ENHANCING THE RELATIONSHIP BETWEEN LEARNING AND ASSESSMENT

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A thesis submitted in partial fulfilment of the requirements for the Degree of Doctorate of Education

University of Canberra

August 2005

ABSTRACT

This study is an investigation of the relationship between assessment and learning in education, and specifically, in the context of Australian secondary students studying English. The purpose of this research is to contribute to change in the way assessment of learning is conducted in view of the shift of educational values from content based towards a more goal-orientated process. Therefore, we begin this study with the premise that educational values should not only inform assessment in terms of outcomes and accountability as specified in national guidelines. They should also support a pedagogic process which helps to develop in students a heightened sense of the value of their own contributions to the community, academic and otherwise.

The intellectual context of this study begins with an overview of most prominent educational theories. We illustrate John Dewey's view that education should not only prepare one for life, but should also be an integral part of life itself. Dewey insisted that education was based in experience and that educational institutions should therefore honour and build on students' experiences. Piaget believed that children are quite sophisticated, active thinkers and theorists. Vygotsky saw all learning, knowledge, and experience had a social basis. Together these three theorists emphasize the active role of students as individuals (Dewey and Piaget) or a group (Vygotsky). Further, as society's values shift from the Industrial Age to an Information Age, there is a growing expectation for individuals to be active and informed citizens, with the ability to exercise judgment and the capacity to make sense of their world. In response to these issues, we conclude that the teaching and assessment processes must support these kinds of requirements.

We examine literature related to learning theories and assessment with the objective of ascertaining and illustrating aspects which they share and which, in our view, hamper the development of learning environments enabling exploratory and critical learning. We argue that when assessment criteria predetermine the learning outcomes, this results in teaching models where students' learning needs are also predetermined. This process alienates students from their sociocultural context which shapes them and from which they derive their identify and the sense of their own value. Consequently, students become an object of pedagogic tools, rather than rightful participants in the lives of their various communities.

Against the background of these reflections, we set out in this study to investigate how learning and assessment can be linked together. To this end, we develop the concept of an Exploratory Learning Environment. In order to articulate the framework of such an environment, we draw on a number of principals generally associated with humanist/constructivist/postmodern approaches to learning and assessment. In the course of this work we argue that students' ways of knowing, and how they learn, cannot be divorced from their individual, and yet socially (interactively) constructed (negotiated), cultural experiences (terms of reference). The philosophy of the Exploratory Learning Environment can be described as promoting engagement and construction, thus supporting learning through experience, inquiry, experimentation and critical reflection.

Consequently, in the Exploratory Learning Environment we seek to integrate pedagogic task construction and students' expectations. To this end, we concentrate our research on strategies, or tools, enhancing students' critical forms of engagement in their community. We aim for the academic knowledge, which they construct as a result, not to serve arbitrarily constructed performance indicators, but the students themselves and the community which they engage. Regarding assessment, our objective is to ascertain the diversity of conflict-generating concerns which students take into account in order to motivate the kinds of socially responsible solutions that they create and, as a result, the kinds of relationships which they want to establish. This approach to assessment allows us to focus students' learning on developing critical thinking skills whose validation comes from students' own evaluation, rather than from an abstract source of authority.

This arrangement of creating learning environments rich in tools enhancing students' critical forms of engagement we carry out using two classes of Year 10 and one class of Year 8 students in two secondary schools. Results from the study demonstrate significant advantages that can be gained when assessment is not limited to the measure of a 'product', but is based in pedagogy enabling critical negotiation. For example, students developed a sense of ownership of their learning task, felt motivated to explore conflicting issues, and, interestingly, valued the assessment process and looked forward to learning about the quality of their performance.

In summary, the theoretical reflections conducted in this study and the experiment conducted within the Exploratory Learning Environment model, together, provide valuable and reliable evidence supporting the need for a critical evaluation of the currently existing relationship between teaching and assessment. Further, this thesis offers examples of solutions in which this link can be fostered. It demonstrates that, when students are empowered to learn by critically linking academic and other forms of knowledge residing in their community, the assessment process become a meaningful tool to them and they become involved in their assessment.

At the same time, teachers learn to reduce the grip they hold on the learning and assessment processes. They do so by adopting the role of a facilitator of the students' negotiation process. This is very different from the traditional teaching practices where the learning process is restricted, rather than enhanced, by assessment.

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Acknowledgments

The author wishes to thank most sincerely Professor Andrew Lian and Ania Lian for their support of this thesis. They have probably had the greatest immediate influence on this thesis, and so deserve to be acknowledged first. I could not have imagined having a better adviser and mentor for my Doctorate in Education than Professor Andrew Lian. Without his intellectual knowledge and perceptiveness I would never have finished. In particular, I would like to thank him for his continuous guidance, inspiration and enthusiasm. He manages to accomplish the perfect balance between providing direction and encouraging independence. In addition, special thanks to Ania Lian whose support was invaluable in clarifying my ideas and contextualizing my framework during the early programming phases of this undertaking and especially for sharing with me her unique way of seeing the real world. I am also indebted to my Secondary Supervisor, Kate Wilson, whose help, suggestions and encouragement helped me in the writing of this thesis and presentation of my final seminar.

Mr. Richard Tate is greatly acknowledged for his proofreading assistance, particularly his careful reading of the manuscript, which has contributed to the clarity of the finished thesis.

Thank you to the University of Canberra for their financial support in awarding me an Australian Postgraduate Award (APA) and UC Postgraduate Research Completion Scholarship.

Above all the true motivation behind this thesis was sparked by my passion for teaching and the students who provided me with the experimental data that I regarded so important and in their interests as students.

Finally, the continued support, love and encouragement of my family, who endured my perpetual absences to complete this thesis, and especially my husband, Neil, whose patience enabled me to complete this work.

Lynne Vey

Glossary

Term	Definition
ELE	An exploratory learning environment or ELE for short is an exploratory learning environment that encourages students to investigate and experiment to uncover relationships and make meaning based on an understanding of their own reality.
Evaluation	Evaluation is the making of statements about the quality or value of assessment tasks. Evaluation is used in assessment in terms of looking at a broad range of evidence to encourage students and assessors to reflect on the process of learning as well as the product of that process. It is an on-going process of measuring progress against expected learning outcomes at particular stages.
Assessment	Black and Wiliam (1998b) define assessment broadly to include all activities that teachers and students undertake to get information that can be used diagnostically to alter teaching and learning. Under this definition, assessment encompasses teacher observation, classroom discussion and analysis of student work, including homework and tests.
Formative Assessment	Formative assessment is assessment that provides feedback into an on-going academic program to be used to modify the program to improve student learning. Assessment is formative when the evidence of learning is actually used to adapt to learning to meet the needs of the students, or by students themselves to change the way they work at their own learning. Formative assessment improves learning.
Summative Assessment	Summative assessment is assessment aimed at determining the learning outcomes of an academic program at the end of the program or at the end of a particular phase of the program. Assessment is summative when it is a test, usually given at the end of a unit, term, semester, or school year. The purpose is to rank and certify learning and often includes such high-stakes tests such as AST, VCE, HSE, ACTAP, BENCHMARKS. Summative assessment proves learning.
Feedback	Feedback helps students reflect on the process of learning as well as the product of that process, and provides specific comments and specific suggestions for improvement and encourages students to focus their attention on understanding the task rather than producing a 'product'.
Rubric	Used in the context of assessment, rubric (often scoring rubric) refers to a scoring guide for some demonstration of student learning. Rubric comes from Latin *rubrica* meaning red earth and Middle English *rubrike* red ocher, heading in red letters of part of a book. Rubric is a set of scoring guidelines (criteria) for assessment work and for giving feedback.
Matrix	A matrix is something that constitutes the place or point from which something else originates, takes form, or develops. In education, a matrix is a rectangular array of elements within rows and columns in which not only is the value of an element important, but also its position in the array
Outcomes	Outcomes-based assessment focuses on what the student knows and can show. Students compare the outcomes with their learning goals and reflect on processes that might be changed so that more learning results.

Quotes

In a corporate world that has all but abandoned the individual performance appraisal for the "work team review", schools - and perhaps remote fire observation stations -

are the last holdouts. Continuing on this path will ensure that the chasm between schools and the real world continues to widen. (Wineburg, 1997)

... The current model of schooling may more appropriately belong to earlier in the twentieth century. It was developed to educate the masses for work in the industrial era. More importantly, it belongs to a print-based culture in which knowledge is owned by those who can access books in which it is recorded. Success is examined and certified by teachers, testing an individual's ability to apply that knowledge. Classroom structure, timetabled lessons, content-based instruction and classes organised sequentially by age are features of the print-based school.

The relevance of this model in the next century needs to be critically examined. (Education Queensland, 1999: 15)

"*Following Einstein's dictum that problems cannot be solved within the mindset that created them… Hawker then follows to say that the first step towards solving any problem is to understand the mental model that the problem arose from or that was used to describe the problem."* Paul Hawker (1999: 6)

The Inquisitors were the first to formalize the idea that to every question there is a right answer. The answer is known, but the question must be asked and correctly answered. Relativism, humanism, common sense and moral beliefs were all irrelevant to this process because they assume doubt. (Saul, 1993: 41)

Within this philosophy of reason the notion of education was to instill knowledge. But knowledge was the domain of the elite. Educating the masses was only to improve the relationship between top and bottom of society: that is giving the masses basic skills, not change the nature of the relationship. Voltaire's Bastards (Saul, 1993: 130)

Chapter 1 – Introduction

1.0 Introduction to Study

This inquiry begins with an interest in assessment. The main issues emerged from the limitations that assessment places on students in producing the results that assessment wants because learning is often measured by testing: specific questions which are definite, a predetermined version of reality, they can be administered within a limited time period and seek to measure only a limited number of cognitive knowledges and skills. Research has shown that critical thinking, problem-solving and learning processes are not addressed in assessment processes (Stiggins et al. 1989; Wilson 1996, Willis et al. 1999). A significant part of a student's critical thinking and problem solving, which is not a part of these assessment processes, is accidental, unconscious, not purposeful and unorganized. Such accidental or unconscious learning processes, critical thinking and problem solving also contribute to a student's knowledge, understanding and education. Education values assessment as a process for educational improvement. However, assessment these days places emphasis on outcomes and accountability, rather than on its ties with learning.

Assessment does not work in a vacuum. Educational values should not only drive why we assess in terms of outcomes and accountability but be a process of improving students' goals in conjunction with common and agreed national learning goals. These goals reflect what citizens highly value and see as essential for success in our society: "school education Australia-wide reflects commonalities as well as diversity, commonalities of purpose and goals for young people in Australia, in the approach to learning in the key learning areas, and in a learning environment reflecting the principals of social justice" (*School Education in Australia* 2005). The relationship between learning and assessment will be enhanced when students can relate to assessment and for the assessment process to take to account the differences that students bring with them to the context of assessment. In other words, create a link between the learning processes and the 'final product'. What is the place of assessment in the system if it does not support learning? This study challenges the

current relationship of learning to assessment "by wrestling with the conditions of the problem at hand, seeking and finding one's own solution (not in isolation but in correspondence with the teacher and other pupils)" (Dewey, 1910: 182).

Today's students need to be better prepared to cope with the rapid changes in technology and those in society's structures. Students have to be more flexible, more able to handle the exponential increase in information. Assessment has to reflect these changing needs or face the prospect of becoming irrelevant to the students' own experience in a rapidly changing society; otherwise its primary purpose to improve learning and enhance teaching (Board of Studies New South Wales, 2003: 6) is eclipsed by the current wave of assessment for 'accountability'. The assumption is that such assessment supports and improves learning. Thus assessment systems need to be regularly reviewed and refined to ensure that the assessment practices are educationally beneficial to all students. Assessment processes must evolve and improve. Assessment is a goal-oriented process. Assessment is about monitoring and matching students' goals with that of agreed national learning goals. Learning and assessment can be enhanced when the process of assessment reflects the process of learning. The quotations of page iv suggest that even well-designed systems must adapt to changing conditions and increased understanding. In this way assessment fosters and values learning.

Currently, aspects of school organisation and assessment work against these needs. The advent of national literacy benchmarks indicates a move towards an assessment-driven approach to curriculum. Australia's Common and Agreed Goals for Schooling in the Twenty-first Century released in *The Adelaide Declaration of 1999*, states that: "the goals have a sharper focus on students and their learning outcomes, thereby lending themselves to improved outcomes reporting and the development of standards and benchmarks […] and consistent with the outcomes focus of assessment, reporting and accountability which is now an integral part of Australia's educational landscape". The 1997 UK White Paper, *Excellence in Schools*, states that "the publication of performance data benefits parents and acts as a spur to improve performance" (Blunkett, 1997: 25). In the US, the 1994 *Goals 2000* initiative sought to encourage the states to adopt performance standards, defined as "concrete examples and explicit definitions of what students have to know and be

able to do to demonstrate that such students are proficient in the skills and knowledge framed by the content standards" (Riley, 1994). These benchmarks mandate content standards and identify what all students should know and be able to do to live and work in the Twenty-First century. These definitions assume that assessment is a determinant mastery of skills in specific content area, student performance and opportunity-to-learn standards.

Assessment should not just monitor students' achievements, it should also advance learning in all our schools. The goal of assessment should be to facilitate learning, enabling students to proceed indirectly to their truths through their own experiences (process) within a supportive environment, rather than proceeding more or less to established truths (product) under the guidance of an expert in such truths. In other words, it enables students to reflect on the process of learning as well as the product of that process. *The Adelaide Declaration* (1999) on *National Goals for schooling in the Twenty-First Century* (2002) states that "these national goals provide a basis for investment in schooling to enable all young people to engage effectively with an increasingly complex world". Yet assessment of learning still involves assessment for accountability, with rigorous technical standards to ensure high quality tests to monitor these educational standards. Such assessments are intended to rank or compare students and are a limited part of the learning process in such a system. Information for accountability and improvement comes from regular, ongoing work and assessment of students in schools on the basis of information gathered over time, not just assessment for data collection. Assessment is about improving learning through a comprehensive and balanced curriculum that does not limit students' present and future opportunities but rather fosters:

- individual initiative and creativity, and
- a spirit of inquiry and investigation, and
- ability to access, discern, infer, analyse and make informed decisions

The purpose of this research is to contribute to a change in the way assessment of learning is conducted in view of the shift in educational values from content based approaches toward a more goal-orientated process, which entails comparing educational performance with educational purposes and expectations of students'

own goals. The National Commission on Education, (Moser et al. 1993: 90) stated that "by the age of 14, students should be equipped to work independently in a flexible learning environment" and be partners in the process of assessment of learning. Whilst much of the pedagogy focuses on learning, assessment has not shifted its focal point from measurement of learning which distances students from the process. Learning, because it takes place in the midst of everything else that is going on, is not precise, linear, simple even to understand, never mind to measure. Learning is difficult to prove in a climate involving conflicting parties or interests, for there are so many immeasurables. For example, assessing learning includes an interpretive perspective such as making judgments about students' achievements; however assessment of learning as a measure only includes an interpretive perspective by educators to the way learning should be interpreted:

> assessment methods were designed to let students demonstrate their knowledge in easily measurable ways so that comparisons between them were facilitated. Students' achievements were viewed in quantitative terms - 'how much do they know?' - and judgments made by assessors were often assumed to be a definitive statement of the student's ability.
>
> (Nightingale et al. 1996: 6)

Assessment of learning should enable both educators and students to make independent judgments about performance and that these capacities can only be developed through involvement in the assessment process. The extent to which students accept passive measures of their learning denies their responsibility for accepting ownership of their learning. Assessment therefore needs to reflect more on the process which encourages students to be confident, creative and productive users of information situated in learning environments that fosters students in "a spirit of inquiry about the world around them; in this manner, assessment then encourages students to think for themselves, to be critical and to be self critical" (Moser et al.1993: 39).

