffered that you would probably have to "... write down or draw ideas."

Then she was asked if that was the reasoning behind why she had selected the drawing pad image to click on as opposed to any other icon. Both students acknowledged that the symbol suggested the function that it might perform and that is why they had chosen it to create the costumes.

The students were asked if they had the ability to take the costumes made in "Stage Struck" and place them on actors, would it alter their perceptions of the process.

Student B responded "Yes well that would have made it more realistic..."

And Student A added "Yeah and if we had been able to place them in front of a background...that would have been cool." In that same vein they were asked what the merits of that hypothetical process might have been and why this was so. The response from Student A was that "It would have brought it all together, seeing the costumes doing something other than just being pictures."
When relating to the subject of the exercises that the students performed they were asked if they could try to think of something that this program might have enabled them to learn about costume and Drama. They responded by noting that they could possibly have taken away some skills about making clothing. Referring back to the work that they had already done, the question was posed "...were happy with what you designed?" Student A responded unhesitatingly "Yes."

Designers’ intentions for the software had been to foster development of the performing arts amongst users of the product; to enable student creativity through creation of digital artefacts/scenes; to promote exploration of and subsequent learning about backstage elements and processes; and also to enable exploration of some roles and career paths within the performing arts. (Wright et.al. 1998, p.673). Specifically the last listed designer intention relating to future use of skills developed and their relevance to real world applications is in line with the Constructivist project of creating authentic learning tasks for students. The data collected seems to indicate that many of these objectives had been achieved through the different activities that the students engaged in with the “Stage Struck” software.

CONTEXT DEPENDENT LEARNING
Designers of “Stage Struck” have argued that one of the programs most important constructivist properties was that the learning gained from this program was intrinsically linked to the context in which it provides for learners to immerse themselves. They argue, “...Knowledge is context dependent, so learning should occur in contexts to which it is relevant...” (Duffy and Cunningham, 1996, cited in Wright et.al. 1998)
They further describe the experiential aspect of “Stage Struck” as being designed to enable student access and experimentation with “...numerous ...design elements that range from more literal pieces to abstract, construction styles” (1998, p.675).

Students responded to software by suggesting that the virtual world of the opera house provided fertile ground for learning about what goes on behind the scenes in the theatre, especially for those who had little experience in this realm.
Harper, Squires and McDougall (2000) acknowledged the increasing success of the team of designers [Wright et.al.] to create multimedia interfaces that “…mimic[s] a real life work setting, [which] adds an atmosphere of authenticity…” and entices learners to “adopt management roles” in order to attain a “sense of ownership” (2000, pp.126-127).

In response to these claims Students were asked if the virtual world environment provided by the software assisted them in learning about the work that goes on behind the scenes in the theatre? Student B responded “Yeah especially if you didn’t know what goes on backstage, or how things are placed on the stage.”

EVIDENCE IN FAVOUR OF A MORE TEACHER CENTRED APPROACH

Students arrived at the part of backstage where there is a number of doors to choose from, each leading to another avenue of stage design. While in this part of the video students were asked, “…Interviewer A asked you to do something, [here] can you remember what she asked you?” The response from Student A was “To find the costume thing but we weren’t quite sure how to get there.” Furthering that line of questioning they were asked if the specificity of the task made the software easier to explore. Student B said she found it useful to have a directed task and that it was a worthwhile process, because she argued that they were previously unaware of anything with which to make costumes.

However Student A contended that he found it interesting knowing what was available, however he argued “I don’t know whether telling people what to do is the best thing. Maybe telling people what’s there and letting people choose their own thing, otherwise kids might be just stuck in one thing.”

Student B rebutted his argument by stating that smaller tasks sometimes help you to understand the program gradually. After which the question was posed “Would have you preferred it if we had given you a small task first instead of just letting you explore initially? Both students responded negatively to this, especially Student A who suggested “…When you start the program, it’s better to do it by finding out for yourself.” When referring to the task that was set the students were asked if they minded it if the task was preset by the interviewer.
They replied that they had not minded the task, because "...it was a good one" and it had been "...easy to find". When asked if the task was too easy or not challenging enough, the students replied "Not really because we were still trying to work out what we were going to do."

When students were asked to consider the results of the costume design exercise and whether they considered them to be successful for both the characters that the costumes were made for, they responded very favourably. Student B said that she was "Happy enough to have a laugh." Student A concurred by saying "It's not the end of the world if they don't [didn't] look like the end result."

In support of teacher generated tasks Student B said that she found the costume design activity useful in learning more about the program that she didn't know existed. Yet the task was structured in such a way as to be open ended enough for students to create something original, while learning more about the general operation of the program, and orientating themselves around it. It was challenging enough for students because they had to find their own way to the costume design facility, and find out how it operated before commencing the actual task. So they weren't spoon-fed all information and given a task that was too easy. While this task was a directed one it still conformed to constructivist ideals of what the level of teacherly intervention ought to be. Jonassen et.al have articulated the constructivist notion that teachers ought to change roles "...from dispensing knowledge to helping learners construct more viable conceptions of the world" (2003, p.13).

**CO-OPERATIVE LEARNING**

The designers of "Stage Struck" were acutely aware of the constructivist philosophy that "...Learners are distributed, multi-dimensional participants in a social-cultural process" (Duffy and Cunningham, 1996, cited in Wright et.al. 1998, p.674). With this in mind they designers set out to embed features within the program that enable the social aspect of learning, namely the "...facility to share files between learners or represent an individual constructed performance and interpretation to other students located within the same classroom or across the internet" (Wright et.al. 1998, p.674).
Within the parameters of the experiment all these functions were not tested to determine if they facilitated learning in this way, however students did work as a pair while using “Stage Struck” and engage in dialogue about which directions they should explore next etc. They were quite effective in using the software in this manner, in that they both seemed to gain something from the process. While Student A had more control of the process as he operated the mouse, Student B was quite undaunted by his “hands-on” approach, and she proceeded to give him instructions and suggestions for what he might do while exploring the package, together with the exercise that was more directed. They were both quite happy to ask each other questions about the operation of the package and what they envisaged it might do.

They didn’t really respond when questioned later about this shared learning experience, however they both had much to say when reflecting upon what they had learned in general. In reference to the co-operative learning capacity of the program, there was little data to corroborate designers’ claims that it facilitated this kind of group work. Despite this, the data that was available stemmed from the researcher’s observations about how students worked together, and this seemed to validate designers’ intentions.