This investigation indicates that current assessment of learning threatens the idea of assessment promoting learning, by skipping over educational values in favour of an exercise in measuring what is easy and is episodic rather than continuous. This tension is summarized in Table 1:1. The argument that this study begins with is that assessment of learning is subject to the institutional and regulatory constraints of accountability and reporting. Assessment is part of the learning process, not the

termination of it. Learning is a process of knowing and knowing is a form of action. Assessment is the measure of the extent of the student's transformation and application. According to the *National Goals for Schooling in the Twenty-First Century* (2002) schooling in Australia is about providing supportive and nurturing environments which contribute to the development of students' sense of self-worth, enthusiasm for learning and optimism for the future. Assessment of learning then, is meant to

- improve learning, and
- report on and certify learning for improvement and accountability using practices which support learning, and
- incorporate processes which ensure all students receive fair treatment, and
- evolve and adapt to changing conditions to ensure all students make sense of their world, make rational and informed decisions and collaborate with others.

Table 1:1 Tension between Assessment supporting learning and Assessment without learning.

Learning Process as part of the Assessment Process (Continuous)		**Learning Process excluded from Assessment Process (Episodic)**
"occurs as a regular part of teaching and learning and that the information gained from assessment activities can be used to shape the teaching and learning process" (Curriculum Corporation , 2002) – *motivate learning*.	**AND**	"to determine a student's level of performance on a specific task or at the conclusion of a unit of teaching and learning" (Curriculum Corporation, 2002) for accountability purposes, be managed – *inform decisions*

When assessment is embedded effectively within educational systems, in meaningful contexts which promote critical reflection and action, it can help educators focus their collective attention, examine their assumptions, and create a shared academic culture dedicated to assuring and improving the quality of learning. In other words, assessment should not be limited to the measurement of a 'product', but include the wide range of processes that influence learning whilst preparing the product of that process.

Assessment occupies a central place in the life of any student and it is becoming increasingly common for assessment to consist only of tests rather than include the process of learning which contributes to test results. The reasons for administering these types of assessment are varied, but the major obstacle to managing ongoing assessment is the need to accommodate masses of data with fewer resources to do so. Assessment should guide learning however assessment refrains from the task of articulating the link between its criteria of judgment and those of the students, therefore 'overrules' learning to become a 'product', rather than a process. This view that assessment drives learning has been advocated by many researchers in the field of learning and assessment over a longer period of time (e.g. Elton & Laurillard, 1979; Crooks, 1998; Biggs, 1998; Shepard, 2000). Assessment itself should be a powerful means both for supporting learning and promoting student motivation. Therefore, improving the learning process implies improving the assessment system to be inclusive of the learning process. Whilst there is strong emphasis on summative assessment (to prove learning has occurred) this study will show that there are strong indicators for including a wide range of learning processes, feedback and formative assessment, which improve learning.

Scriven (1967) first used the terms formative and summative in the context of curriculum evaluation, but now they are accepted practice in assessment of learning. According to Sadler (1989), formative assessment is "specifically intended to provide feedback on performance to improve and accelerate learning" (Sadler, 1989: 77). The terms formative and summative refer to the purpose of assessment rather than the methods used (Brown & Knight, 1994, Rowntree 1987), thus the collective data may be regarded as formative when it provides feedback on performance, but summative when the mark or grade contributes to the final outcome. Both formative and summative assessment enables the educator to assess the process of learning as well as the product of that process and offer feedback to students for their self-assessment and reflection. The teacher's assessment can be reported as a statistical analysis of the responses to task construction and students' self-assessment and teacher's observation and feedback as a performance report. The 'washback effect' from these reports alerts educators to students who are experiencing difficulty and further provides opportunities for students to improve their understanding. Thus the

intention is to bring in a positive washback effect which can influence pedagogy and classroom praxis. In this way connections are identified between situational contexts, the students' experiences, knowledge and an understanding of the real world. Hence, it can be implied that assessment processes that reflect an understanding of learning and which both students and teachers find convincing and significant have been found to influence students' approaches and attitudes to assessment (Scouller 1996; Scouller & Prosser 1994; Ramsden 1992; Crooks & Mahalski 1985; Thomas & Bain 1984).

Changing assessment practices is not only changing how we view learning and assessment, but also - and even more - about changing how we view the manufactured article, the 'product' of that process of learning, that represents versions of students' experiences (be it summative or formative assessment) that we rely upon in our daily practices as educators and students. In other words, rather than dealing with assessments of learning (summative or formative assessment) we need as educators to create conditions which enable an interrelatedness between learning and assessment, where the emphasis is on learning to learn. When students have situational contexts for reflection and for the application of such higher level cognitive abilities such as problem solving, analysis, synthesis and application, they approach assessment tasks according to their perceptions of the task demands and of the value given to their learning experiences. Thus, students are confronted by new ways of thinking that introduce them to the principals of meaningful task construction, their version of reality and a reflection process, which enables them to apply these principals to their own learning and to experiences from their own lives. Assessment therefore has the capacity to improve the whole of students' learning. Assessment for accountability is increasing from multiple stakeholders (students, parents, systems, institutions) who share a common goal of improving outcomes for all students; that are "designed to assure institutional conformity to specified norms…a move toward learning-based models which emphasize what students know and can actually do i.e., student learning outcomes" (Astin, 1993; Fyre, 1999). Thus there is a need to provide students with better opportunities to achieve their own learning goals in accord with agreed national learning goals rather than accepting that assessment measurement tests alone are adequate.

1.1 Background and Context

Educational goals and students' goals are in a synergistic relationship between learning, the process of learning and assessment, the latter being a way of enacting these goals and responsibilities. However, educational goals and values are disregarded when assessment deems important those aspects of the educational process which are quantifiable and as perceptions of learning rather than how people learn. Students respond to the situation they perceive, and it is not necessarily the same situation that has been defined by the educator. As such, assessment methods that are perceived by students as threatening and stressful, for instance, may prompt them towards a surface approach to learning, which inhibits the development of depth of understanding (Gibbs 1992; Ramsden, 1992). Lack of feedback on the learning process and lack of clarity or misunderstandings about what will be rewarded by the assessment system are also factors which lead students to adopt a surface approach in which "a narrow, instrumental approach to learning that emphasises the reproduction of material is adopted at the expense of critical thinking, deep understanding and independent activity" (Boud, 1990: 104). In other words, students are taught 'what' to think not 'how' to think. This is because it is assumed that education is about learning knowledge and truth, but "knowledge is only part of understanding. Genuine understanding comes from hands-on experience" (Papert 1980) and further that knowledge and truth can be learned best by being broken down into subject areas and each subject area into lesson units, each taught sequentially and atomically. Then to prove learning has taken place, assessment measures the 'products' of these segments.

When assessment is viewed in this manner it is an adjunct to learning, something that simply verifies that learning has taken place and has little to do with fostering or enhancing learning. This extreme and caricatured view of assessment, solely viewed as a testing mechanism designed to grade and label students, can easily contaminate learning (Sambell, McDowell & Brown 1997). But single snapshots of the learning process are not enough if the aim of education is to value and foster life long learning. Assessment must be a process that encourages students to reason their way through to their own conclusions. Instead, students are being taught to produce other

people's ideas dragged together by assessment which controls their learning rather than opening up their understanding to the real world. Wiggins' (1998) basic premise is stated as follows: "we have the tests we deserve because we are wanting to 'reduce 'assessment' to 'testing' and to see testing as separate from learning" (Wiggins 1998: 288). Testing does very little for students because it dismisses the importance of diversity of experiences, meaning is irrelevant and understanding unimportant. It focuses on what is wrong with no thought given to how weaknesses can become strengths. The process of assessment exerts two pressures, feedback and psychological. Studies by Orsmond and Merry (1997) and Mires, Friedman Ben-David, Preece and Smith (2001) revealed that "this stressful pre-occupation with passing and failing, is probably the reason why students could not acknowledge the potential value of feedback or as a learning opportunity". Assessment therefore, should be designed to improve learning, to improve performance through constructive feedback which enhances and encourages learning, not just to quantify or as Wiggins (1993) asserts "assessment should improve performance, not just audit it" (Wiggins, *op. cit.:* 5). In fact, the 'washback effect' from testing does help students as West (1988) states that when producing assessment tasks which include the process of learning "the washback effect encourages students to acquire those skills in order to pass the tests" (West, *op. cit.:* 8). Furthermore, this study will indicate that this was more so when assessment of learning was an active on-going process and a shared model of power and control in the classroom.

Thus, the apparent objectivity of traditional tests masks the primary purpose of assessment, which is to support and promote learning. However, in isolation, these assessment practices might seem just fine, but they have negative effects on learning. Studies by Crooks (1988) and Black (1993) indicate that assessment practices generally encourage superficial and rote learning, concentrate on recall of isolated details, usually items of knowledge which students soon forget. It can be argued that this is still happening, despite current pedagogy supporting learning as the assessment function is over-emphasised and the learning function under-emphasised. Black and Wiliam (1998) indicated that there is a tendency to use a normative rather than a criterion-based approach, which emphasises competition between students rather than the personal improvement of each. Their evidence is that with such

practices the effect of feedback is to teach the weaker students that they lack ability, so they are de-motivated and lose confidence in their own capacity to learn. Furthermore, Piper (1997) describes the Benchmark assessment of achievement in Year 3 and Year 5 of a students' primary educational experience as spasmodic, because "the assessment is not in terms of which curriculum objectives have been achieved. The assessment is in terms of status of a particular group of students relative to the proportion of reference group whose qualities are not known to the teachers." (Silis & Izard, 2001: 5). The argument is that assessments are inherently unethical because they rarely serve the interests of students and therefore abuse the power position of the educator (with classroom testing) or the system (as with ASTs, HSCs VCEs, ACTAP and Benchmarks, for example). Students who do not score well on this type of assessment are de-motivated and lose confidence in their own capacity to learn.

However, even in the absence of assessment tests, educators and students themselves make evaluative comments of students' ability: 'the best', 'the smartest in the class'. Such holistic assessments stress basic knowledge and encourage passive learning, but on the other hand, let the learning take its 'natural' course to the way learning should be, rather than explain what the measure of the immeasurables of learning are. Assessment of logical-mathematical and verbal-linguistic abilities, which ignore the progress of learning has formalised this process. The one-size-fits-all standardized tests assume that every child learns and tests in the same way at the same time. These types of tests are assumed to provide valuable information to support decision-making processes in many ways and at many levels: from the level of the individual to that of the class, the school, the state and nationally.

Assessment, in the way it is administered and the way the results are interpreted and used, all become critical aspects of any school's program. Thus, in today's society testing or assessment is synonymous with accountability, holding not only students but teachers, schools and institutions accountable for students' performance. This shift in focus from inputs (students' performance) to outputs (results) means educational reform can only be addressed by market competition. Interest in accountability through 'market reforms', that is, higher achievement levels for all

students on state benchmarks and school tests, has been linked to greater funding for the schools (*Goals 2000* was signed into law in the US in March 1994 to provide funding to states over a five-year period to support state-level improvement initiatives and award sub grants to local school districts to develop and implement education improvement plans that focus on improving achievement for all students). Such initiatives have the support of the public, based on parents concerned with accountability in both the US and similarly in Australia because it continues to insist on basic skills and knowledge for all students to prepare them for further education or the workforce. In Australia, the Australian Government provides significant funding to support the implementation of the National Literacy and Numeracy Plan through the Strategic Assistance Program which provides approximately $1.4 billion over the four years 2001-2004 to government and non-government school education authorities (*Adelaide Declaration on National Goals for Schooling in the Twenty-first Century, March 1999*). For this reason, it can be argued that the underlying purpose of this funding is to improve the quality of education, however unless there is accountability for learning as well as assessment then accountability merely serves the purpose of stakeholders not the students.

Thus assessment is not about improving learning it is inextricably bound to society's demand for greater accountability. Lyotard (1984) suggests that the control of this market capitalism (knowledge) "the reproducing of students to fulfill the technical demands of the system" (Lyotard 1984: 3) is beyond the control of the institutions and that power and knowledge are simply two aspects of the same question: who decides what knowledge is? Who knows what needs to be decided? Knowledge, as Lyotard (1984) acknowledges, "has already become the principal force of production, changing the composition of the workforce in developed countries" (Lyotard, *op. cit*: 4). Educational institutions want measures of the progress made by students; to be accountable (market capitalism) against progress made by the system (for support and funding). For example, "an *Education Week* survey in 2000 showed that 66 percent of teachers thought state tests were forcing them to concentrate too much on what was tested to the detriment of learning and nearly half said they spent 'a great deal of time' helping students prepare for tests" (Doherty 2003).

Schools and universities in the past century have attempted to deal with the massification (expansion and access) of education. The result is that assessment is problematic. Firstly, assessment which does not reflect understanding promotes anxiety and a preoccupation with test results that often undermines students' interest in learning and desire to be challenged. Secondly, time spent on test preparation devalues learning as a process and students internalize judgments as if tests were the final arbiter of one's worth. Consequently, the educational model of assessment has become more dependent on consumerism that is to say the student 'product' is reduced to a single all-purpose process of 'management' as if it were the summit of learning. By concentrating on management, assessment of learning is efficiency freed from social reality. Thus, the efficient delivery of indigestible quantities of content and information leaves the student little room to be more than a spectator. This linear efficiency produces the narrow logic that dislocates students from reality "worst of all, it is capable of removing from democracy [and education] its greatest strength, the ability to act in a non conventional manner, just as it removes from individuals [students] their strength as nonlinear beings" (Saul, 1992: 581).

With this impetus, the focus on assessment in terms of what will be assessed, for example, the techniques and instruments to be used continue to dominate a system that caters to the mass production mentality by being efficient and measurable as it conditions students who are ready to face the demands of an industrial age. Over the past hundred years and particularly in response to demands for accountability in schools since the 1960s, stakeholders have advanced the belief that content testing is a valid and reliable measure of learning and important decisions about students are made on the basis of scores from these assessments. Whether these assessment instruments serve to encourage students how to learn and to feel able to learn has not been part of the informed decisions. Assessment of the product becomes more meaningful for students only when students are aware of the steps of the process, which they take as they create the product, but also when they are aware of assessment that considers the learning process as well.

There is little evidence to support this view that a national system of coordinated state-level standardised achievement tests guided by benchmarks will enable the improvement of the quality of teaching and student achievement. According to Allan

Luke (1998: 1), translating – benchmarks into testing – puts at risk innovations in instruction, curriculum and assessment built up by Australian teachers, researchers and curriculum developers over the past three decades. Furthermore, as Allan Luke states, although Australia has been an international leader in curriculum development and assessment reform, the development of literacy benchmarks heralds a move back to an assessment-driven approach to curriculum (Luke *ibid.*).

Education ultimately fosters *conscientizcao*, or the development of the awakening of critical awareness (Freire 1972: 19). Assessment therefore, should not circumvent the analysis of reality, avoid creative discussion, or aim to keep up the supply and demand for perceived markets. Assessment, rather than being a 'direct' measure of students' product to meet a perceived demand, should facilitate conditions for students to satisfy the demand as an investment in their own learning.

Assessment tests can provide valuable data that show what students need to do to improve their efforts and performance and at the same time give educators the information necessary to adapt to students' needs. Therefore, it is important that schools and educators create environments to assist students to formulate their understanding, which focuses on experiences meaningful to the student. In other words, assessing learning is about connecting the social reality of the classroom (Learning) and the constraints of assessment of the wider school system (Assessment). The evidence from our study will indicate that significant learning gains lie within a setting that enables students to construct their own social reality. To this end, Rousseau's *Emile* offers a "plan of education which emphasizes direct contact with the physical world and which sets aside education that may not be obtained from books alone" (*cited in* Dame, 1997: 73). While Rousseau places much emphasis on discovery learning, he also acknowledges that students cannot "develop the full possibilities of being" (Dame, *op. cit.*: 67) without a supportive environment. Assessing learning is about social processes in social settings and assessment must concern itself with these issues as well as merely accountability ones.