Both students worked harmoniously while operating the program, although one student seemed to have physical control of the hardware, the other was persistent in contributing to the learning process by asking questions, giving instructions, and suggestions for what they might do next etc. So the basic assumption of designers that the software possesses attributes to facilitate cooperative learning is maintained. This is substantiated by evidence provided by students that their collaborative efforts to share ideas, and produce a constructive piece of work in which they were both satisfied, was successful.

**GENERAL DESIGN AND USEABILITY**

Some general comments that arose during the course of this interview included: hot spots in the initial foyer area were effective in assisting students navigate the program successfully. The roll over functions within the software helped to illuminate areas to explore within the software and give some kind of direction.
Regarding the “Drag and Drop” function of “Stage Struck”, they were asked if they had encountered this kind of mechanism in other programs that they had used before. The response from Student A was that he had. So the software provided a familiar kind of platform for students to be scaffolded into learning about Theatre practices.

When students were shown the part where they had discovered the map in the program, which also served as a shortcut navigation system they were asked these questions: “Did you think the map was a better way of finding your way around the program?” The students responded by saying that the process of exploring was “fun” but the map was a good way of getting “…somewhere fast…” However Student A reiterated that while the map was an especially good device if you knew where you were going and just wanted to get there as expeditiously as possible, it was also good to explore the program by touring it with the mouse and discovering new things as you came across them. When asked if they preferred to have both options of the exploratory mode as well as the navigation system Student A responded “Yeah, one lets you find new things while the other lets you jump to things that you want to go to straight away”.

This demonstrates how the designers’ intentions to create “flexible digital tools”, which arguably facilitate “…exploration, collection and reprocessing of information…” (Wright et.al. 1998 p.675) was successfully achieved.

However in making other general comments about “Stage Struck” students would have liked to take the process of creation to a higher level. Student A commented on the scene creation potential of the software “…it would have been cool if rather than doing set scenes, it would have been better if you could take different pieces of dialogue and pieced them together”.

Barry Harper (1996), co-designer of “Stage Struck”, highlighted the importance of providing users with enough “choices” (p.5) for experimentation, and exploration. The designers claimed to have embedded a “range” of performance options into the software for this purpose. When asked about the number of options that the software presented, and whether there were too many options, Student A replied that there could never be too many options. The
question was rephrased so it asked the students to generally state their positions on whether it was better to have a multitude of options rather than a very finite range of options. Students suggested that if the software had conformed to the latter category it would have been “boring”. So the implication is that the software had in fact provided enough variety to keep the user interested.

Yet when students were asked if the programs relative flexibility had been reasonably comprehensive the students agreed that it was, however Student B hastened to mention that there were specifically “...not many options with underwear...” The students were further asked about the relative importance of underwear to costume design. Student A responded by saying “...it brings together what you are wearing, especially if the Actor could be affected by what they are wearing underneath the costume...” So generally speaking, except for in the case of underwear alternatives, the software was regarded as having a broad range of options for the audience to explore.

However while the data collected from the students who participated in this study indicated that many of the designers’ intentions had been achieved in terms of the software’s potential to act as a successful learning aid for students. This was at least partly the case because it was used in an environment that was supportive of the underlying tenets of constructivism.

**TEACHER/DESIGNER PERSPECTIVE**

The findings that follow are not so straightforward because as the interviews of the teacher participants indicate that there was a strong probability that they held beliefs regarding teaching and learning that were not sympathetic to the constructivist framework upon which the software was based. It is their use of the software in a subversive manner that accounts for the inconsistency within the data.

The participants in this segment of the project are from two separate public schools. Teacher One is a male teacher from a large co-educational school in the Northern part of Melbourne. Teacher Two is a male teacher from a Senior Secondary College 11-12 located in the southeastern Melbourne suburbs. His students were older than the target audience of 15 years. Both teachers have
used “Stage Struck” in their everyday classroom practice to greater or lesser extents. Teachers were asked questions to reveal their classroom practice and the ways in which they managed to incorporate “Stage Struck” into curriculum delivery. They were also asked questions which would determine if the software was a useful classroom tool when used in the ways that designers had intended. Overall the scope of the interviews covered topics that were geared towards ascertaining the potential of the program to satisfy constructivist aims within the teachers’ individual contexts, and looked at the ways in which teachers chose to use the program. They also covered questions such as “Stage Struck’s” value to the Drama/Theatre studies curriculum, general design and useability, facility to develop transferable skills. The objective was to build a clearer picture of whether teachers used the software in a manner that saw it reach it’s fullest educational potential.

CONSTRUCTIVIST EVIDENCE

COOPERATIVE LEARNING

As mentioned earlier designers’ intentions were to implement features within “Stage Struck” that promoted the constructivist ideal of co-operative learning and enabled users of the software to participate in groups. Teacher One noted that when working within a laptop program, “Stage Struck” was effective in facilitating collaborative learning. He found that “Kids would gather around a Lap-top and have lots of fun.” He also said, “…It worked well for group work…” due to the fact that “…kids liked showing each other their designs…” Another reason that Teacher One considered the use of the software in the drama classroom to be “…a fairly relaxing group activity…” was because he saw it as a social leveller that enabled “…people with no drawing skills…[to]…produce work that was equal to those art students within the class…”

On the question of whether “Stage Struck” promotes group work Teacher Two’s initial expectations were that there would “…be more discussion and compromise,” within the class. His findings were that these aims were fulfilled by some of his students. The results he achieved were: when he grouped students in pairs to work through the software, the interaction was satisfactory, but argued that although the software complimented group-work, “…it is not designed exclusively for co-operative learning…”
So the data suggests that the teachers were relatively happy with the programs ability to be used in collaborative situations, although they noted it’s potential to be used successfully in other learning dynamics.

**ACTIVE LEARNING**

When discussing teacherly intercession into the learning process, Teacher One suggested that using “Stage Struck” was “fun and achievable without much teacher intervention.” While noting “It was an enjoyable activity in direct contrast to direct pedagogy which can place more physical demands on the students”. Teacher One also spoke of his role shifting to that of a “facilitator”. “At first I was happy for the students to use it and experience it, and just play around with the software, not expecting a product.”

So in the instances where Teacher One had used the product in a manner that was consistent with designers’ intentions he seemed to generate good results from the product and to be relatively pleased with using it as a learning tool.

Teacher Two initially also expected to adopt more of a facilitator role “… to introduce them [the students] to the software to set a task and that their level of computer expertise and interest would be enough to carry them through…” He hoped to achieve “…a more interest based approach…rather than a traditional sort of pedagogy…” He had varying degrees of success with the product and found his older students more reticent to experiment with “Stage Struck” than he had previously imagined. He then chose to adopt a more conventional approach of teaching that included roles such as “disciplinarian or encourager.” Yet it was not before discovering that “…There were some students able to engage in risk-taking by playing around with things and seeing how they worked.” He argued that the students “…were quite interested in the real footage enclosed, as compared to animations of computer games…”

The designers Wright et.al. (1998) outlined in a conference paper their intentions to design software that “…supports active learning…”. This is clearly another constructivist tenet that they geared “Stage Struck” towards. However the data has been somewhat ambiguous in demonstrating that their objectives were achieved. Upon reflection of the testimony of both teachers it seemed to
produce mixed results that suggested in some instances students were happy to actively pursue their own understanding of the topic through the use of the medium. Yet others suggested that students within at least the class belonging to Teacher Two had been less than willing to engage in experimentation with a new product.

Despite the ambiguity of the findings Teacher One pointed out, when discussing the process of teaching with “Stage Struck”, it could be seen as a virtual world with its own activities. He suggested that it could be seen as a computer game and the inherent problems/obstacles could be solved in the same way you solve a computer game problem. This indicates that the active learning principle advocated and implemented by designers, was understood by Teacher One to be important. Constructivists as mentioned above, argue that meaning is made in the process of doing something, in an environment that is significant to that action. This is central to the active learning precept and to the process of interacting with computerised simulations that are relevant to the subject (such as “Stage Struck”).

Teacher Two similarly noted the game-like properties of the program. He listed the aims for his initial approach with the software were “... to get the students to try and interact with the software in a game type fashion, like they would do at home on their own computer, with their own computer games.” Teacher Two recognised the rationale for employing a familiar lexicon of game structures to assist with the accumulation of new knowledge. He suggested “...the mechanism was to teach them from the known to the unknown.”

**CONSTRUCTIVE LEARNING**

Designers of “Stage Struck” agreed with principles espoused by Duffy and Cunningham (1996) “... All knowledge is constructed: All learning is a process of construction...” (cited in Wright et.al. 1998, p.673) and it was their intention to provide software to further enable this process. Clearly Teacher Two was impressed with the software’s facilities to support this objective. He noted that it was “quite important” for students to see “... that you could construct a scene based on the same set of dialogue but delivered in different
ways..." He also suggested that "Stage Struck's" facility to do this in "...the learning cycle was actually quite good."

**EVIDENCE WHICH DOES NOT CONFORM TO CONSTRUCTIVISM**

While there is obviously evidence to suggest that some learning did take place in a manner according with designers' intentions (as outlined above), there is also evidence to support the claim that the teachers weren't overwhelmingly positive about the softwares potential to assist them with their work. This is due to their personal philosophies towards teaching and learning and does not indicate a failure of the software to fulfil designers' objectives.

Evidence that suggested that Teacher One adopted a different approach to teaching and learning included: his focus on outcomes for students and consequent attitude that "software posed a problem for assessment – whether you assess a printed folio or electronic folio."

Also his resistance to the ideas of co-operative learning indicated he might come from a more traditional school of thought. Teacher One had contended "...There was some suggestion that there was a possibility of collaboration with other schools, but I couldn’t really see it myself. I couldn’t see that it was worth the effort to do that, especially since most of that was to do with sharing performance elements, in features that I didn’t particularly have any use for".

Whereas Teacher Two started off with an experimental, exploratory approach to using the software, but after using it once, changed his approach to more teacher-centric one. This was because, according to him, his initial ideas of being a facilitator weren’t fulfilled. He "...ended up playing far more roles..." like "Encourager" or "Disciplinarian". So his new approach incorporated the setting of a task for his students to complete "...like for example they had to find a piece of text that I knew was actually in the data base. Teacher Two continued by saying "...The second year I used the software, I applied it to a far more direct pedagogical task. I was trying to manipulate...[the exercise]... rather than letting them go all over the place and doing whatever they wanted."
This approach runs contrary to the aims of constructivists and designers who have stressed the importance of letting students build knowledge by exploring the software themselves. It also disables the process of giving the power to students to create their own meanings. The latter process was seen as important by designers because they had intended that learners would “...gain a sense of ownership”, while using the software. Clearly the power to create meaning has never really been relinquished by the teachers interviewed.

GENERAL TRANSFERABLE SKILLS
Despite their negativity towards the software, Teacher One has suggested that “Stage Struck” was useful in the development of generic skills such as the interpersonal skills gained from group work – especially at his previous school where students had laptops and could gather around a laptop and work together. He also suggested that the sound design facet of the program, could teach students skills that were transferable to Music. Teacher Two limited his response on the topic of the acquisition of generic skills to that of “research skills”. Apparently students can gain valuable research skills through accessing the databases and information about Australian theatre through using this program.

RATIONALE FOR DRAMA TEACHERS NOT USING THE SOFTWARE
The teachers quite freely suggested reasons why they believed the software was not used more widely. Teacher One mentioned in relation to his employment of “Stage Struck” that he “…didn’t find it useful in teaching” and in proportion to other Drama teaching tools he “…only use[d] it for very particular purposes, 5% as a teaching tool.” Teacher Two believed that these reasons stemmed from techno phobia, in that “Drama teachers are basically computer illiterate/phobic and don’t warm well to confronting a room full of boxes.” It also included “…the fact that many teachers didn’t have access to computer labs”, the software was “dated” and “…with burgeoning internet access...” somewhat redundant in terms of its research facility. This is one rationale for why relatively few teachers in Victoria have incorporated “Stage Struck” into their curriculum.
GENERAL COMMENTS

In general Teacher One considered that "Stage Struck" possessed "...sound mixing...of quite a good standard and useful for fast design work that can be used in a real way." This arguably could be perceived as validation of designers' intentions to create a program that provided access to authentic learning. Some observations that Teacher Two made about the software in general were that "Students didn't interact very well with it due to the generational group or the general clientele at the School where I [he] work[s]."