The argument is that learning and assessment of learning reflect society's needs. However, assessment is still preparing students for the industrial age, whereas our rapidly changing society requires students to be users of information to be able to

make decisions in the information age. Thus, there can be a relationship between learning and assessment so long as assessment with learning is preparing students to apply what they know and can do in real-life situations rather than an assessment process which disregards the process of learning and in so doing, is preparing students for the old world. More simply, upon whose judgment does knowledge or understanding rest?

This study suggests that students' understanding of the present system of assessment measures is not retrievable in real life, or in problem-solving contexts, because this approach ignores the relationship between learning and assessment. Good learning necessarily implies a process of evaluation of one's success and progress towards a goal but does not require assessment as such which is essentially a set of criteria for success created by society as a way of legitimizing, usually in a formal way, the attainment of agreed learning outcomes or standards by the student. It therefore seems to us that assessment on its own may have no real value but that learning has value independently of (formal) assessment mechanisms. There is no contention that assessment should be abandoned altogether. Rather, the implication is to determine the value of assessment in a learning environment, which creates conditions that enhance the relationship between learning and assessment, thereby giving value to the process of meaningful learning and assessment.

Assessment without the learning process dislocates students from the process of assessment. Assessment implies a relationship, something that is 'for' and 'between' students and educators, rather than what is 'done' to students by educators. This dislocation is the motivation behind the investigation of the history of assessment.

1.2 History of Assessment

Throughout history, assessment of learning or understanding has reflected to some extent society's needs. Early group societies valued knowledge and information as being essential for control and a belief system. As these societies become more civilized they institutionalized knowledge through control to maintain the function of social rites and basic organisation of their societies. Thus, a paradigm shift occurred when societies from the past that valued knowledge as being dynamic, interactive and person-based to societies of today, which view knowledge as detached and

impersonal. Knowledge acquisition has become passive cognition of content and representation of word content (rote learning and memorization). Thus, learning became isolated from living and shifted from one-on-one teaching, to organized group learning, focusing exclusively on the concentration of content extraction.

This section of the study illustrates that most cultures invented methods of assessing essential knowledge by focusing on mastery of content, rather than the process of learning because knowledge was power. Francis Bacon believed it was "better to *aspire* to a knowledge [understanding] that is free from ideological bias rather than to promote claims to truth that have been deliberately conceived to support a particular ideology or ungrounded system of belief" (Henry, 2002: 9-10). The effect has been that in education, particularly assessment, power depends not on the effect with which it is used but rather on the effectiveness with which it is used in controlling, detaching and depersonalizing learning.

In East Asia, assessment as a means of social stratification can be traced back to the times of Confucius (551-479 BCE) in the early days of Zhou rule. For an ideal social and political order, Confucius believed that the only way such a system could be made to work properly was for each person to act according to prescribed relationships. "Let the ruler be a ruler and the subject a subject," (Wertz 2002: 3). Thus an assessment of people's ability was to provide traditional Chinese society with a comprehensive framework on which to order virtually every aspect of life.

During the Tang dynasty (A.D. 618-907), a government system supported by a large class of Confucian literati selected through civil service examinations was designed to draw the best talents into government. These scholar-officials acquired status in their local communities, family ties, and shared values that connected them to the imperial court. From Tang times until the closing days of the Qing Empire in 1911, scholar-officials functioned often as intermediaries between the grass-roots level and the government. Confucius tended to disregard practical knowledge and his emphasis on studying the classics had a significant influence on the history of Chinese education: "during the imperial [civic] examinations, the test items were almost solely based on the classics" (Zhu, 1992: 3-21). Therefore, the purpose of

education was not only to ensure loyalty to the government but focus more on traditional beliefs about society's needs, the social development of the individual: self, family, state and finally peace in the empire. Because of this exclusive focus Confucianism is often criticized for impeding China's progress in science and technology. In current Chinese education, the lack of student inquiry and discovery is still a serious issue.

Likewise, in European history, during the Hellenic period this idea of individual differences in ability, performance and selection for the preservation of the state was mentioned by Socrates (469-399 BCE). His theory of 'intellectualism'- and most interestingly, from the point of view of theorising about assessment - allows no room for the notion of practical knowledge, but rather stresses the importance of philosophy for the upper-class young Athenian men who gathered around him to hear and engage in his discussions, as "he had an inspirational and educational effect upon them, heightening their powers of critical thought and encouraging them to take seriously their individual responsibility to think through and decide how to conduct their lives by including 'a central concern for others" (Palmer, 2001: 7). This notion of a classical education for the elite was posited also by Plato (427-347 BC), who designed a complex system of education to place everyone in the class to which they were best suited. Plato's five levels of assessment, based on observation, experience, recollection, dialectic reasoning, and to systematize these results into theories, Brumbaugh (1987) were designed to ensure that those who had power really wanted to rule the state for the best interests of the cultural environment. Therefore, Plato's ideal state ensures that every individual is placed in his/her proper role and that each class maintains its proper social role, so that there is balance and harmony throughout the state. "We decided that a society was just when each of the three types of human character it contained performed its own function," (Plato). Plato did not advocate mass education "not because it should be the privilege of a future ruling elite, but because the 'natural abilities' people must have to benefit from demanding intellectual disciplines are possessed by relatively few" (Palmer, *op. cit.*: 13). Likewise current educational policies produce a homogenous culture of non-thinking conformists and consumers.

Aristotle (384-322 BCE), like Plato, believed that the state should have complete control of education and use it to maintain the status quo. Aristotle, influenced by his own aristocratic background, accepted that some people are slaves or manual labourers by nature while others are naturally endowed to be soldiers or rulers. He believed that "the education of free Greek citizens – workers and slaves - only needs basic training for their future jobs" (Woodfin & Groves, 2001: 138). Aristotle believed knowledge evolved according to some inner purpose, such as questioning, and therefore learning was a life long process. Furthermore, Aristotle placed more emphasis on the learning process by insisting that mental reasoning must follow the acquisition of knowledge through investigation and clarifying physical things. Key themes of his education remain to the present day, including liberal education: "it is an education that frees the mind from ignorance and is also the education appropriate for free men,…[and] vocational education was fit only for the lower classes" (J. Palmer, *op. cit.*: 19).

Assessment in the Middle Ages was more formal than Athenian education. For example, the University of Bologna, the oldest extant university in the world, employed oral and written law examinations on Roman Law in its school of law in the eleventh century. In the Middle Ages, the word 'university' did not have the meaning it does today. In fact, the Latin word *universitas* meant 'corporation'. Scholars or Masters were just one group of professionals who banded together in corporations to protect their rights in medieval towns, made the rules, and determined the subjects to be taught and examined. The term used for university in the modern sense was *studium generale* a school where one could obtain the *licentia ubique docendi*, a licence entitling the bearer to teach anywhere within Christendom (Verger, 1992: 35). This feature became the hallmark of universities. The academic emphasis was on knowledge of Arts and Humanities not the Sciences. Great teachers of the Middle Ages were professors of theology, e.g. Abelard, Magnus, and Thomas Aquinas (who Christianised Aristotle's arguments for the existence of God). Students came mostly from the Middle Classes or the Poor. The usual time for a bachelor's degree was five years. Examinations in philosophy, theology, the visual arts and literature were oral and given when it was thought that the student was prepared for them. Whilst it can be contended that education in the Middle Ages

maintained society's status quo, it nonetheless valued learning as a process rather than a product.

An example of testing in the medieval period was the oral exam at the Catholic University of Leuven, one of the most famous and largest in Belgium, founded in 1425 by Pope Martin V, to place students in the categories of Honours, Satisfactory, Charity Passes and Failures. The creation of the University of Leuven was not unique, in fact, in late Medieval Europe in Christian countries, universities were founded so that higher education in Christianity could be divulged and controlled in a universal way, for instance, by using one common language (Latin) for studies. During the 1500s, Jesuits (the Catholic order founded by St. Ignatius of Loyola) uniformly adopted written tests for student placement and evaluation. Thus, the education of Jesuits was designed to strengthen Roman Catholicism against Protestant expansion. The Jesuits, like the Greek philosophers, were concerned chiefly with the education of the nobility and those of wealth, although they did conduct trade schools and, in mission countries, schools for the poor. Tests were assessments of their teaching of the catechism and the object of this society was the propagation and strengthening of the Catholic faith everywhere. Thus, Scholasticism, in consulting only the *Bible* and the writings of early church leaders for answers to *all* questions isolated students even further from the real world. Even investigation of the physical world and consultation of secular sources were forbidden.

However, the obsession with tests or assessments not for the betterment of learning but to further theology, separate social class, cultures and gender is further evidenced by an early intelligence test published in 1534 by Sir Anthony Fitzherbert. His test of mentality, or ability to understand was intended to differentiate between the "*idiot*" (a person deemed unable to learn) and the '*lunatic*' (believed to be suffering from lunacy – insane). It involved tasks like counting 20 pence, stating who their mother or father was, their age, understanding/reasoning what was to his/her benefit or loss, knowing letters and being able to read. If in fact, the individual could perform these tasks, then it was concluded that he was 'not a natural idiot'. If someone from a lower class was able to answer questions correctly, then they were deemed lunatic

(acting in an outrageous manner). Subsequently such questions were omitted from future tests to avoid any moving beyond their lot in life (Kamphaus, 1993).

It is also arguable that the reality of assessment in the Middle Ages was imposed by economic conditions. In other words, books were so scarce, lessons had to be dictated and then memorized and accepted principals were not contested. Teachers would read passages and boys had to learn the contents by heart in Latin. Church leaders such as bishops and archbishops sat on the king's council and played leading roles in government. In the case of bishops, who were often wealthy and came from noble families, their satisfactory completion of study was tested by oral examination. This entitled them to become a master and, if they chose to go on, to study for a doctoral degree in one of the higher branches of learning. Education in economic terms, therefore, was meant only for adults who contributed to the economic growth of a nation or state, thereby reinforcing the cultural divide. Assessment underwent a paradigm shift from learning as a process to one of a production, from a natural process to a testing and examination culture. Thus, the answer is known, but the questions must be asked and correctly answered. Humanism was irrelevant to this process because it assumes doubt. The new forms and range of purposes for assessment mean that traditional models underpinning assessment theory are no longer adequate, hence the paradigm shift.

As the economy in the early part of the nineteenth century became more industrial, educators were preparing students to join the workforce. There was an abundance of raw materials and therefore there was a need for a steady supply of factory labour. Machines and natural resources, not people, mattered to the industrial giants—Britain, Germany, France and the United States. Thus, education focused more on national economy (structure, accounting, reporting) and dropped its humanist education. According to the *Human Capital Theory* of Adam Smith "a man educated at the expense of much labour and time, was expected to earn wages over and above the usual wages of common labour in order to repay the cost of an education" (Marginson, 1993: 33). The masses, it was believed by the middle and upper class elite (business administrators), could not be given more than a basic education. Thus, students learned rote exercises, to read and do simple mathematics; all learned to memorise information and to follow instructions. According to Saul

individual choice would be submerged beneath systems as we "witness the death of the individual and live in an age of unparalleled conformism" (Saul, 1992: 466). The school curriculum was viewed as a means of passing down to the student all the learning necessary for effective citizenry. What these business administrators were attempting to do, is to ensure a class limited by common standards to advance industry because "the US economy needed legions of minimally skilled workers to perform repetitive tasks, and the schools organised their patterns of teaching and learning accordingly" (Wilson, 1996: 129).

Thus schools in the late nineteenth and early twentieth century became production lines and were modelled after a 'factory' model of design, (Gross & Chandler, 1964). Bring in the raw material (the students,) process this material through the machinery (classrooms and the school) by trained and skilled labourers (teachers) for an output - being a completed product (the graduate). During this period, educational assessment used testing to determine whether you belonged to the upper or lower class. Because the strength of the economy depended directly on the abilities of its workers, there was pressure on schools to redefine what it meant to be educated in terms of society's needs. Francis Galton developed the concept of standardized testing in the Nineteenth century in order to sort people into these groups. He based his eugenics theories on his ideas of racially and morally superior 'types'. In his publication, *Classification of Men according to Their Natural Gifts* he strongly believed as had Plato and Aristotle, that intelligence was inherited and could be objectively measured; he developed a test battery similar to the tests of sensory and physical skill used by experimental psychologists. The test was logical in that information was obtained through the senses. His observation indicated that the gifted are well above average and the 'idiots' are well below. Thus, the first operationalisation of the distribution of intelligence (normal curve) became the foundation of 'classical test theory'. Hence, it can be argued that standardized tests were deemed essential for control and cooperation of society: separating the sheep from the goats, the mass from the elite, the illusion from reality, and acceptance by the masses of the reality of the illusion. Thus, governments, colleges, and universities used these test scores of intelligence at the expense of morals, ethics and gender. In other words, students can

learn what the teacher knows and "become an expert whose competence is equal to that of the teacher" (Sarup, 1993).

Since the beginning of the twentieth century, however, governments have increasingly intervened in the area of schooling (funding institutions, selecting staff, and approving curricula, granting access and validating diplomas) to the point that, education has become identified with catering to market demands. In other words, as the factories got bigger, so did the demand to locate education in centrally located places such as schools thus centralizing and controlling knowledge. Just as the Industrial era monopolised production, a move away from the Cottage industry, so did schools and education systems, control learning by moving away from private tuition. Hence, the education system that emerged in the nineteenth century and consolidated during the twentieth century shows many similarities with the industrial system along which it developed. For example, assessment; standardized tests continued to channel students in the semi-skilled employment pool while those students who were 'gifted', capable of more complex reasoning processes were prepared as the managers of the workforce. Consequently, this inclination for general education matched the industrial need for the training of basic skills within the work force.

To cater further to this growing market, there was a demand to standardize educational services even further. This meant the planning of a standard curriculum valid for every student in each year level and in specific disciplines. The standard curriculum can be compared to the Ford T model, available in every range of colour provided it was black. Similarly, the curriculum and learning environments reflected this model by producing robotic students to operate the machines to sustain the economy. The reality of twentieth century education was the product of an era in which massification, standardization and fragmentation were valued beliefs. As stated by McLuhan:

> "mass education is a child of the mechanical age. It grew up along with the production line. It reached maturity just at that historical moment when western civilization had attained its final extreme of fragmentation and specialization and had mastered the linear technique of stamping our products in the mass."
>
> (McLuhan & Leonard, 1967: 24)

Hence, learning was understood primarily as a product, something you acquire from education and assessment sought to prove the result. Students are dislocated from reality by fragmenting thinking into discrete disciplines and removing choices for the students. Assessment still bears the stamp of a factory model that saw the beginning and end of imagination all at the same time and which it was organised to serve.

Another example of this economic managerialism, in the latter part of the 20th century, is the status and power of the system to generate the illusion of reality, which it maintains by its widespread custom of not returning examination scripts or revealing marking procedures to students. Nationally, Australian students are assessed in literacy and numeracy skills in years 3, 5, 7 and 9. All written work is marked externally and each participating student receives a report in both a visual and a skill-specific way about his or her achievement in relation to the achievement of the year cohort against the state average. In the Australian Capital Territory (ACT), the Department of Education and Training, "owns all data produced as a result of the implementation of the ACTAP" (ACT Department of Education and Training Policy 2003). This 'boardroom secrecy' of only providing information rather than return examination scripts with feedback about their performance, maintains an education system that is static in its evolution. Furthermore, the purpose of the ACTAP results is to provide the ACT education system with: "information about ACT student achievement in relation to the national benchmark levels; standardised data on the lowest 20% (or so) of students for possible resource targeting; the ability to contribute to the national data collection so that we can put a case for our fair share of Commonwealth resources" (ACT Department of Education and Training Policy 2003). Summative assessments are an attempt to prove student learning at some point in time and even though they are not designed to provide the immediate, contextualized feedback useful for helping teacher and student during the learning process, they can however contribute to the steps in the process of learning.

Teaching has changed and yet the philosophies, which govern the methodology of assessment, have not changed, especially in the way in which learning is demonstrated as a by-product of the demand perceived. For example, Brauner & Burns (1965: 11) assert that the teacher negotiates the 'market' with the Board of Education by passing on their possession of knowledge to students (which is an

epistemological *product)* and assessment is how students produce knowledge (which is an epistemological *process*)". Thus, process is the intellectual means by which the product is realised. In this way, assessment of learning in the nineteenth and twentieth centuries can be equated with power: testing what is predetermined or already known – content and expected outcomes. In other words, educators cannot directly pass on to students what they have learned (the power of knowledge and truths) – one can only facilitate the conditions (the potential for knowledge and truths). The student, like the manufacturer must produce according to the standards that ensure the consumer (employer) will get fair use from the product he/she buys (employs). However, the context of society for the twenty-first century has shifted from one based on capital goods (industrial) to one based on services (information), and there has been a corresponding shift in the expectations of learning. Yet research by Black and Wiliam (1998b) has shown that this shift has not occurred in assessment. Black and Wiliam draw the analogy that the classroom is like a black box.

> "Certain inputs from the outside -- pupils, teachers, other resources, management rules and requirements, parental anxieties, standards, tests with high stakes, and so on -- are fed into the box. Some outputs are supposed to follow: pupils who are more knowledgeable and competent, better test results, teachers who are reasonably satisfied, and so on. But what is happening inside the box? How can anyone be sure that a particular set of new inputs will produce better outputs if we don't at least study what happens inside?"
>
> Black and Wiliam (1998b: 2)

According to Black and Wiliam (1998), difficulties with assessment revolve around three issues: *effective learning* (tests encourage rote and superficial learning), *negative impact*, (marks and grades overemphasized whereas feedback underemphasized), *managerial role* (where collection of marks to fill in records is given higher priority than the analysis of students' product). What is needed to link assessment with learning is for assessment, be it formative or summative, to consider the process of learning when valuing the worth of the end 'product'. Thus, assessment *per se* could be made more helpful in assisting students to have the confidence and ability to manage their own learning and meaning of reality: managers of their own assessment of learning (ACT Department of Education and Training Policy, 2003).

Assessment can no longer subordinate quality to quantity and it needs to be aligned with learning to move beyond this 'old world' reality; a methodology which accepts truths *per se* from the delivery of information to one that is based on a view shared by John Seely Brown (2001): "learning is a remarkably social process that occurs as the result of a social framework that fosters learning" and not primarily as the result of teaching. History has shown that assessment rather than be an interactive and personal assessment of the process of learning continues to favour learning as an entity to be produced: the end 'product' rather than the 'journey'. In preparing students for the twenty-first century, assessment must reflect our rapidly changing society. A new system of education; one that values the process which bears the fruits and would interconnect learning and assessment to support the student of the future by creating conditions in which students use and apply information rather than produce it. Rogers (1994) says that the creation of open learning environments lead to self-initiation and learning by the student and which is more rapid, more thorough and lasting than traditional assessment and learning environments.

1.3 Background to Study

Learning has taken on a wide range of viewpoints including 'informal', 'experiential', 'situated' and 'incidental' learning, and has been approached from an equally diverse range of theoretical perspectives including humanist, constructivist, and postmodern (e.g. Lian 2005; Boud et al. 1985; Candy, 1991; Foley, 1999; Garrick, 1998; Lave & Wenger, 1991; Livingstone, 1999; Marsick & Watkins, 1990; Usher et al. 1997). The theoretical principals of humanism focus on the process of learning, as opposed to its content, and on the conditions enabling students to appreciate and evaluate how their understanding of the world is continually transformed through life experiences. In this sense, learning is seen as an integral part of human existential growth, rather than as an academic skill of itself and for itself.

Constructivism values teacher-supported learning that is initiated and directed by the student. Students are seen as learning by experimentation and are left to make their *own* inferences, discoveries and conclusions. Constructivism appreciates the historical context of students' learning. It emphasizes that learning is not an "all or

nothing" process, but that students learn by building upon knowledge that they already possess.

Postmodernist approaches to learning acknowledge the transforming power of learning and its historical context while also embracing the idea of the sources of human interests (or motivation) moving beyond the particularistic politics of class, ethnicity, race and gender. Consequently, postmodern theories see critical reflection as a means enabling students to explore, rather than assume, the belief systems which shape and inform people's (or their own) actions. Postmodern models, therefore, see learning as an outcome of a process enabling students to identify, question and modify assumptions which have a limiting impact upon their contexts of interactions.

The humanist, constructivist and postmodern perspectives on learning, together, see students as participants in the social context which shapes them, and which is affected by the quality of their critical reflection. Critical reflection becomes a tool for enhancing students' participation in their various contexts of life. Ideally, learning should entail a process enabling students to transform their lives and their historically constructed contexts through students' enhanced and informed participation. In turn, in order for the assessment process to support this learning goal, it is necessary for assessment to identify criteria enabling evaluation of students' expansive and critical learning. The humanist, constructivist and postmodern models help us to focus learning and assessment on the following concerns which also become the central features of the learning environment (Exploratory Learning Environment) which we are proposing and testing in this study:

- Learning as an outcome of participation in real life activities enabling students to evaluate the beliefs upon which they base their actions;
- Questioning as a strategy facilitating critical reflection;
- Negotiation as a means for evaluating the validation power of the newly formed criteria of judgment.

The notion that people construct their own meaning is consistent with the major views of Piaget (1973) and Vygotsky (1978) about the nature of the development of

learning. Learning was taken for granted as a natural process by pragmatists such as Rousseau (1972: 117) "teach by doing whenever you can and only fall back upon words when doing is out of the question". Rousseau's naturalistic approach to education was not to stifle the student, rather children should "engage within a well-ordered environment and learn by interacting with it…in an imaginary micro-environment…rather than the dry pedantry of textbooks" (Palmer *op. cit.*: 56). Later Dewey (1916) was influential in advocating individual experiences in education as preparing people for active citizenship in a participatory democracy. For Vygotsky education could not be reduced to the acquisition of a body of information, this is only one of the sources of the development of the child. He believed that intellectual development was more important than knowledge and his Zone of Proximal Development is the difference between children's capacity to solve problems on their own and their capacity to solve them with assistance. In other words, Vygotsky advocated that educators not simplify the content, but rather provide unfamiliar content and the setting for students to step from their current level to a higher level of understanding: "development is more productive if children are exposed to new learning precisely in their proximal zone of development" (Vygotsky, 1978). Rogers (1961:1 93) argues that individuals need the freedom to follow courses of action and the more one experiences freedom of choice, the more the choices will be effectively implemented in behaviour. If we want students to be critical thinkers then we need to provide environments that promote the advancement of information for students to reflect on and construct their own meaning of the world.

Paulo Freire in his *Pedagogy of the Oppressed* (1972) denounces traditional or oppressive education systems as they are based upon an epistemology of ideas (Freire calls them myths) which are obstacles to the development of critical thought. The problem is that our present system is obsessed with methods for measuring knowledge and presenting the results as 'truths' about student learning. However these measures are limited and furthermore do not measure anything that represents actuality. Rather, the concern that is posited is that assessment is generating an illusion. When learning is viewed as a process, then assessment ought to shift to the process of that learning as well as the product of that process. It can be argued

therefore that the product as a stand-alone is not sufficient evidence of the quality of the thinking processes that produced it.

Our assertion is that the movement towards accountability in education in the late twentieth century represents a retrogression when it shifted from the natural development of the student to one in which the goal of education was to expedite the transfer of vast amounts of information to the greatest number of students in the shortest possible time and then test that information in order to determine 'acquired knowledge'. Assessment, in this context, undermines humanism and supposes some systematic procedure, which if followed, guarantees that the 'evidence' or 'data' gathered will hit upon the 'truth' about learning.

If we want to understand assessment, then we need to understand how globalization (cultural, economic and political diversity, spurred by market liberalisation and information, communication and transportation technologies) and postmodernity are inextricably intertwined in assessment practices with notions of a consumer society and commodification (the development of attempts to standardize 'products'). Does this mean that education, in preparing students for life-long learning, is created by the economic challenges of the new world order of education or by political economy? The education debate if nothing else is a shift from mass education (Modernism) to a focus on the individual, who experiences some change or transformation (Postmodern). Rather than being a "study of the ways in which forms of knowledge are delivered, or its functions as an agent of social reproduction, [education] becomes a creative and critical perspective in its own right" (Schostak 1993). According to Freire (1998: 72) this shift has enabled educators to know what happens in the world of children with whom they work. Freire's intention was to support the development of truly reflective practice and to equip the students better to address issues in their everyday world outside of the learning environment. In other words, Freire believed students learn things, not to know them but to use that knowledge to construct their own reality. But as Sarup (1993: 138) points out, educational policy today, particularly assessment puts emphasis on skills and training, rather than on a humanist ideal of education in general: essentially meaningful, socially interactive and personal.

Has there been a further shift away from a humanistic approach to education brought about by the changes in a global economy marked by constant restructuring, flux and rapid change, and novel material conditions and subjectivities? We would argue that this is so. This is because corporate education wants a measure of the progress made by the student; to be accountable (market capitalism) against progress made by the system (for support and funding). "Learning has increasingly been seen as a commodity or as an investment rather than as a way of exploring what might make for the good life or human flourishing" (Smith, 2002). Or as Fromm (1976) would describe this separation, it is a form of education that looks to 'having' rather than 'being' in that the student is transformed into a commodity, experiences education as an investment which must bring the maximum profit obtainable under existing market conditions (Fromm 1957: 67). According to Barlow and Robertson (1994), there is in our current assessment practices an underlying corporate agenda, which seeks to have an education system, which mirrors the economy, and have it based on competition and choice. For example, in New Zealand an overall weakness in educational reforms is that they facilitated greater competition and choice in the education system, but they did little to create the conditions under which market competition could work (LaRocque, 2004).

Corporate education exists to promote programming consumers rather than educate students to see capitalism for what it is and to think critically about it. Thus the assessment of this acquisition of knowledge further dislocates students from reality as it becomes obsolete and already ceasing to be an end in itself. It can be asserted the educational model of assessment has become more dependent on consumerism and we accept the illusion that assessment is a goal-oriented process aimed at winning certification. According to Sarup "it is and will be produced in order to be sold" (Sarup, 1993). That is to say, students' 'products' (outcomes) are reduced to a form of productivity, producing absolute truths (consumerism). There is a need to dismantle the commercial structures that dominate assessment because they ignore the decision making process, social responsibilities and students' identities. Without these principals, only the abstract remains. Assessment, when so abstracted, becomes a process of unrelated assertions about learning and therefore there is no relationship between learning and assessment. Hence, the paradigmatic shift in

assessment has brought about a refocus: to concentrate on how things are done rather than why.

The argument is that these measures of competition do not seem to provide much insight in answering the questions of how students learn, in what conditions and how can students assess themselves and their learning process in the context of their action and in the context of a collaborative learning environment. Rather assessment of what had been absorbed through content control, i.e. determined by how much could be extracted from the students by examination and by arranging the environment so that significant questioning is not valued because they are restricted to memorizing somebody else's answers to somebody else's questions. Learning should be spontaneous. Learning is discovering, connecting, understanding and making meaning yet there is nothing that goes on in education that is spontaneous. There is nothing static about life, learning or assessment, but humans; in particular the ruling elite (management) have always desired a static model that they could predict or control. This is because "management cannot solve problems. Nor can it stir up creativity of any sort. It can only manage what it is given" (Saul, 1992: 135). Students with their curious mind strive towards an understanding of the real world, and are agitated and concerned by the learning conditions they cannot understand, envisage, or manage. Every generation marvels at the thoughts and creations of its ancestors and dreams to tests their theories and understanding. To temper such instinctive basic reasoning, 'assessment' is prescribed to control and curtail such processes of inquiry. Foucault's arguments in his study of prisons *Discipline and Punish: The Birth of the Prison* (1977) when applied to education are structures, organisation and assessment that are set up, and are not places where learning can be discovered but rather places where knowledge about people is created. When education systems no longer serve the needs of society or the individual student, reform is called for, evolution continues and includes a model, which links learning and assessment of that learning process necessary for use at all levels regardless of national outcomes or standards.

1.4 Statement of the Problem

What is needed is a system to address critically questions around assessment that seeks to bolster a process that fails to acknowledge the process of learning. Hutchings (1989) argues that we need "assessment predicated on a view of learning that is integrated and multi-dimensional" (Hutchings, *op. cit.*: 29). The implication then is to consider assessment as a continuous process which would represent a significant conceptual shift that extends beyond assessing mastery of knowledge to assessment of learning goals or "outcomes in critical thinking, cultural understanding, empathy, citizenship and social responsibility" (Astin, 1996).

Despite the large number of theories about learning, these theories have had relatively little impact on assessment practices. More recently, however, some changes in accountability have occurred, requiring students to apply their understanding in real life situations rather than assessing knowledge and skills in isolation. Historically, assessment emphasises qualitative and quantitative aspects of performance, but more recently accountability has been the dominant feature of assessment. Schools' high ideals have tended to fade away as State-provided finances have declined and as the State 'encourages' closer partnerships between education and industry (Kenway & Bullen, 2001: 102). Yet, learning to think critically, to analyse and synthesize information to solve problems in a variety of contexts and to work effectively in teams are crucial skills for modern employees and industry; however, there is little evidence that our education systems are developing these skills in our children (Bransford, Goldman & Vye, 1991). More recently, a review of assessment at Queensland's University of Technology (1998/9) showed that "the variety of practices across faculties were without pedagogical justification and often misinterpreted policies and guidelines. In particular the working party identified the critical need to confirm the link between assessment and learning objectives".

This study then subverts the notion of assessment and looks at aspects of learning environments enhancing the relationship between learning and students' own assessment. It does so by proposing strategies assisting students in assessing the enabling power of the strategies (solutions) which they apply in the context of their

learning activities. We argue, assessment research refrains from the task of articulating the link between its criteria of judgment and those of the students. It is therefore the task of pedagogy to create this link in order for students to relate to assessment and for the assessment process to take account of the differences that students bring with them into the context of assessment.

Thus, the focal point of this study has been to conceptualise a framework, in the context of supportive learning environments that represent a balanced system (von Bertalanffy, 1968) which basically means that the interaction of all components needs to be taken into account if a lasting change is to be produced. Accordingly, the relationship between learning and assessment of learning will be working together in the sense of getting the benefits of cooperation and therefore enhanced. Assessment then will be holistic rather than fragmentary; it is self reinforcing and more rewarding for students and educators because it addresses the entire relationship rather than only selected elements of it.

1.5 A model for assessing learning

The model for assessing learning that will be developed here and entitled: an 'Exploratory Learning Environment' (ELE) will seek to enhance the relationship between learning and assessment. The concept of an 'exploratory learning environment' has evolved from observations of several supportive learning environments including situational contexts over a decade ago; strategies to be implemented will encourage 'learning by doing', students making choices and critical dialogue through negotiation, effective communication and collaboration in natural learning environments. These are the more popular approaches in current learning theories. The main goals are to combine these elements in ways that make it possible to broaden experiences for students; to individualize learning activities to a greater degree and to better support assessment of learning.