Regarding audience concerns Teacher Two argued that the program was limited and lacked sophistication for a year 11 consumer. However he did stipulate that it could be satisfactory for year 9's. As 15 year olds were the designers' target audience, this may be a fair comment.
VALUE TO DRAMA/THEATRE STUDIES

When asked what about the value of “Stage Struck” to teaching and learning, Teacher One found that it was a good introduction to the world of theatre, for his students. He was particularly impressed with the design features that the program had to offer. He found that the sound design feature was a particularly good one for getting students to create fast sound effects and sound scapes, and to a lesser extent set design was a useful facet of the program. He mentioned that the costume design facility was more useful for junior secondary students than for older students. He found that the Design activities in “Stage Struck” were a refreshing teaching tool, as, according to him, there is a current trend in Drama teaching to move away from these areas and focus upon acting skills. Teacher One also appreciated having “... something [the software] which demonstrates importance of visual and aural aspects...” of the theatre, and noted the benefits of being able to experiment with the use of colour in the design functions, something he believed to be much harder to achieve through conventional design techniques.

Teacher Two noted that features of the program including Set Design, Costume, Directing, and Blocking provided a firm grounding into stagecraft areas, which was useful at his school, because as a senior secondary college Theatre Studies often attracted a number of students who have had no experience in the theatre at all. Teacher Two also suggested that in retrospect he would have preferred to have been able to incorporate the software into a unit of work for students in the middle school. He said “In lower levels – years 8, 9 & 10, it would have been good to play around with.” He mentioned that he had conducted workshops on “Stage Struck” at conferences for Drama Australia around the country. He also took note of the level of enthusiasm that teachers of these middle years had exhibited when engaging with the software, and used this evidence to support his notion that “Stage Struck” is aimed at these year levels.

However Teacher Two had mixed responses to the software. While he agreed that the software provided a great introduction to the backstage elements of the Theatre and Theatre History, he also found the facility of the program to enable learning about acting and directing quite satisfactory, in that the students were
engaged while constructing a scene. Yet the costume design component was, according to him, “...a waste of time.”

**GENERAL DESIGN AND USEABILITY.**

Teacher One’s opinion on the general useability of “Stage Struck” varied in sentiment. On the one hand he found the program was laid out fairly logically, however this was one of its few good points, he confided. The criticisms which Teacher One, had of the program included: That is was difficult to save work except by putting it back through the program (because the facility to move work to desktop and moving it back again proved unreliable), and that it was equally difficult to make hard copies because there was no facility to print. To present work students had to do it on screen or via electronic folios which were impractical because you had to put it back through the program which was time consuming etc. He also said that it was unreliable to email a folio of electronic designs because files would not open. Teacher One asserted that the Sound design facet was flexible and had potential, but would have been better if you could save work as WAV files. His suggestion for further use in the future was that “Maybe presentation of work could be assessed through a show on the data projector, but it would be easier if you could transfer files to Power-point which is very sympathetic for showing work.”

Teacher Two, who teaches Multimedia as well as Theatre Studies, had two different perspectives on the software. A technical approach, which deconstructs the software for it’s merits in terms of current software, internet usage and games structures and he also observes it in terms of its ability to teach Drama/Theatre Studies. He says of the Costume design elements “…the Interface components to do with the costume module are primitive to say the least...It doesn’t have the facility to resize something and be able to bring it into the program, or bring something in and manipulate it.” Students, according to Teacher Two, find the software to be boring and childish. He explained, that this was due to the two dimensional appearance of the images, and says that it was no better than “Barbie’s Cut and Paste”.

On a more positive note Teacher Two praised the software in terms of its facility to enable scene construction. “…The part of the program that deals with
putting actors on the stage and changing vocal intonations and actually constructing a particular scenario using a given piece of text... Personally I found... quite sophisticated." However he went on to comment that the texts within the software were actually quite limiting, in that "Students would have liked to have been able to go into the program and put a little of their own script in, and see how it is actually done."

REFLECTION ON THE DATA

The Teachers who were surveyed, acknowledged some worthy points about the software, but generally had a negative response to it. Considering the small sample size and the subjectivity of these two teachers is one variable in determining if the software is useful according to a teacher's perspective. However another explanation for the negative testimony that the data has yielded was that the subjects in question both seemed to possess more dictatorial approaches to teaching and learning. Specifically evidence such as that provided by Teacher Two who spoke of later adopting a more direct pedagogical approach, in which he sought to manipulate the outcomes, validates this analysis.

Yet if we recall the designers' intentions as found in the literature, they clearly indicate that the software was designed for a constructivist classroom. Harper (1996) who was one of the designers of the software had indicated ideals for the teaching/learning relationship and software tools used in conjunction with this partnership. These predictions included that the alliance of the tools and a harmonious learning environment ought to facilitate "...less structure, less teacher presentation, and elimination of worksheets." (p.5)

If this was the intended learning situation, perhaps the application of the software to a behaviourist classroom will not produce the desired responses, from a teachers' perspective.

Although there has been much affirmative feedback to suggest that "Stage Struck" fits the category of "constructivist" software, and teachers have noted some contributions that the software has made to their respective classrooms, there is also the wealth of negative comments received from teachers regarding this. So although the data did not offer any overwhelmingly clear-cut outcomes,
there is a strong case for suggesting that the software did not fit the teachers' approaches to teaching and learning.
CHAPTER 4
DISCUSSION

It has been suggested that the “most important consideration in assessing educational software is the way in which it can be used to enhance students’ learning” (Squires and McDougall, p.87, 1994). Keeping this in mind, the “discussion” segment of this thesis sets out to analyse the interactions between pairs of stakeholders within the broader context of this study and linking the findings to the literature. The perspectives interaction paradigm (Squires and McDougall, 1994) has been a particularly useful analytical tool for determining the objectives this study, for it has revealed the importance of matching teaching ideology with compatible software. It has also provided a more comprehensive approach to evaluating the software in question “Stage Struck”. With less emphasis placed upon the technological useability, etc. of the software and more placed upon the educational concerns of the tool the research has provided a view of how the program was intended to be received and how its audience actually received it.

Through this study it was clearly demonstrated the designers of this software had intended “Stage Struck” to both follow a constructivist paradigm in it’s design to assist with student directed learning, and to be used in a supportive constructivist environment through which users could realise its full potential. The intentions of designers Rob Wright, John Hedberg and Barry Harper (1998), specified that the software should enable active, constructive, intentional, authentic, and co-operative learning amongst learners. These ideals were manifested in this program through the incorporation of multiple platforms for students to experiment with performance ideas, and multiple choices for students to explore and to construct their own understanding of Australian theatre practices, people and history. The students who participated in this study provided a wealth of data to indicate that designers had achieved these objectives, and through these small victories have had their appreciation of the theatre enhanced. This, according to Squires and McDougall (1994) is the most important measure of educational software.
However the findings indicate that not all situations wherein the software is used support or validate constructivist ideas. The teachers who participated in this study initially tried to incorporate notions of exploration into their classroom practices when using the software. Yet fell back upon didactic methods when students were not achieving the outcomes that they desired. The teachers argued that it was difficult to get students to perform as required when using the software. However they did draw attention to the fact that students were working well co-operatively when using the software. So too the students that participated in the study seemed to interact well when using the tool. Their interaction with “Stage Struck” was particularly successful, they argued when they had the scope to explore the software without any further instruction. It was then that students seemed most engaged and claimed to have enjoyed the process the most. During that time students adopted the management roles of designers and through exercising the choices therein, gained a greater sense of ownership of the operation. They articulated this by stating that this phase of their interaction was more fun than being told “do this, do that.” In this way they conformed to what constructivist sources suggested that they might.