In such flexible learning systems the student is much more active than in a conventional classroom. The control in such an exploratory learning environment is left completely to the user and this encourages students to explore and experiment to uncover relationships, to make meaning and to make informed decisions. Students

are immersed in a learning context and explore, investigate, interpret and explain in light of their own preconceptions, motivations, experiences and expectations. This metacognitive activity is called 'metalearning' (Biggs, 1985) and focuses on the process of learning – how the student goes about a task (engagement and construction) rather than on the content of what is learned. Thus, the ELE model is to be based on humanist/constructivist/postmodern approaches which describe a cycle of events, in which the students' learning processes are related to learning goals and assessment that emphasises outcomes (or standards) which reflect these learning goals. It is a thinking matrix which, instead of providing one 'right' way of assessing learning, offers a series of decision making stages which lead links assessment to learning and is meaningful to all students.

The ELE, therefore, is about creating conditions allowing students to negotiate the terms of reference which inform their interpretations of the learning demands. The objective of this negotiation is to help students to create their own interpretations of those learning demands by evaluating (negotiating) the enabling power of the strategies which they apply in their learning context. Validation of those strategies is a function of the enabling power that they offer. The more students can do, the more appropriate strategies they create. Consequently, in an ELE environment, students do not assimilate knowledge. Rather, they create knowledge by being helped to question the enabling power of the strategies (solutions) which they apply in the context of their learning activities. The outcome of this process is an expansion of the understandings which inform their interpretive systems. The more students are challenged, the stronger the information basis they create for evaluating subsequent learning demands.

1.6 Research Questions

In this study our specific objective is to identify principals for a learning environment facilitating a form of learning and assessment where students' ways of knowing, and how they learn, are not divorced from their individual, and yet socially constructed (negotiated), frames of reference. In this goal we seek to address the challenge of educational philosophies laid down by humanist/constructivist/postmodern approaches to learning and assessment where the primary focus is on conditions

enabling students to negotiate the learning objectives. In such an environment, learning objectives are not arbitrarily objectified entities. Instead, students construct their meaning by exploring the strategic potential of different ways in which they approach their problems at hand. In order to formulate a theoretical and practical basis for such learning, in this study we seek to address the following questions:

1. What principals would form a theoretical framework of an environment enabling learning by exploration of different ways of approaching problems?
2. How could an exploratory learning model help us to link assessment and learning in a way that would not threaten the negotiation basis of learning?

1.7 Method

The following activities represent the steps of the project:

1. Develop an Exploratory Learning Environment Model and trial it
2. Observe the trial to see what changes occur and why
3. Investigate the impact of the study on students and their opinions about the model
4. Implications for the future.

The research will involve 3 groups of students in Year 8 and Year 10. All students are enrolled in two secondary high schools and their results will be obtained directly from the ELE model for the 3 groups. Each group will participate by way of surveys and interviews. Research question 1 is to be addressed across the 3 groups and is concerned with the theoretical framework of an environment enabling learning by exploration of different ways of approaching problems. This will be addressed by comparing the results of the same assessment tasks pre and post intervention. Feedback will be investigated across the three groups to mesh qualitative and quantitative data. Additional information on students' performance, use of feedback and preference for the mode of learning and assessment will be obtained by surveys and interviews.

Question 2 will investigate students' general attitudes and response to the ELE and how students' explorations expand their understandings which inform their

interpretative systems. Student surveys and self-assessment rubrics are to be used to collect information regarding general attitudes and responses, while interviews are to be conducted and additional information will be sought to validate responses given on the surveys.

Additional factors to be investigated are the potential of this model to benefit assessment of learning. Familiarity with the ELE will be investigated in two ways: firstly, by considering a group, i.e. (Experimental Group) which has previously used the ELE with the researcher in the role of teacher/researcher/participant-observer and secondly, by considering the groups (Group A and Group B) which have not (researcher/participant-observer only). The performance measures on the final products of the learning process will be investigated to determine a connection between assessment and learning.

1.8 Purpose of the study

The purpose of this study is to enhance the relationship between the concept of learning as negotiation (exploration) and assessment. We do so by proposing theoretical principals of a negotiation-based learning environment (the ELE model) and by investigating the advantages of the model when translated into a practical context of teaching English as the first language to secondary students in Australia. We will do so while referring to a number of principals which typically are identified with the learning theories of humanism, constructivism and postmodernism (Table 1). In those theories, students are encouraged to 'learn by doing' through trial and error. This experimentation helps students to assess the belief systems, or values, which give value to the strategies which they apply in their learning contexts.

Our concern with the link between concept of learning as negotiation (exploration) and assessment is important. While we agree that assessment should motivate the design of learning environments, we also believe that assessment must do this in way which does not reduce students to objects without history and, as a result, to automata whose lack of individual history prevents them from taking a stand, or critically approaching information. The concern with the methodology and the ethics of learning is not new. The ancient Greeks saw it as educationally important to 'Know thyself', Rousseau's 'wholeness and harmony'; John Dewey 'reflective self-

awareness' and Vygotsky 'social interaction' are buzzwords in education today. However, it is our view that unless our intellectual frameworks strive to make assessment equally ethical as we try this when seeking to assist learning, our teaching practices will be reduced to techniques for transmitting information, rather than supporting its critical appraisal and construction.

In this study we seek to illustrate those critical forms of learning that can be supported in a learning environment where both, students and teachers proceed by critically examining the assumptions which inform their criteria of judgment. From the students' perspective, this means that students are empowered to learn by considering competing perspectives/experiences/points of view. On the other hand, from the teachers' perspective, this means continuously questioning (and, therefore, critically evaluating) the design of the conditions enabling this form of students' learning. Consequently, each party is given the possibility to ***negotiate*** their understanding of the learning objectives from the perspectives enabled by this process of critical reflection. Each party, therefore, ***explores*** and, as a result, ***never stops learning*** about, the understandings which give value to the expectations of themselves and others. The exploratory feature of this process allows us to formulate principals of a learning and assessment model to which we refer as an ***Exploratory Learning Environment*** (ELE).

Exploratory learning environments do not guide students towards some predefined outcome, but offer conditions for students to make decisions about the objectives that drive their learning process. In contrast, in Didactic Theory or lower order thinking, which Cannella and Reiff (1994) label as memory-oriented transmission models, it is assumed that students who have no questions typically are learning well, while students with a lot of questions are experiencing difficulty. Learning is assessed according to the evidence that teachers identify as indicating transfer of knowledge from them to the student. On the other hand, in Critical Theory, or higher order thinking (Paul, 1995: 276), it is believed that students who ask questions are demonstrating a significant sign of learning. Knowledge is formed through a meaningful involvement, not by imitation or repetition (Kroll & LaBoskey, 1996). Learning activities in constructivist settings are characterized by active engagement,

inquiry, problem solving, and collaboration with others. Assessment is found in the students' ability to explain in their own words, with examples justifying why and how it is so and why it is relevant. The notion that people construct their own meaning is also consistent with the major influences of Piaget (1973) and Vygotsky (1978) about the nature of the development of learning.

Table 1: The ELE Framework

The ELE framework and the learning theories of humanism, constructivism and postmodernism	Description
Supportive environment	Students construct meaning from what they understand if they are engaged in 'doing the activity'. The learning environment is an integrated whole and students' learning is seen as a lifelong project.
Exploration	Learning is a problem-solving process where neither the nature of the problem nor its way of addressing are predetermined. They depend on students' evaluation of the context of their activity and the form of impact that they choose to exert.
Experimentation	Through experimentation the students are actively involved in searching for meaning and the construction of what they perceive to be the reality. They do so by questioning, challenging and reconstructing what they know and can do. Synergy is gained from meshing, the past with issues of the present and future.
Discovery/ Experience	Students are encouraged to learn by relating contexts, rather than by acquiring arbitrarily defined structures. This process of relating helps them to discover and be surprised by new information which they construct.
Imagination/ Inquiry	Students derive satisfaction from meaningfully self-constructed knowledge and curiosity about contexts.
Critical dialogue	Create conditions challenging students' systems of perception (A. B. Lian 2005).
Culture as a process involving formation of meaning	Creates situations for students to examine, understand and evaluate the impact of different ways of thinking/experiencing (Luke 2004).
Feedback	Feedback is not about evaluating students' performance. Instead, it is about creating conditions enabling students to contrast and to compare their understandings against conflicting systems and, as a result, to construct their own feedback regarding the strategies which they apply (A. B. Lian 2005).
Cooperative learning	Often this term applies to students working in groups as a preferred model of learning. However, we are of the belief that no self is an island (Lyotard: 1985: 15). Hence, after Freadman (1994) and Lian (A. B. Lian 2005), we take cooperative learning to mean by evaluating the relevance, or the impact, of one's criteria of judgment when acting upon others. This is a very different process to students working in classroom, in groups, and speculating about events in ways which are inconsequential to their own realities.
Information Communication and Technology	This quality refers to teachers exploring the use of technology in assist students in the organisation (and presentation) of information.

1.9 Significance

This study is significant for three reasons. First, we will test whether humanist/constructivist/postmodern frameworks will benefit assessment practices. The aim is for the role of the imaginative not to be taken to mean one culture, or one set of principals deciding upon values and beliefs. Thus, the concept of plurality of cultures, implied in the idea of the imaginative, is considered legitimate in the process of forging a personal or collective identity.

Second, our research seeks a more informed understanding of the use of the ELE as a tool for linking learning and assessment, rather than as a pedagogical technique alone. Thus the ELE will furnish not only "*une raison d'être*", but also the methodology for optimising the relationship between learning and assessment.

Third, the study has implications for current learning and assessment practices, because it helps to integrate concepts such as cultural pluralism together with techniques for enhancing students' motivation, self-assessment and self-awareness. It achieves this by enabling students, irrespective of their particular experiential conditions (e.g. their past, race, class, gender or age), to participate fully in the ongoing learning activities involving them in confronting, challenging, contesting, comparing, contrasting, constructing, connecting, collaborating and communicating meaning (adapted from Andrew Lian, 2000).

The idea of cultural pluralism, as we use it, helps us to embrace the concept of culture more as historically-shaped experiences, rather than arbitrarily identified features (such as race, for example). This is because no single feature alone can determine its actual impact upon the students' learning process. As Chambers explains below, there is a difference between one's actual culture (i.e. interactions that shape us) and CULTURE as an abstract defined to differentiate one set of features from others:

> [..] theoretically, where culture is understood as the mediating "context" of social interactions, so that there are notionally as many "cultures" as there are interactions, any given local context of such a kind is understandable as significant only as a factor of the other possible contextual mediations that it

> excludes: culture, in other words, forms a structural network of contextual differences. The "given" context, then, is a product of its insertion into a theoretically limitless field of possible cultural mediations, which can be called the global culture as opposed to the particular or local cultures that constitute it (and from which it has no separate existence).
>
> (Chambers, 1996: 147)

Cultural pluralism, therefore, is a notion reflecting the diversity of interactions which form our frames of references and which, as a result, inform our interpretations of reality. Culture, in this sense, is irreducible to language, nation or any other feature, and, as we argue in this study, demands from teachers a more complex understanding of the motivations and perceptions informing students' approach to learning activities.

1.10 Scope and Limitations

The population for this study involved three groups of students ranging in ages from 14 to 16 years of age. In this study, the special focus is on investigating ways to improve learning conditions that could support learning and assessment of that learning.

The premise of this study is that students can interpret and communicate their own constructions of reality and yet it may be difficult for students to do so because of the limitations in current assessment processes which are placed on them.

This study explores the theories of learning and assessment in an attempt to link learning and assessment where learning comes first. The challenge for educators is to devise better learning environments to support the process of learning and assessment of that learning and suggest ways to help students develop their own assessment of learning outcomes through a process of consolidation, reflection and revision.

1.11 Outline of this study

Chapter One outlines the background to the study and identifies the various components of the problem to be studied.

Chapter Two covers the theoretical and empirical literature relating to the significant areas of the study. Central issues concern the philosophical basis of assessment and the culture of the education system.

Chapter Three discusses the research design and methodology employed in this study.

Chapter Four analyses the data to discover the correlations of learning and assessment. The results are then discussed with reference to the hypotheses and relevant learning theories.

Chapter Five discusses conclusions which can be drawn from the study and some tentative implications are outlined.

Chapter Six provides a summary of the study and its implications for future research.

The Bibliography follows Chapter Six. Finally, the appendices, which follow the Bibliography, provide the development of the framework employed in the study.

Chapter 2 – Review of Literature

2.0 Introduction – Overview of Assessment

First, what is assessment? What does it mean to assess someone? The root of the term 'assessment' is *assidere*, which is also the root of the French *asseoir*, to seat or set. It was first used in the sense of setting the value of property to apportion a tax. Assessment requires time, as well as interaction between the assessor and the person or property being assessed, so that the congruence of perception with reality or, in education, the congruence between underlying mental processes and surface observation, can be verified. The idea here is that the product is not sufficient evidence of the quality of the thinking processes that produced it. So in educational terms what does it mean? Grant Wiggins (1994) on the etymology of the words 'test' and 'assessment' provides some interesting insights. The original *testum* was an earthenware pot that was used as a colander to separate gold from the surrounding ore. The term was later extended to the notion of determining the worth of a product or of a person's effort. The key notion here is that a test measures knowledge or ability after the fact, with the assumption that the product of learning will contain in itself all of the information that the evaluator needs to know about the students and the quality of their thinking processes.

2.1 Assessment and Learning

There exist three tenets of understanding when discussing learning and assessment. One is the obvious discussion of the reality of assessment. In reality, assessment influences what is learned. That is to say, a body of thought (*product*) that is internally consistent and is composed of responses made to questions raised in (the *process* of) assessment. Such process is monological and students are assessed on established truths, according to experts in such truths. It is the belief of the researcher that viewed this way, the *product* of education therefore is the continuance of students by which and through which society perceives advancement. In other words, education or rather assessment is about comparisons; how far above or below does the student's score fall. By way of illustration, the widely held assumption is that the '*bell shaped curve'* not only identifies and examines the criteria that guide policy and

practice in education, it also assesses and affirms such policies and practices which seek to compare students from different year levels or age groups by standardizing scores to ensure that subjects are given the same weight when banding or streaming students. Whilst standardized tests often can be effective for assessment of achievement in that "they can inform the critically important school improvement decisions that are made at district, state, and federal levels", (Stiggins 2002: 1) the primary goal of standardized assessment however, is to measure the extent of students' learning for accountability and comparison purposes (Sanchez & Ice 2005). The assumption, here, ignores reasoning or justification; for the students' motivation and sense of achievement need not be anteceded by assessment in the interest of accountability. Another tenet is a discussion of assessment in the interests of the student being able to function in the twenty first century. Hence, given a theory of humanity that holds that children by their nature are curious, we might well favour assessment in the interest of the student to understand, make it logical, real and just rather than organized in ways that are completely antagonistic to how learning occurs. Thirdly, and less obvious, is the convergence of these two ideals as a singular method of action. The concept of a system of assessment, which considers both the process of learning and the product then, is a model that provides educators with a framework that supports discovery learning and offers a more inclusive picture of what students understand, apply and use. Instead of a snapshot of the students' product, there is a comprehensive picture of the students' process of learning as well as the product of that process. Whilst educational institutions and educators stress that important decisions should not be made on the basis of snapshot assessment results, many educators at local, state, and national levels seem determined to violate this principal.

2.2. Overview of Learning

This *Review of Literature* will examine the principals behind learning theories and exploratory learning environments as a more inclusive approach to support students in their attempts to understand their own reality. Rather than an action that limits students to constructing a specific vision of reality, this review discusses the relationship of learning in relation to exploratory learning environments and the relationship of assessment and learning in such environments. Then this research

summarily will probe the correlation between learning and assessment as they converge into methodology for assessing learning. To begin with the theoretical precepts behind *Educational Theories* specifically put forth by John Dewey, Thomas Aquinas, Plato, Aristotle, Jean-Jacques Rousseau, B. F Skinner, Jerome Bruner, Jean Piaget, Lev Vygotsky, Paulo Freire, Immanuel Kant, Abraham Maslow and Carl Rogers will be reviewed and discussed. This study will then look at how concepts of knowledge have been used in assessment. Finally this chapter will summarise how perspectives garnered from Rousseau, Dewey, Piaget, Vygotsky, and Freire can be harnessed to create an Exploratory Learning Environment that enhances the relationship between learning and assessment.

2.3 Educational Theories

Educational theories and their relationship to learning are necessary to provide a framework for understanding assessment. Theory construction implies the development of conceptual frameworks that take into account the contributions of earlier theories. Using this premise, educational philosophies tend towards eight major precepts of theoretical research: Humanism, Behaviourism, Cognitivism, Essentialism, Perennialism, Progressivism, Constructivism and Postmodernism (Reconstruction or Critical Pedagogy).

- *Humanism* contends that humans are innately good; born free but become enslaved by institutions. Humanists believe that how a person feels about learning is as important as how the person thinks or behaves.
- *Behaviourism* deals with the student adapting to the environment and learning is a relatively permanent change due to the experience. Contemporary behaviourists view the *environment* as the key to learning. Human nature, according to behaviourism, is neither good nor bad, but merely the product of one's environment.
- *Cognitivism* is a learning theory that is based on thought processes behind behaviour. In other words, the focus is more on the student as an active participant in the learning process.
- *Essentialism* stresses the basics of life. It focuses on fundamental knowledge and skills. Basic subjects, such as mathematics, natural science, history

foreign languages and literature are taught. Everyone needs to be taught what is wrong and what is right

- *Perennialist* theories seek to help students discover those ideas most insightful and timeless in understanding the human experience.
- *Progressivism* provides an approach, which is more student-centered, and that learning is entrenched in answering questions developed by the student.
- *Constructivism* is the idea that the environment needs to be highly adaptive to the student. In constructivism *knowledge* is seen as *relativistic* (nothing is absolute but varies according to time and space) and *fallibilist* (nothing can be taken for granted).
- *Postmodernism or Reconstruction* is the idea that learning results from an emphasis on criticism rather than evaluation with a focus on constantly rethinking and deconstructing beliefs, resources and values to reveal strategies used to represent truth claims in texts.

2.3.1 Humanism

Humanism is the naturalistic philosophy or way of life centred on human concerns and values that asserts the dignity and worth of humans and their capacity for self-actualization through the use of reason and scientific inquiry; "learning how to learn rather than absorb fact" (Tuckman, 1992: 224). However, it can be argued that is more a concept for curriculum development rather than a movement of philosophy of learning by empowering students to actualize their human potentials. Humanism displaced Scholasticism, which is the study of Scholastic philosophy and the use of philosophical knowledge in explaining and defending the truths of faith as distinguishing features of Middle Ages rhetoric. As the principal philosophy of Western Europe, Renaissance Humanism deprived church leaders of the monopoly on learning that they had previously held, especially the notion of what constituted knowledge and how it should be tested for one to be able to join the ranks of those privileged scholars. Humanism generally is associated with beliefs about freedom and autonomy and notions that "human beings are capable of making significant personal choices within the constraints imposed by heredity, personal history, and environment" (Elias & Merriam, 1980: 118). Humanists believe the whole person,

not just the intellect, is engaged in the growth and development, thus these are the signs of real learning.

This educational approach is rooted in the writings of Jean-Jacques Rousseau (1712-1778), who believed that the child entered the world not as a blank slate but with certain innate qualities and tendencies. Rousseau also brought up the idea of one to one teaching and with hands on experience, which he believed was the best way for the students to learn. He believed that there was little for the teacher to do other than stand aside and observe. For Rousseau, the learning environment was as important as the aim of education. He believed educators should create opportunities for new experiences and reflection for students as "the power of the environment in determining the success of educational encounters, is crucial (a view Dewey shared) and a more effective [means of] education" (Darling, 1994: 16). In his novel *Emile,* Rousseau outlined the natural tendency for people to learn, and which will flourish if nourishing, encouraging environments are provided. Hence, his educational goal was to maximise human potential rather than restrict it. In other words, Rousseau considered learning environments to be places in which natural growth could take place and the facilitator "must accomplish their mission of educating, albeit in such a way that your pupil always believes himself to be the master, whereas it is always you who are" (Rousseau, vol. 4 1969: 362). Furthermore, Rousseau's understanding of assessing learning was by observations: "early judgments must be formed not through words or abstractions but through sensations and feelings" (Rousseau, *ibid.*)

In the twentieth century, humanism has taken on a number of different, often conflicting, meanings. In the works of the pragmatist philosopher Ferdinand Schiller (1864-1937) humanism is seen as that philosophical understanding which stems from human activity. Patterson (1973: 22) has stated, that "the purpose of education is to develop self-actualizing persons". According to Valett (1977: 12), humanistic education is a lifelong process, the purpose of which "is to develop individuals who will be able to live joyous, humane, and meaningful lives". Essential characteristics of the humanistic educator are empathic understanding, respect or acceptance, and genuineness or authenticity (Patterson, 1973; Rogers, 1983). These ideals of self-directedness and personal authenticity have become the linchpins of humanism.

While many individuals have made important contributions to humanistic education, two of the most noteworthy contributors are Abraham Maslow and Carl Rogers.

Maslow (1970) discussed the concept of "self-actualization", which he described as "the full use and exploitation of talents, capacities, potentialities" (Maslow 1970: 150). However if students' needs are not met, then "children have this potential taken from them" (Hoffman, 1988: 296). This is supported by Rogers (1983) who emphasized the process of learning as a function which may hold constructive, tentative, changing processes which exist in the relationship between the facilitator and the student (Rogers, 1983: 105). The first of these attitudinal qualities is 'realness' in the system, yet the faceless embodiment of assessment challenges the present system of assessment of learning in that it fails to support students in their attempt to understand and make meaning. Even if there is a relationship between the facilitator and the student, a relationship between assessment and learning is nonetheless void, due to students' apathy, undisciplined efforts to progress and often a dislike of the nature of assessment, which fails to acknowledge their learning journey.

Rogers, like Maslow, believed that self-direction the "means that one chooses - and then learns from the consequences' (Rogers, 1961: 171) enables the student to develop the real self. Rogers believed that the real self emerged from a process of freeing a person and removing obstacles so that normal growth and development could proceed and the student can become an independent and self-directed individual. However, if the process of assessment is only concerned with the end 'product' then the student will develop an ideal self. In other words, the real self according to Rogers includes the following qualities: openness to experience one's perception of one's experiences in the world and being able to accept one's reality and one's feelings. In other words, the student is free to make choices and take responsibility for those choices. The aim of education and purpose of assessment should be to create conditions that facilitate learning, empowering students with a sense of achievement and success. According to Maslow it is more important how to learn, rather than absorb facts (Marshall & Tucker, 1992: 224).

It is suggested here that in order to prepare students for the real world, learning is more about the process of learning itself, a continuing openness to experience and process of change. In terms of realness, Rogers (1983) understood the difficulties in achieving this if facilitators were too judgmental and evaluative of student learning. In other words, Rogers (1983: 105-106) stated that learning rests upon certain attitudinal qualities which exist in the personal relationship between the facilitator and the student". Further Rogers found that the politics of education and educational institutions were an important determinant in the success or failure of the motivation and development of the '*ideal self*', '*what*' to think rather than '*how*' to think, the '*real self*'. When learning is threatening to the self (e.g. tests, assessment, poor grades) the students block out the situation altogether. Hence, the *ideal self* atones by perceptual distortion through reinterpreting the situation to appear less threatening. Subsequently, the constructed reality of it could be true, and then maybe it really was true. In other words, students assume the grade is better than it really is. In so doing, the student is putting a greater distance between the real and ideal: reality and illusion. In light of these philosophic understandings, it can be summarized thus: humanistic educators urge their students to pursue neither ultimate truths nor self-realizations but to constantly choose, form and create their realities by enlarging their sense of freedom and responsibility from the meanings, values and events that constitute the reality of their lives; or as Rousseau states a "well regulated freedom (how to think) provides the only valid basis and aim of a sound education" (Edwards, 1967: 221).

2.3.2 Behaviourism

For many years educationists believed that learning was through repetition until students 'learned' the information. In other words, the emphasis was on 'what to think'. This perspective from Behavioural learning theories asserts that all behaviour can be explained as response to stimuli. Learning is not doing; it is changing what we do. In other words, behaviourists like John B. Watson (1878 -1958) who was the principal originator of behaviouristic psychology and B. F. Skinner (1904 -1990), its best known promoter, focused on the students' efforts to accumulate knowledge of the natural world and the educator to transmit it. As knowledge in the educational context relies on transmission, learning is passive and controlled by the instructor. It

can be argued that behaviourism is synonymous with objectivism in which the specific vision of reality is limited to the idea that there is a fixed world of knowledge that students must come to memorise and be assessed on what they produce or reproduce.

Behaviourism then is heavily dependent on textbooks and the educator acts as the pipeline for transfer. This process perceives learning to be an assimilation of objective reality. For example, students have knowledge interpreted for them and are then expected to replicate its composition into their thinking. As Susan Hanley (1994: 3) states, the goal of the student is to regurgitate the accepted explanation or methodology expostulated by the teacher. Furthermore, in the Behaviourists' view the only way to keep pace with ever-increasing technology is to focus on basic skills that are needed to manage this technology. In other words, students need to be instructed in how to use tools such as language, which encodes reality by using grammar and vocabulary and, according to Jerome Bruner (1983: 132), increases the students' knowledge and their capacity to learn. Thus, language is the key to knowledge, as it mirrors a reflection of reality. Students construct new ideas or concepts based upon their current/past knowledge. Nonetheless, this condition is subject to the nature and pacing of rewards and punishments, which Bruner believed encourage a predisposition to learning by the student.

Behaviourists, therefore, believe anything can be taught to anyone at any age, the important factor is how it is taught. This meant behaviourists would use a reward and punishment method as a means of controlling behaviour in the classroom, because they believe that all behaviour can be controlled and that learning itself is a form of behaviour modification. For this reason, it may be suggested that behaviourist thinking was responsible for the grade system. Why else would there be grades in school if they did not modify the behaviour of the students? As Bruner (1983) states the "reward and excitement perpetuates the student to learn even more" (Bruner 1983: 135). It can be argued that the purpose of assessment was for mere rewards. Consequently, the shift towards Education Evaluation, Measurement, and Testing gained emphasis, as has the accountability movement in education because of this shared belief of 'controlled motivation'. Conversely, Bruner (1962) argues, "the present system of rewards and punishments as seen by [student]s in school actually

tends to inhibit the use of intuitive thinking (Bruner 1962: 66)". Assessment requires students to assimilate knowledge; it does not require them to create and construct their own understanding of the real world.

Contemporary behaviourists, however, have shifted their focus from viewing the environment as modifying behaviour to an understanding of the environment as the key to learning. Bruner, who can also be classified as a cognitivist and constructivist or as an evolutionary step between these three theories of learning (behaviourism, cognitivism and constructivism), believed that experiences should be designed that will help the student interact with their environment to explore and ask questions. In Bruner's view there should be new ways for students to analyse their environments (Bruner, 1986: 138) and challenge perceptions, myths and illusions, that take away the opportunity to understand and make meaning. All behaviour is learned; therefore, the next logical step to improve learning is to construct an environment in which the probability of reinforcing appropriate behaviour is maximized. In this way, behaviourists shift the focus of education to motivation of the student. Learning is not doing; it is changing what we do. In *Toward a Theory of Instruction,* Bruner (1966) advocated discovery learning. For example, rather than telling students how logic circuit works, a teacher might allow students to use a simulation that lets them discover the rules themselves.

B. F. Skinner believed that behaviours were controlled by more than the result of the action instead of the events that followed the behaviour. So once order was discovered, it could be put to the useful purpose of improving the human condition. His basic premise was that the environments of the individual; "a person does not act upon the world, the world acts upon him" (Skinner 1976) - the stimulus conditions - were the ultimate controllers of an individual's behaviour. Hence, he believed in "designing better environments that would solve existing problems by changing and reshaping behaviour" (Skinner, 1990: 1210) because students will attempt to avoid experiences and stimuli that are not pleasing and will seek experiences that are pleasing and rewarding.

Behaviourists also believe that discovery learning is important, but only when it is organised in a spiral manner. In other words, each new idea builds on what was

previously learnt. For the behaviourists discovery learning is most successful when students have prerequisite knowledge and undergo some structured experiences (Roblyer, Edwards, & Havriluk, 1997: 68). Thus to instruct someone in these disciplines is not a matter of getting them to commit results to mind, rather, it is to teach the student to participate in the process that makes possible the establishment of knowledge. According to Bruner (1966: 72) learning is not about teaching a subject to produce little living libraries on that subject, but rather to get students to think for themselves, to consider matters, to take part in the process of knowledge-getting. Knowing is a process not a product: active not passive. Nevertheless, the position of behaviourists presents the student as an endlessly malleable social product. As Schulam and Keisler (1966:155) state, it is more likely that expectancies of goal attainment guide the growth of motives of students rather than the other way round. Hence, the behaviourist paradigm values tasks and skills to be mastered: what to think (a specific vision of reality) in preference to what is relevant to students in understanding their own reality: how to think. "This is what Harvard calls taming unruly reality…taking time to work out the answers expected by the examiners" (Saul, 1992: 129).

2.3.3 Cognitivism

Behaviourist theory was countered by Cognitivism or more a reaction to the behaviourist theory because it was believed to be too simplistic. The stimulus-response view was considered too simple to explain such behaviours as communication and language. Furthermore, students do not always behave in certain ways because of rewards or punishments. Thus, Jerome Bruner, believing learning is dependent on how information is structured, organised and conceptualised, proposed a cognitive learning model that emphasized the acquisition, organization (structure), understanding and transfer of knowledge, focusing on 'how' to learn, rather than 'what' to learn. He purported that stimulus input received is actively perceived and interpreted in an organized fashion, using expectations developed from prior experiences. Bruner's learning theory assumes that students interpret external events as they are encountered, and incorporate them into their own cognitive schemata.

This notion of schemata was advanced further in the 1960s, as discontent with the inadequacies of behaviourism grew, resulting in another school of thought. As the

behaviourists' perspective could not easily explain why students attempt to organise and make sense of the information they learn, Albert Bandura's (1977: 27) major premise was that students learn by observing others. According to Bandura (1991) cognitive points of reference are formed in students' social relationships, which regulate their performance under changing circumstances. Thus, cognitivists believe that there is more to learning than simple question and answer. Furthermore, they were interested not only in the results that learning produces, but in the thought processes along the way. For example, facilitators provide students with challenging tasks and expect them to make informed decisions about how to solve the problems. The emphasis was more on the communication or transfer of knowledge to the student. Thus, it can be argued that this model too, does not allow for thinking and compares students to computers, in that they take in information, organise it, store it and then retrieve when necessary.

Cognitivism developed around the late 1950s at a time when technology was advancing rapidly and the need to find alternate ways of processing information. Hence, the cognitive school focused on knowledge viewed as symbolic mental constructs in the students' mind and the learning process is the means by which these symbolic representations are committed to memory. In other words, a method of processing information that is given and absolute. Robert Gagne, whose theories shifted from behaviourist to cognitivist equated learning to that of information processing: learning occurs progressively, and it does so by way of a 'learning hierarchy'. In learning new material, the student will draw on previously learned capabilities to acquire it. In other words, Gagne believed that learning conditions both external and internal are in turn dependent on what is being learnt. Thus, Gagne speculated on how these conditions could be applied to the design of single lessons, of courses and entire systems of instruction. (Gagne & Briggs, 1974: 14) Cognitivism views knowledge as abstract symbolic representations in the mind of the student, but does not provide opportunities for the students to explain why and how these representations may be relevant to them as individuals.