Some earlier cited authorities on the topics of using “Stage Struck” in the classroom, such as Hilary Bland (2001) and Robyn Pascoe (2001) have worried that entering into cyberspace to complete drama work may detract from the physical aspect drama. Yet they have recognised that this is another medium for engaging students and providing that the exercises using “Stage Struck” are clearly linked to the curriculum, seem to approve of its use in this new arena. Teacher One had indicated that there was a growing trend in the study of Drama and Theatre Studies to focus more and more on building acting skills to the detriment of all other stagecraft skills. One aspect that he particularly appreciated about the program was its facilities to develop those skills. So it might be said, that the inclusion of “Stage Struck” into the curriculum could enhance neglected aspects of the curriculum such as stagecraft without taking anything away from the physical aspect of the Drama classroom. Because if an examination of the software’s use can be made the findings would be such that the time allocated to the employment of teaching/learning tools like “Stage
Struck” was quite minimal. For example Teacher One indicated that only 5% of his time in the classroom could be spent in these pursuits.
DESIGNER/STUDENT INTERACTION

As discussed earlier, the intentions of designers to produce software that had built-in Constructivist properties to enhance the learning experience, seemed to be achieved when tested by students in a controlled environment. This experiential learning aid enabled students to learn intentionally, actively, cooperatively, authentically, and constructively while in this virtual world. However, students also worked well when given a directed task and asked to perform it, so the software also seems to be flexible enough to accommodate a more teacher-centred approach, when required.

"Stage Struck", while containing some databases with information about Australian companies, stages and major protagonists in the Australian theatre scene, is primarily a tool by which students navigate around to construct their own pathways of understanding. However, the web of knowledge constructed is not the only thing that students create, as there are a number of role-playing designer tasks for students to take on in order to design digital artefacts. Designers of "Stage Struck" have suggested that these tasks within the software are implemented to enhance student access to and experimentation with various stagecraft elements. (Wright et al. 1998 p.675) The students who were involved constructed a number of items using the program including a scene with dialogue, a set when they were exploring the software in their own time, and a number of costumes when given the focussed task later on. As Squires and McDougall (1994) have indicated materials such as "Stage Struck" that "...emphasize personal expression and exploration..." and that provide students with "...opportunities to pursue their own approaches to learning..." (p.88) are, by their definition "constructivist".

Research from the late 1980's suggested that enhancement of learning was linked to increasing learner control. And "Combining control and complexity seems to develop a feeling of involvement, but combining control and challenge is more effective in promoting learning." (Squires and McDougall, 1994, p.90) The initial discovery process of the software was conducive to producing results that confirmed "Stage Struck's" potential to assist with constructivist objectives such as intentional learning or problem solving. Students provided evidence that
the course of action assisted in building an understanding of the “drag and drop”
conventions that the program utilised to construct stagecraft artefacts. Referring
to this process of exploration students corroborated the idea that a mixture of
both this and directed tasks were their preferred method of working with this
program. As Student A said “…I wouldn’t like to be forced to do tasks the
whole time…you need a bit of time to do your own thing…” When the software
is used in this way, students gain a sense of empowerment and ownership over
the process of learning, which are important steps to take on the journey to
becoming constructivist learners.

On a similar topic the students were asked about the symbolism of the drawing
pad icon and it’s relevance to the real-world project of costume design. They
agreed that it was highly relevant to the tools of the costume designer, and it
was this icon that led students to find out what their related task was. It is
particularly in this instance where it becomes apparent that the project that
Harper Squires and McDougall (2000) speak of, to create a hybrid of symbolic
and experiential simulations that overcome challenges of “complexity,
credibility and ownership” (p.126) is relevant to “Stage Struck’s” construction.

In the course of the study students reflected on the assigned task of creating
some costumes through “Stage Struck”, and recognised the potential of the
program to immerse the user into tasks that were authentic stagecraft activities.
Whilst discussing the production design elements of the software Student B said
“…it makes you think about the things that they [the designers] do, like with the
costumes and stuff…” Drawing on the testimony of students, it can be said that
the objectives of designers to create software that provided authentic
environments and activities was achieved. Students were asked to envisage a
scenario whereby they were to design the costumes for the school play of
“Beauty and the Beast” (which is the production they chose to design for in the
designated task). They were then asked if then would know what to do as a
consequence of using the program. The students agreed that it did help to
generate ideas for period costume, and that it would be a useful tool to
demonstrate costumes to directors/cast members to enable instantaneous
alterations to be made on the spot to the costumes colour, accessories. When
posed the hypothetical scenario if they had the costume design role allocated to
them, and they had access to "Stage Struck" at school, would they get it out and use it as a tool? Student B saw the possibilities for such a scenario: "You could use it to show some of the characters if they thought this looked alright and see if they'd wear it...." As did Student A, who suggested that it might serve to test out ideas.

In support of more directed teacher generated tasks Student B said that she found the costume design activity useful in learning more about the program that she didn't know existed. The task was structured in such a way as to be open ended enough for students to create something original, while learning more about the general operation of the program, and orientating themselves around it. It was challenging enough for students because they had to find their own way to the costume design facility, and find out how it operated before commencing the actual task. So they weren't spoon-fed all information and given a task that was too easy.

Student A argued that it was interesting to be given the task, in that it presented another avenue of the software that he had not previously discovered, however he contended that the task might be too directed and not give students enough scope to choose an aspect of design which was more suited to their interests. His ideal task for using this program was to alert users to the opportunities that the software provided and enabling them to choose their own pathway through it. Otherwise, he suggested, "...kids might be just stuck in one thing."

Student B maintained that a directed task serves as a gradual initiation to the program, yet held, as did Student A, that early exploration was still the best familiarisation technique with the software in question.

In reference to the co-operative learning capacity of the program, there was little data to corroborate designers' claims that it facilitated this kind of group work. The data that was available stemmed from the researcher's own observations about how students worked together, as they didn't really respond when questioned about it overtly. Both students worked harmoniously while operating the program, although one student seemed to have physical control of the hardware, the other was persistent in contributing to the learning process by asking questions, giving instructions, and suggestions for what they might do
next etc. Thereby the basic assumption of designers that the software possesses attributes to facilitate cooperative learning is upheld. This is substantiated by evidence provided by students that their collaborative efforts to share ideas, and produce a constructive piece of work in which they were both satisfied, was successful.

Squires and McDougall (1994) have suggested that an important project after discovering the implicit or explicit learning theory behind software such as “Stage Struck” is “…to judge whether the software design is consistent with the approach to learning in the classroom environment that the software is intended to support.” (p.90) In this particular experiment it is abundantly clear that the software and the environment in which it was being operated were harmonious in the intentions of supporting constructivist ideals. Thus the software yielded positive comments when being discussed during the interview situation.

However in the case of the other subjects interviewed, the findings were significantly different and this was due to their expectations of how the software could be employed into their framework and environment of teaching and learning.

**DESIGNER/TEACHER INTERACTION**

As Squires and McDougall (1994) have suggested, that it is important to discern what learning theories underpin a software package such as this one, in order to determine whether: “the learning theories are appropriate to the selector’s perceived approaches to teaching and learning.” (p.88)

As indicated through their responses, the teachers interviewed, may have begun using “Stage Struck” with a less than behaviourist approach initially, however as they continued with the software, they sought to intervene more and more with the process of learning. This intervention denied “Stage Struck” the opportunity to reach its fullest potential in their classrooms. According to a constructivist perspective “Learning is considered to be a personal and experiential process which the Teacher facilitates by organizing and supporting appropriate learning environment” (Squires and McDougall, 1994, p. 88).
Yet the teacher interviews also revealed that the software did indeed fulfil many objectives that designers had aimed for and constructivists such as Jonassen (2003) list as being indicators of a constructivist approach. These things include: It served to facilitate co-operative learning, especially when applied to a school with an established laptop computer program as Teacher One had suggested. Teacher Two corroborated this idea by stating that the results he achieved were when he grouped students in pairs to work through the software, satisfactory and it was complimentary to the cooperative dynamic. These favourable results indicate that the designers’ intention to create a tool to enhance the learning of participants in a “social-cultural process” was successful.

“Stage Struck” also provided indicators of active learning, such as the risk-taking that was mentioned by Teacher Two in his interview i.e. “…There were some students able to engage in risk-taking by playing around with things and seeing how they worked. They were quite interested in the real footage enclosed, as compared to animations of computer games…” While on the topic of computer games, it is the contention of Teacher Two that the problem solving aspect of the program is effective because it is presented in a computer game-like fashion, which enables students to follow the latter conventions in the process of solving problems. Harper, Squires and McDougall, (2000) have suggested that the clearly articulated activities within programs like “Stage Struck” enable students to manage complexity (pp.126-127).

Another indicator that the software facilitated constructivist learning was, as Teacher Two noted its ability to highlight the importance of scene construction, through the basis of “…the same set of dialogue but delivered in different ways…” He regarded “Stage Struck”'s” facility to do this in “…the learning cycle …actually quite good.”

The Teachers who were surveyed, acknowledged some other worthy points about the software, but by in large had a fairly negative response to it. Considering the small sample size and the subjectivity of these two teachers is one variable in determining if the software is useful according to a teacher’s perspective. However another explanation for the negative testimony that the
data has yielded was that the subjects in question both seemed to possess a teaching approach that does not conform to constructivist ideals. Specifically evidence such as that provided by Teacher Two who spoke of later adopting a more direct pedagogical approach, in which he sought to manipulate the outcomes, validates this analysis.

Perhaps the application of the software to a classroom that is not an open to the educational philosophy of constructivism, will not produce the desired responses, from a teachers’ perspective. As Squires and McDougall have proffered, it is important to discern what learning theories underpin a software package such as this one, in order to determine whether: "the learning theories are appropriate to the selector’s perceived approaches to teaching and learning." (1994, p.88) Thus by inference, the negative responses received from the teachers interviewed indicates that the software does in fact contain constructivist qualities, which are mostly incompatible with a more traditional paradigm.

If we consider further reasons for Drama teachers general negativity towards the software we may recollect that Drama is a tradition, which has lasted thousands of years and practitioners have never been to eager to embrace new technology, hence the techno-phobia. Many Drama teachers still suffer this affliction, and because the dramatic tradition has conventionally been passed down as a kind of apprenticeship from elder to younger actor it may take time to be adopted as a valid practice. Unfortunately for “Stage Struck” it may be too late by the time Drama teachers finally adopt it as part of their established tool kit because the interface may prove redundant by that moment in history. If teachers are finding that it has dated already, by the time it catches on the software will be a dinosaur, and consequently suffer the fate of all good dinosaurs - extinction. “Stage Struck’’s” only hope is to have the apprentices (i.e. the students) revolutionise the dramatic tradition and teach the teachers the benefits of having software like “Stage Struck” in the drama classroom.

In reference to methodological issues, this project did not include all possible participants, which would have provided perfectly positive data to corroborate the claims of the designers. However participants for a study of this nature were
so scarce that it is fortunate that any could be found. Consequently when comparing the designer/teacher interaction, inconsistencies between their perspectives emerged. Thus the data did not fully match the designers’ intentions. However this gave the project more objectivity in the sense that that the researcher was unable to obtain perfectly homogenous ideas from subjects to argue a clear cut case that “Stage Struck” was not only useful in constructivist frameworks, but that it could work in with other methodological approaches. Yet by using the perspectives interaction paradigm to examine the data, a more balanced picture emerged which placed less emphasis upon basic useability functions of the software (as previous evaluation procedures may have), and more upon educational concerns. In essence this demonstrated that while the software may not work as effectively in every environment, it is effective when used in that framework that was prescribed by its authors. This is an outcome that was predicted by its designers and has been since proven in practice.