2.3.4 Essentialism

Essentialism is somewhat similar to behaviourism, in that 'what to think' is valued. For example, there is a common core of information and skills that students must

attain, and schools should be organized to transmit this core of essential material. Thus, the educational goal of essentialists is to transmit one's cultural heritage and develop students into good citizens. In other words, essentialists believe that the purpose of education is to pass on a body of knowledge (both factual and cultural) to students. This view of education has been very influential in shaping current education policy. For example knowledge acquisition therefore, is paramount. Students are required to master a body of information which is tested. Such test items are designed to 'represent competence' by extracting knowledge and skills from their real-life contexts. These tests must be kept under lock and key so students do not have knowledge about or access to them ahead of time. Thus, traditional tests may seek to improve student performance in a general way via the washback effect; they will study in a particular way in the hope that this will improve their test performance. Tests are often perceived as exerting a conservative force which impedes progress. As Andrews and Fullilove (1994) point out, "not only have many tests failed to change, but they have continued to exert a powerful negative washback effect on teaching" (Andrews et al., *op. cit.*: 57). These authors also note that "educationalists often decry the 'negative' washback effects of examinations and regard washback as an impediment to educational reform or innovation in schools" (Andrews et al*., op. cit.*: 59-60). As Heyneman (1987) has commented, "it is true that teachers teach to an examination. National officials have three choices with regard to this 'backwash effect': they can fight it, ignore it, or use it" (p. 260; as cited in Andrews, 1994a: 51). However, there is virtually no way that students can "learn by doing" while taking a traditional test in the way that they learn while engaging in a performance-based or ongoing assessment. Traditional tests can not be beaten when it comes to reliability as there is little chance that the scores on a test will vary even if the students takes two parallel versions of the same test. This means that traditional tests lend themselves to a wide range of statistical analyses and comparisons, hence the influence this theory has had in shaping education, particularly when performance-based or ongoing assessments tend to be ill-structured, open-ended and complex. According to Gardner (1999) these traditional tests usually test for linguistic and mathematical skills, both of which will lead to success through school, however the question remains that traditional tests do not identify how skilled a particular person may be in cognitive tasks that require skills

such as creativity, interpersonal skills, or insight. Hence, this philosophy is grounded in a conservative approach that accepts the social, political and economic structure of society.

Aristotle (384-322 B.C.) believed that the goal of the state was to educate with a view to preserving its own institutions. Learning never represents an interpersonal relationship but rather a disciplined inquiry about some aspect of reality and that reality, knowledge and value exist independently of the human mind. For E.D. Hirsch (1996: 19) knowledge was 'intellectual capital'. Therefore to meet the demand perceived, the more knowledge (capital) the student had the more they could acquire. Hirsch defends the cause for essentialism because he believes that progressive education was a failure. He disagreed with Dewey's idea that "the vocational department is on exactly the same level as the academic, and the school takes the wholesome attitude that the boy who intends to be a carpenter or painter needs to stay in school just as many years as the boy who is going to college" (Dewey, 1915: 262). Hirsch claimed that this view led to the elimination of many academic subjects on the ground that they would not be useful in life, and to substitution of trivial, recreational and vocational subjects alleged to be of more practical value. He stated further that the emphasis on hands-on learning and critical thinking skills should be replaced with a core, common curriculum that focused on a specific share body of knowledge (Hirsch 1996, 29: 1) a 'Back to Basics' approach, hence, the importance of a *product* 'what to think' instead of 'how to think' *process.*

Despite William Bagley's (1934) belief that "gripping and enduring interests frequently grow out of initial learning efforts that are not appealing and attractive", Essentialist assessment of learning does not promote independent thought or independent actions, but rather conformity and control of the masses. Students therefore, are not able to construct their own view of reality, instead they are accepting of the contrived vision of reality: what is predetermined or already known: content and outcomes. Whilst Dewey's 'progressive' educators were encouraging 'how to think', the Essentialists, were testing memory: 'what to think', as indicators for progress reflecting the principals of the assembly line – creating second-class citizens to fill a multitude of inhumane and degrading jobs (Emery, 1981: 374).

While the progressives were trying to create an individualized classroom where the students could develop and become autonomous, the essentialists were hoping to improve instruction by grouping children according to mental ability, evidenced by standardized assessment. While the progressives saw in the child-centered classroom the hope for social change, and a relationship between assessment and learning, the essentialists developed uniform curriculum content in the hope for social stability, and assessment and learning with no connectedness.

2.3.5 Perennialism

Perennialism is a theory of education in which ideas are the focus for promoting learning. The term '*perennialism*' may be defined as 'everlasting' and the perennialist seeks everlasting truths. The foundations of perennialism lie in the philosophy of Plato who considered ideas to be the only true reality. It is not that he rejected the material world, but rather, believed that the material world is characterized by constant change and uncertainty, whereas ideas endure throughout time. Plato's view also considered the environment was critical for learning: "close direction of the child's educational environment…is necessary to counteract those pressures that threaten their propensity for reason" (Palmer, 2001: 12). Other perennialists such as Aristotle first used logic as the basis for modern scientific inquiry and were also responsible for the idea of dividing knowledge into separate fields of learning, in other words decontextualizing and simplifying knowledge for learning. Dewey (1938: 77) argued against this separation of ideas into subject matter on the grounds that it "had to do with the past…and education should derive its materials from the present experience to enable the student to cope better". Whilst the student draws on his past memory, the achievements of the past only help students understand better their present reality.

Perennialism was propounded by Mortimer Adler who regarded this theory as an alternative to essentialism because it encouraged students how to think and how to pursue truth (Adler, 1971: 75). Accordingly students are immersed in the study of profound and enduring ideas rather than undue reliance on textbooks, which according to Adler have probably done as much to denigrate a sense of reality as any single force. In his view, Great Books are the classics that have withstood the test of time, as distinct from textbooks and books without lasting significance (Adler

1982:18). However, perennialists hold similar beliefs to essentialists in that they believe that early schooling is best directed towards preparing children for maturity, and they emphasize the importance of fundamental skills. Moreover, their learning environments mirror essentialists, in that student interests or experiences are ignored. In other words, teachers dictate what is taught, and in the words of George Kneller (1963: 95), "education should seek to adjust the individual, not to the world as such, but to what is true". In other words, it helps students think rationally (Ornstein et al. 1993: 62), not critically. This idea of imparting knowledge via the teacher is a restrictive view and does not acknowledge the active part the students play in understanding social reality or seeking it to change that reality to something better.

Don Tapscott in his book *Growing up with Digital: The Rise of the Net Generation* argues that students are no longer satisfied with being passive recipients of 'banking' teaching processes, rather they want to discover reality for themselves by becoming interactive with the learning (Tapscott, 1998: 127). Thus it can be argued that perennialism limits students to why things work so that the only specific vision of reality for students is interpretation of concepts and an explanation of why these concepts are meaningful to them. Accordingly, perennialists believe they prepare students for life rather than life long learning; the focus on 'what' should be learned rather than 'how' to learn. With either the essentialist or perennialist approach, teachers have the power to choose the curriculum, organize the school day, and construct classroom activities. There is little opportunity for self-directed or any individualized learning. Perennialists, for example, encouraged homogeneity (or streaming by another name), as it was self evident to them, that subjects that require maturity cannot be taught to the immature. Despite the Perennialists' curriculum having a liberal approach, especially in developing reasoning skills, it does however focus more on the classics believing all knowledge of topics is in the Great Books. Therefore, "education should seek to adjust the individual, not to the world as such, but to what is true. Knowledge is truth. The truth is everywhere the same" (Kneller, *op. cit.:* 95). Hence learning is the same for everyone. Learning should have no vocational aim. Just as Plato believed education was for those with natural ability (to think and reason), so do perennialists, who as Hutchins (1968: 262) states, group children according to standardized tests as a means of perpetuating social stratas,

poverty and racial discrimination. "The lack of 'ability' among the poor is a consequence of conditions under which they were brought up. The school cannot compete with or remedy these conditions" (Hutchins 1968: 18). Consequently, the perennialists' curriculum reinforces a predominantly Western heritage believing that "Great books are the classics that have withstood the test of time, as distinct from text books and books without lasting significance" (Adler, 1982: 18). Students, in this system, are perceived as merely vessels to be filled and disciplined in the proven strategies of the 'old world'. In other words, they learn unchanging principals of past realities, with no opportunity to challenge and contest these against their own realities. Yet books are merely tools of learning not a source of indisputable knowledge. Hence learning is merely an adjustment to the truths taught through these books.

2.3.6 Progressivism

Progressivism is an educational theory that emphasizes a student-centered approach based on the notion that learning is most meaningful when it is done through hands-on experiences and in an environment that is non-authoritarian. Progressivism is a contemporary American educational theory and from its establishment in the mid-1920s through the mid-1950s, progressivism was the most influential educational view in America.

Originally, an American philosopher, Charles S. Peirce (1839-1914), founded the philosophical system called *pragmatism* and believed that the meaning and value of ideas could be found only in their practical results. Pragmatism was carried much further by John Dewey (1859-1952) and he insisted that ideas must always be tested by experimentation. Dewey's philosophical pragmatism has links to constructivism as his philosophy suggests that education begins with the curiosity of the students and by situating them in a genuine situation of experiences, students can explore, think, reflect and interact with the environment. This became the basis for what was described as progressive education and a way to close the gap between scientific knowledge and other ways of knowing. Believing that people learn best when it is relevant, Progressivists centre learning on experiences and interests of the student who learn by doing as "book learning, according to Dewey was not a substitute for actually doing things" (Dewey, 1916: 18). Fundamental to Dewey's epistemology is

that knowledge is acquired and expanded as students apply previous knowledge to solving new and meaningful things. Hence, Dewey brought critical thinking into the foreground of learning with his scientific approach. In *Democracy and Education*, Dewey is clear in his argument that method is not separable from subject matter. For him, method, or structure, is structure for a purpose: "method means that arrangement of subject matter which makes it most effective in use….never is method something outside of the material" (Dewey, *op. cit.*: 172). Dewey clearly states, "the subject matter of the student is not . . . identical with the formulated, the crystallized, and systematized subject matter of the adult" (Dewey, *op. cit.*: 190). In other words, he believed that to teach well, the teacher must connect the subject matter to the needs, desires, interests, stage of cognitive development, of the student, within the physical, social, and political context that the students and teachers find themselves. Furthermore, he suggested that the environment facilitates learning.

Dewey's reasoning for a democratic learning environment was a criticism of the manipulation by the new urban industrialised order, which served to alienate students by sorting and selecting according to assessment of presumed ability and isolating subjects rather than uniting them around students' experience and culture. Education, he believed, could not admit the domination of single interests or privileged perspectives, rather it should enable "individual students a personal interest in the societal processes which organises their life, as well as control over their destiny" (Dewey, 1916). Thus, this mechanical structure of learning is only relevant to the perceptions of economic socialism. Dewey, however, believed that "education is not a means to living but is identical with the operation of living a life which is fruitful and inherently significant…and the absence of a social environment in connection with learning is a need, otherwise this isolation renders school knowledge inapplicable to life" (Dewey, *op. cit.*: 359). In other words, Dewey believed that education should be tested by experiments and that learning is rooted in questions developed by students in familiar settings: "by understanding his/[her] own environment a student is laying the foundations for their own control of the environment" (Dewey, *op. cit.*: 102). His progressive style also emphasises the need for schools to prepare students for change. By adapting to change students gain "true human wisdom from the immediate environment, thus formed by having to do with

uncompromising realities and hence adapting to future situations" (Dewey, *op. cit.*: 63).

Learning, according to Dewey is a construction and reorganisation of meaningful experiences and he made it clear that teachers help link students' interests to experiences. The belief that all education comes through experience does not mean all experiences are genuinely educational; the issue, as Dewey (1963: 26) states, is the quality of the experience that influences later experiences as they promote having desirable future experiences. Learning in other words, is educational experiments in the genuine etymological sense of experiment, that is, to make a trial of something. Theories and practices are developed, tested, criticized, refined and tried again. Experimentalism became increasingly important as Dewey's ideals on learning evolved. For him, not only were educational experiments falsifiable, but in a contingent evolving world, their generalisability was always subject to revision. There is no end of inquiry for Dewey; nonetheless, he believed the best way to render human experience was to facilitate experiences; 'experiential continuum' a development within, by, and for the experience (Dewey, *op. cit.*: 28). Furthermore, freedom for the student in the classroom was not an end in itself. In other words, as we alter our relationship with our environment, we ourselves are made different by practice and experience and every belief should be evaluated to establish reality. With a paradigm shift toward more interactive learning, these progressivists' views highlight the importance of situational learning which supports students discovering their place in the world.

2.3.7 Constructivism

Constructivism is a philosophy about learning that proposes students build their own understanding of new ideas. Constructivism represents a paradigm shift from education based on behaviourism to education based on cognitive theory. Learning is not a linear process and in trying to make meaning students use both prior experiences and understanding gained from new explorations to construct their own understanding of the world they live in. The work of John Dewey provides historical precedents for constructivist learning theory as Dewey felt that students construct their own knowledge on the basis of interaction with their environment. Dewey

theoretical principals are based on a belief that the student's experience must form the basis of the school curriculum. He believed that subject matter should not be learned in isolation, maintaining the importance of acquainting students and teachers with the conditions of the local community (physical, historical, economic and occupational) in order to utilize them as educational resources. Dewey believed that the main aim of education was the preparation of individuals to participate in social change. Thus, students were actively participating in the learning process, rather than simply assimilating information (Dewey, 1938). Jean Piaget and Lev Vygotsky, early constructivists, believed that students constructed their own knowledge, and in so doing decided what they were capable of learning as they came to understand the world around them. Thus, it is assumed students are more critical and creative in their ability to construct their own view of reality. Constructivists provide an environment that encourages critical thinking and students should be given the opportunity to construct their own frames of thought and develop their own version of reality. However, they recognise that this view of reality is for the most part determined by the socio-historical environment. In other words, a world that is perceived real because it is structured and that structure can be modelled for the student. Hence, learning is the active framing of personal meaning rather than the framing of someone else's meaning.

More than thirty years ago, Bruner called this concept, "guided discovery", and it emphasized the 'production' of new knowledge. The approach invited students to think, to go beyond the given information and then discover the information for themselves. Discovery learning takes place most notably in problem solving situations where students draw on their own experience and prior knowledge to discover the truths that are to be understood. Bruner advocated that if students were allowed to pursue concepts on their own they would gain a better understanding in an environment that promoted 'how to think'. Bruner wrote "emphasis on discovery in learning has precisely the effect on the student of leading him/[her] to be a constructionist, to organize what he/she is encountering in a manner not only designed to discover regularity and relatedness, but also to avoid the kind of information drift that fails to keep account of the uses to which information might have to be put" (Bruner, 1961: 22). However, in his more recent work Bruner

expanded his theoretical framework to include aspects of learning that suggests students learn best when their facilitator leads them to discovering information "encourage students to discover on their own … we want to give them…. a proper confidence in their ability to operate independently. There is also some need for the children to pause and review in order to recognise the connections within what they have learned - the kind of internal discovery that is probably of the highest value" (Bruner, 1966: 96), particularly when students are on their own and in supportive environments: "where students are allowed to discover knowledge on their own" (Milner, 1991: 464).