The element of the gender was not analysed in this study as it would have developed a whole other dimension to the project and it was outside the scope of this minor thesis.
CONCLUSION

In conclusion, if the aim of this project was to assess “Stage Struck” in terms of its potential to fulfill the objectives of its designers, then the aims have been met. The stated hypothesis for this thesis was that “Stage Struck” would fulfill the objectives of designers, teachers and students when used in a constructivist setting. Despite some seemingly negative responses from the teachers interviewed, the fact that their methodologies were not conducive to supporting “Stage Struck” only proves the statement that the software succeeds in environments that embrace constructivism. However most of the data collected with students was conducted in circumstances that could be considered constructivist from the tasks that were provided for students to undertake. The outcomes from this experiment were derived from students’ metacognitive reflections upon their actions with the software, and the researcher’s observations of their efforts. The findings supported the claim that as designers had suggested, students found themselves enabled to become more active, constructive, co-operative, problem solvers, and teachers had also found that using the software assisted with the building of generic skills within their charges.

This study has provided a foundation for more research in the area of computers in the drama classroom, and raised some questions about why there seems to be a lack of enthusiasm from Drama teachers about the burgeoning area of computer technology generally. Hopefully it will provide a cogent rationale for those teachers working within a constructivist framework to adopt such software as “Stage Struck” and utilize it as one of the many tools a within the repertoire of drama teaching aids. This project has also provided a broad analysis of one particular program and could provide useful feedback to designers who may choose to take on some of the suggestions that the data presented. The perspectives interaction paradigm analysis provided a wealth of rich data to assist in the appraisal of this software, and so too Wilson’s metacognitive reflection process enabled a greater response from the younger subjects involved in this project, than any interview might have achieved.
Finally as the designers have achieved their objectives, this study has achieved its purpose.
Appendix A
DATA COLLECTION PHASE 2 – STUDENT PERSPECTIVE

Interviewer A: Did you have any difficulty in using the Software?

Student B: No, it was more difficulty in using the mouse.

Interviewer A: When you were using the software here in pairs, do you think the software lends itself to working in groups?

Interviewer B: What did you think it was for when you were just mucking around with it at this stage?

Student A: Probably for use in a school for when you are learning about things that were in the theatre.

Student A: It reminds me of some software that I’ve used when it was about the time of the Olympics.

Interviewer A: Why was that? Because of the location?

Student A: No just because it was the same sort of “going around” except instead of the opera house it was Homebush. Those boats were annoying because they move but they don’t do anything.

Interviewer B: Can I just pause it there… How did you know to go down there?

Student B: Because if you go over it with the mouse (roll over hot spot) it moves.

Interviewer B: After using the software about Homebush, what did you think you might be able to do with this software? I mean this was about Drama obviously, but what did you think that you might be able to do with this software?

Student A: I wasn’t quite sure at the start, I knew that it had information in there, after we clicked on that little thing and the box popped up, but I didn’t know about the costume making and stuff like that.

Interviewer A: And what did you think that you learned about Australian theatre by going behind the scenes with this program?

Student A: Not much, but that was because I was busy exploring other bits that interested me.

Student B: I learned that the opera house is open All days except Christmas day and Good Friday.

Interviewer B: Was that helpful when the voice-over told you what to do? (referring to the scene construction component)
Student A: Yes or else I wouldn’t have known what to do. Yeah, we wouldn’t have known to drag it out (referring to the drag and drop menu system) without it.

Student B: Well I would have.

Interviewer A: Do you use this kind of Drag and Drop function with other software that you’ve used?

Student A: Yeah but it’s a lot easier with a mouse.

Interviewer A: You were taking lots of different paths through the software, did you find this software enabled you to control your own learning?

Student A: Yeah, well it’s not like you are being forced to learn.

Student B: Yeah, when you know what you are doing.

Interviewer A: Because of that reason did you feel that you had some sense of ownership of the process of learning, when you were creating your own pathways through the software?

Student A: It’s a lot more fun that having someone sit there and tell you “do this, do that”....Oh yeah and that colour thing...

Interviewer A: ...The palette?

Student A: Yeah, it was hard to use because it was too small.

Interviewer B: When you were doing this what were you thinking that you were doing? (when students were experimenting with creating their own scene)

Student A: Oh, I thought you could make a scene by adding the elements to match the voice track, but I wasn’t quite sure how to make the people move to what they were saying.

Interviewer B: So you were trying to match the voice track?

Student A: Yeah.

Interviewer B: So if what you were doing was to create a scene and match a track, did you find this difficult?

Student A: A little...but only because I haven’t used it before.

Student B: we weren’t sure what was in there, but we were matching it to something we had in our heads.

Interviewer B: So you were fairly happy with what you were doing? I mean we only asked you to explore, but you were fairly comfortable with what you were doing?

Student A and B both nod.
Interviewer A: And do you think going into this virtual world environment assisted you in learning about going behind the scenes in the theatre?

Student B: Yeah especially if you didn’t know what goes on backstage, or how things are placed on the stage...

Student A: Yeah, except when you wanted to go to a certain bit, it was a bit hard until we found the navigator thing...

Interviewer B: Was there too many things?

Student A: You can never have too many things, but they could have made them a bit easier to find.

Interviewer B: So in a way it’s better to have too many things than too few things?

Student B: It’s boring if you have to do something more defined...

Student A: It’s boring if you’ve got to do the same thing over and over again, especially if you’ve got to do it in school...you can’t just go “well I’ve done that”, you have to keep going.

Interviewer B: Did it seem real with the things you were putting in the scene, such as the props, the people, are these some of the things that you might have to think about if you were doing a real play?

Students A & B: Yeah.
Student B: Yeah, but the theatre work that we do usually we have no props and no background...

Interviewer A: And if you were to become a designer for the stage do you think that you could learn about the things that you needed to do from using this program?

Student B: Yeah, it makes you think about the things that they do do, like with the costumes and stuff...

Student A: I think with the things we were doing before (designing the scene), it would have been cool if rather than doing set scenes, it would have been better if you could take different pieces of dialogue and pieced them together.

Interviewer A: Did you think you achieved something through just exploring the program, and seeing how it worked?
Interviewer B: Before we asked you to do a task do you think you’d found out enough about how it worked?

Student A: Yeah

Student B: Yeah, you know with the dragging and putting stuff together.

Interviewer B: Now while we are here, perhaps you can pause it just for a second, because this is slightly different because this is slightly different to what we did
before. Before we just asked you to explore, have anything to do, but then Sue asked you to do something, can you remember what she asked you?

Student A: To find the costume thing but we weren’t quite sure how to get there.

Interviewer B: Yeah, was that, because she asked you to do something, was that easier to explore it further?

Student B: Well we didn’t really realise that there was anything to make costumes with so that was worthwhile.

Student A: Yeah it’s interesting knowing what’s there, but I don’t whether telling people what to do is the best thing. Maybe telling people what’s there and letting people choose their own thing, otherwise kids might be just stuck in one thing.

Student B: But sometimes when you have a small task that helps you get to know a program.

Interviewer B: Would have you preferred it if we had given you a small task first instead of just letting you explore?

Student B: No.

Student A: No, when you start the program, it’s better to do it by finding out for yourself.

Interviewer B: By the sounds of things, you didn’t mind the task that Sue set?

Student B: No.

Student A: No, it was a good one.

Student B: No, it was good that the costume thing was easy to find.

Interviewer A: Was it too easy? Was it not challenging enough?

Student B: Not really because we were still trying to work out what we were going to do.

Interviewer B: So here, if you remember what you were doing here, what were you actually looking for?

Student A: Um something to do with costume, maybe a door to the costume room or costume rack, but basically we just put our mouse over anything to do with a costume and clicked on it and hopefully we’d find it eventually.

Interviewer B: You knew you would find something to do with costumes?

Student A: Yep.

Student B: Yeah.
Interviewer B: And you weren’t annoyed when you clicked on some costumes that you didn’t actually get costumes, it just kept going?

Student A: yep.

Interviewer B: Yep.

Interviewer B: So at this point you’ve found two things, you found the map of the whole area...how did you feel about that? Did you think the map was a better way of finding your way around the program?

Student A: Um, it was fun exploring....
Student B: It’s good if you want to get somewhere fast...
Student A:...but if you know where you want to go it’s good just to able to go there, but it’s also good to go around, and go (pointing) “oooh”.

Interviewer B: So it’s good to have a choice, to go either way?

Student A: Yeah, one lets you find new things while the other lets you jump to things that you want to go to straight away?

Interviewer B: And is it the same with this, now that you are in the costume design department or wherever, was it the same? I mean they’ve got two things that you could have looked at, why did you choose to go to the pad?

Student B: Because it looked like you could design your own (drawing hand motion)?

Student A: The other way you were just looking at some other costumes...

Interviewer B: Is that more realistic? I mean it’s the same question but is that more realistic to do? I mean what would you have to do if you were going to design your own in the real world?

Student B: You would have to write down or draw ideas.

Interviewer B: So that’s why you chose the pad?
Student A and B: Yeah.

Student A: We should have made him a dog...

Student B: We would have had a hard time making people dogs...

Student A: Yeah, I guess the clothes wouldn’t have gone on a dog.

Student B: A dog with like extra hair and a face.

Interviewer A: So in the Costumes palette do you think there were enough options there, or did you think it was restrictive?

Student B: Some didn’t have enough but some did.
Student A: The accessories could have had a bit more.

Interviewer A: So would you say that the program was flexible overall?

Student A: yeah.

Student B: Yeah, but there is not many options with underwear...

Interviewer B: In costume design do you need underwear?

Student A: Yes, it brings together what you are wearing, especially if the Actor could be affected by what they are wearing underneath the costume... Especially if they are wearing a skirt, and the skirt goes up, and they are wearing daggy underwear, it could ruin a performance.

Interviewer A: If there was something about this program specifically about costume design, that you would change if you could, what would it be?

Student A: The colour palette...

Interviewer A: Yeah, why?

Student A: It was tricky when you knew what colour you wanted and you just had to keep clicking.

Interviewer B: We've asked this before but did you think that you were actually learning about costume design or did you think it was just fun?

Student B: We weren't sure.

Student A: It wasn't really learning about costume design, because here (indicating screen) you've got a set choice of things whereas if you were actually designing you could choose whatever you wanted to use in the world. Whereas here you are more choosing what's in the costume rack and not actually designing your costumes from scratch.

Interviewer B: Were you happy with what you ended up with for both the characters?

Student A: Yep.

Student B: Happy enough to have a laugh.

Student A: It's not the end of the world if they don't look like the end result.

Interviewer B: Although we don't know the answer to this, but if you could have put the costume on the actors would that have made a difference to your feelings towards the process?

Student B: Yes well that would have made it more realistic.

Student A: Yeah and if we had been able to place them in front of a background and maybe even recorded a voice track, that would have been cool.
Interviewer B: What would have been good about that why?

Student A: It would have brought it all together, seeing the costumes doing something other than just being pictures.

Interviewer B: If you were to try to think of this program as trying to teach you something, can you think of anything it has taught you about costume and drama, in terms of the little exercises that you did?

Student A: Um, I don’t there is sort of making a clothing thing, which I have done before in other programs...

Student B: Like Barbie’s Fashion design program...except you can print out the actual clothes with the barbie.

Interviewer B: One you were happy with what you designed?

Student A: Yes.

Interviewer B: So did you think you learnt anything more than just pasting stuff onto a computer screen?

Student A: Not really.

Interviewer B: I’m pressing this I know, but if you were to do a production at school of beauty and the beast and your job was to design the costumes would you know where to start after seeing this?

Student A: Yeah, it did give you ideas about the sort of things they would be wearing in Beauty and the beast...

Student B: The sort of items that they would be wearing and that.

Interviewer B: So if you were asked to perform this role, and you had this resource in your school do you think you would go and get this out and use it as a tool?

Student B: You could use it to show some of the characters if they thought this looked all right and see if they’d wear it....

Student A: It’s good for testing out ideas...

Student B: Especially if you can’t draw well...

Student A: Yeah, and shortens the thing, because you can convey an idea without drawing the whole thing.

Student B: Yeah and you could easily change the colour of one item...

Student A: Maybe there could have been like a random button, where you click it and you get all this crazy stuff for ideas? Like if you couldn’t think of anything to do you could just click on it.
Interviewer B: Well my last question is, would you use this program to do a whole show, like would this get you interested?

Student B: If I had the time I would… I don’t know how long it would take, it’s like you’ve got to concentrate so that it would all work together.

Interviewer A: What are the other options? Perhaps pen and paper? And do you think that would work out to be the same amount of time as using the program? Coming up with all the ideas, and then getting them down on paper?

Student A: Um, using this before hand to get a few ideas would be good. I wouldn’t rely on it for doing the show.

Interviewer B: Would you use it more than once, or do you think it is pretty limited?

Student B: Yeah you could use it more than once…

Interviewer B: Well what are the other options?

Student A: Um I don’t know, because we’ve barely started to look at what’s there.

Interviewer B: Well I suppose that’s actually prefer to explore it more or be given more tasks to do?

Student A: A mixture of both, but I wouldn’t like to be forced to do tasks the whole time, because you might see something you like in the middle of a task
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