Discovery learning and providing environments that stimulate the interests of the student are two primary methods of encouraging students to *construct*, *compare,* and *contest* (Lian A.P. 2000). Piaget (1929) states that it is assumed that students have to construct their own knowledge, individually and collectively: "what the child learns by himself, what none can teach him and what he must discover alone" (Piaget, 1963: 129-130). Students, Piaget noted, have a toolkit of conceptions and skills with which they construct knowledge to solve problems presented by the environment. The role of the community, other students and teacher, is to provide the setting, pose the challenges and offer the support that will encourage natural learning. Hence, this learning supports interaction with the environment over time. If Piaget's natural development theory is right then it is only logical that learning be situated in an environment that enables "the child to learn by himself, what none can teach him and what he must discover alone" (Egan on Piaget, 1983: 62). Piaget defended this theory by stating that students' failure to learn can be apportioned to teachers who do not understand what structures are needed to provide appropriate learning conditions.

Research into constructivism is often not constructive in itself. Constructivists generally believe that knowledge is not discovered and that the ideas teachers teach do not correspond to reality. In the constructivist paradigm, learning emphasises the process and not the product, however assessment practices centre on the students' ability to accumulate knowledge transmitted by the teacher. The role of assessment then is to assess the accepted explanation, being the product espoused by teachers. This tension repudiates the aims of *The Adelaide Declaration on National Goals for Schooling in the Twenty-First Century* (1999), which is constructivist in its

pedagogical aims: students should "have the capacity to analyse, problem solve and communicate ideas and information", yet assessment of a product, rather than the process is the focus (truth is defined as an observable fact) in that all students "should have attained high standards of knowledge through a comprehensive curriculum". From a constructivist perspective, learning is not a stimulus-response phenomenon and furthermore the conceptual worlds of students could be very different from educators or those intended by educators.

There are also those, particularly the 'Back to the Basics' advocates who argue that constructivism does not provide a model for teaching: radical constructivists, such as Ernst von Glaserfeld (1995: 3-16) are of the opinion that cognition serves to organize the students' experiential world, rather than to discover the ontological reality: the role of the teacher is not to dispense knowledge but rather provide students with opportunities and incentives to construct and reflect on their own construction of reality (von Glaserfeld 1996). Others claim that discovery learning or exploratory learning environments show that the theory can effectively guide educational practice by supporting students to function in the real world; Lave (1990) taking the realist position viewed cognition as a process by which students eventually construct mental schema that correspond to the environment. Herrington and Oliver, (1995) refined their Constructivist's model on the belief that useable knowledge is best gained in learning environments that enable contexts that allow for the natural complexity of the real world, in other words, the process of learning in contexts that reflect the way knowledge will be useful in real life. Understanding the relationship between learning and assessment in a constructivist learning environment would be to grasp how theory impacts on practice, especially when an awareness of the social construction of knowledge suggests a pedagogical emphasis on discussion, collaboration and negotiation and shared meanings (von Glaserfeld 1996: 485) then assessment should do the same. In other words, students interpret and construct a reality based on experiences and interactions with their environment, rather than thinking of *truth* in terms of a match to someone else's reality. Thus assessment is interwoven with teaching and learning. Exploration, problem-solving, higher order thinking and meaningful understanding encourage students to become independent students.

Socrates is not generally associated with constructivist philosophy yet his approach of probing, inquiring about and exploring phenomena until they become meaningful, consisted of leading students through a series of questions in order to promote critical thinking that was useful in understanding the real world. For example, in the application of the 'dialectical' method two processes are distinguishable: the destructive process, by which the worse opinion was eradicated, and the constructive process, by which the better opinion was induced; learning is based on questions and involves no direct transfer of information, but rather enables the student to see the truth for themselves. Socrates believed quite passionately about challenging and rationalising issues. He believed it was not mere 'ignorance' but 'ignorance mistaking itself for knowledge' or 'false conceit of wisdom,' which was "a more stubborn and a more formidable foe" (Cornford, 1960: 174-177). Ironically, this approach led to Socrates' downfall because of the self-doubt individuals (and students) experienced when challenging what is 'beyond'. However, the issue then is that the Athenians (like students) were unable to confront, compare and contrast (Lian, 2000) their vision of reality with the oligarchic system of the day, in which the market was narrow to maintain a hierarchical and stratified economy and where political compulsion was mandatory. In the same way, our education system is based to some extent on the Socratic method of questioning and understanding, yet our assessment is oligarchic with its statistic compulsion (government funding that grants accreditation to educational institutions, compulsory school attendance, mass-produced standardised tests, low-common denominator textbooks), that has stifled educational innovation, especially in the realm of assessment. Separating knowledge into domains such as the agreed eight key learning areas and assessment of these KLAs has narrowed students' understanding to a set of checks and balances; evidence of the mastery of facts and information.

It is argued that assessment of learning ignores the students' real learning experiences by focusing on ways of obtaining statistical results. Discovery learning therefore threatens the system's monopoly of education as it offers diversity of educational choice. Hence, the goals of assessment in the education process lie intrinsically within the student and not with those of the system. In today's educational system

great value is placed on standardized tests in determining the success of students, however all too often these tests are misinterpreted, misused, or simply do not adequately measure how students will perform on real-life tasks. Standardized tests are not good predictors of success as there are students who may not score well on a standardized test, but succeed in school and/or college. The challenge is to develop learning environments that achieve integration of standardized tests with students' expansion of their understandings which inform their interpretive systems. The constructivist approach allows experiential learning that is active and encourages students to make their own choices. The role of the teacher is not to cover curriculum content but to help the student 'uncover' facts, issues and ideas in a subject area or rather construct their own meaning from the experiences within the learning environment, but this approach does not 'fit' the current assessment structure because it is without coercion or prescription.

Central to constructivism is its conception of learning. In other words, Lev Vygotsky and others emphasized that the students develop meaning by relating new knowledge to their previous knowledge. For example, the Zone of Proximal Development (ZPD), according to Vygotsky is "the distance between the actual developmental levels as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978: 86). Vygotsky believed also, that education could not be reduced to the acquisition of a body of information as it can be defined as the artificial development of the student. Furthermore, his proximal development has implications for assessment, especially concerning children with learning and behavioural problems. In the book, *Scaffolding Children's Learning* Berk and Winsler (1995) discuss Vygotsky's dissatisfaction with the ability and achievement tests as valid measures of children's capacity to learn. Two students can differ substantially in the Zone of Proximal Development that each requires. One student may do their best on their own, while the other needs some assistance. Therefore, the ZPD is crucial for identifying each student's readiness to benefit from instruction and the learning environment. The role of education or the teacher is not to dispense knowledge but rather provide students with opportunities to construct their own knowledge or understanding. Vygotsky's methodology involves studying

the dynamics of the development process (rather than present performance - graded assessment) and the capacities of students, in order to draw maximum benefit from the assistance and learning opportunities offered.

In this paradigm, learning emphasizes the process and not the product. Thus, the reality for the student is the process of constructing meaningful representations, or making sense of their experiential world. This perspective is consistent with the constructivist predisposition to favour multiple truths, representations, perceptions and realities. The concept of multiplicity has valid propositions for creating different perceptions of assessment because students interpret and construct a reality based on their experiences and interactions with their environments. Rather than thinking of truth in terms of a match to reality, assessment instead is the notion of viability which is based on students' interests, ability and needs. The major issue is not whether the student can match a specific reality but rather the issue is how an assessment of this reality meets the needs of the student and most importantly, enhances student learning. According to psychologist Ernst von Glaserfeld (1995: 7) "constructivist concepts, model, theories are viable in the learning process if they prove adequate in the contexts in which they were created". Learning in this context is about learning from our environment, which is an *active* rather than a *passive* process. In other words, the learning process would no longer revolve around teacher-student interactions. Rather, students' actions should emerge in response to the learning demands that they actually experience while engaged in exploratory activities. In this way, students' explorations enable them to examine their own interpretations against which they assess the impact of the solutions which they apply. As Freeman notes,

> "classrooms and students are not just settings for implementing ideas; they are frameworks of interpretation that teachers use for knowing: knowing when and how to act and react, what information to present or explain and how, when to respond or correct individual students."
>
> (Freeman, 1996: 98)

We would argue that merging the ecological and constructivist traditions is critical to understanding the dynamic conditions of a learning environment interested in linking assessment and teaching objectives. The principals of ecology emphasise the sociohistorical context of social action and, consequently, help us to focus teaching

and assessment on techniques supporting learning and outcomes which result in critically informed differences, rather than in unified and unifying belief systems. An Exploratory Learning Environment, which we put forward in Chapter 3, provides a theoretical framework for combining the concerns of the ecological and constructivist traditions with structured-environment interactions and a continuous assessment of students' learning.

Further, we are of the view that education does not start with great ideas, the world or humanity, but with the individual. Consequently, there are a number of questions which needs to be raised. Is learning about getting students to *understand* new ideas, or about forcing them to accept certain beliefs? Should assessment of that learning then be about convincing others or about *enlightening* others?

Since this study argues that assessment is a preconceived notion about being pluralist rather than the reality of conformism, perhaps then another optimal position for understanding the constructivist perspective to learning and real-world environments is to parallel constructivism to other learning theories. Constructivism takes on a variety of structures such as behaviourism and cognitivism. The basic distinction is that while the behaviourists view knowledge as nothing more than passive entities - largely automatic responses to external factors in the environment, whereas cognitivists view knowledge as abstract symbolic representations in the mind of students, the constructivists view knowledge as constructed realities made by each student through a learning process. Knowledge therefore, cannot be transmitted from one person to the other; it needs to be (re)constructed by each person. Yet the trend in assessment is to avoid reference to meaning, representation and thought. Knowledge is static and passive. Assessment then, values knowledge as absolute because the 'product' of the student should represent a real work that is thought of as existing, separate and independent of the student; and this knowledge should be considered true only if it correctly reflects that independent world. As Jonassen (1991: 28) states "knowledge is stable because the essential properties of objects are knowable and relatively unchanging". According to Papert (1993: 141), the education system, especially assessment, in being too structured, i.e. what to think rather than how to think, stifles students' natural curiosity. Like Piaget, Papert believed that children as

students have a natural curiosity to construct meaning of their world. Can constructivism effectively enhance the relationship between assessment and learning? Such is the question that this inquiry considers. The principal of necessary change is congruent with a Chinese proverb: if a man is hungry you can give him fish, but it is better to give him a line and teach him to catch fish himself (Papert, 1993). Hence, a major problem with current education is that it often ignores constructivist ideology by discounting the reality of the continually changing world in which we live. Consequently, the systematic process offered by assessing learning is a problem for educators according to constructivists, because there is nothing systematic about the way in which we learn or construct knowledge (Kanuka & Anderson, 1999). The process of constructivism draws on the students' intentions, strategies, and experiences and encourages self-directed exploration and discovery learning (Reeves, 1997).

2.3.8 Postmodernism

The term 'postmodernism' is not only difficult to define; it is also often confused or deliberately conflated with a related term, 'Poststructuralism'. While there are philosophical and historical overlaps between the two movements, they have different intellectual genealogies, theoretical trajectories and applications. Postmodernism takes as its theoretical object 'modernism': the pursuit of ever-increasing levels of order; modern societies constantly are on guard against anything and everything labelled as 'disorder', which might disrupt order. Thus modern societies rely on continually establishing a binary opposition between 'order' and 'disorder', so that they can assert the superiority of 'order', while post structuralism takes as it theoretical object 'structuralism': an essentially formalist method which focuses on signifying structures rather than on its content. Thus, each movement is an attempt to supersede its predecessor, tending to set up two sets of binaries.

The two movements can be distinguished by their particular theoretical concerns that become apparent in their respective historical genealogies. Poststructuralism can be seen as a specific philosophical response motivated by the work of Friedrich Nietzsche and Martin Heidegger against the social scientific pretensions of structuralism (Peters, 1996, 1999). As our concern is more with the relationship

between assessment and learning, the literature review focuses on Postmodernism. In the context of education, postmodernists believe that education should result in self-empowerment rather than serving economic means. Names most often associated with postmodernism are Jean-Francois Lyotard, Jacques Derrida, Michel Foucault and even Dewey can be thought of as postmodern, given that he wrote within the modern era and in many ways expressed its spirit: the challenging of beliefs, tolerance of uncertainty, and emphasis on diversity, acceptance of creativity and change, and highlighting the constructedness of reality. Foucault also explored the notion that truth has its origin in historical conflict and struggle and its impact on institutions, students and social systems.

Postmodernists have helped us see that reality, especially in education, is more complex than probable. It does not exist objectively, 'out there,' simply to be mirrored by our thoughts. Rather, it is in part a human creation. Reality is moulded in accordance with our needs, interests, prejudices and cultural traditions. A postmodernist approach to learning and assessment emphasizes the role of the imaginary, as expressed in cultural traditions and legitimized as a reason for its pluralism. Thus, the pluralist society gives right of existence to numerous different types of culture, to a cultural pluralism. As Burbules and Rice (1991) state postmodernism is in opposition to modernism, "characterized by a strong antipathy to the language, issues and values of modernism" which can be seen in the regulation of class, racial and gender difference through rigid forms of assessment to sort and track. The emerging conditions of interdeterminacy and hybridity are evident in postmodern approaches to teaching and learning by incorporating information systems which generate new socializing contexts for students as well as valuing their cultures as legitimate in the process of forging a personal or collective identity. Thus, it would furnish not only "*une raison d'être*" but also the only reason and eventually the only moral values for the existence of these entities. Such an approach encourages the questioning of accepted 'realities', however, we must help students find their own realities. As students do not learn in the same way, they cannot be assessed in a standardized manner. Therefore, it is important that an assessor create an environment to understand how students learn thereby enabling them to properly assess the child's progress (Lazear, 1992). Such environments encourage students to

make inferences, draw their own conclusions and decide what actions to take. In other words, promoting 'how to think' enables students to make sense of the world, to have their answers, resolutions and definitions, as well as their uncertainty and questions.

Postmodern education encourages students 'how to think', to create their own reality and to use critical thinking skills, inquiry, question-asking, and the taking of action as teaching strategies so that they learn to handle controversy and to recognize multiple perspectives. Postmodernism, it can be argued, is not a 'system' of ideas, but an assortment of challenges to the old system of modernity which refers to a set of philosophical, political and ethical ideas that provide the basis for the aesthetic aspect of modernism. To reiterate and define postmodernism, or as Jean-Francois Lyotard said in "simplifying to the extreme I define *postmodern,* as incredulity towards meta-narratives" (Lyotard, 1984), and presupposes an objectifiable reality; we first need to understand the progression of society from realism to modernism and finally postmodernism, to understand the paradigmatic shift from supporting students to alienating them from their realities. Within this discourse, Lyotard means you cannot dissolve reality into simply another text; you need to abandon the linear narratives of Western history in favour of allowing students to critically address the construction of their own subjectivities as they simultaneously engage in constructing their own reality. Just as meta-narratives have lost their power to convince, i.e. nothing more than stories that are told in order to legitimise various versions of "the truth", in the same way, current assessment practices legitimise learning.

Thus the age of modernism is arguably defined by alienation, social fragmentation and imperialism. It was an enlightened rejection of tradition and authority, espoused in essentialism and progressivism, in favour of reason and natural science which nonetheless, was subordinated to the imperatives of a history and culture that is linear and uniform. In the context of education, modernists' assessment dislocated the student from the real world by standardizing measures of their productivity rather than assessing the personal development of autonomous individuals. Hence, postmodern education repudiates modernisms' view of reality, which connects learning and assessment to the mastery of autonomous and specialized bodies of knowledge: the product. If traditional teacher-directed or institutionally imposed and

standardized methods of assessment are used, they run the risk of reflecting the "social, political, cultural and ideological conditions" of society and thus are implicated in generating "divisions that make difficult the construction of our ideals of change and transformation" (Freire, 1998: 55). In other words, the prevailing world view of the modern era, dating from the Enlightenment (Eighteenth century), sets forth a 'reality' wherein there are absolute principals and laws, discovered through reason and science. The suggestion is that the learning and assessment are not intrinsically linked with students' realities and lives. In other words, assessment is "a deliberate attempt to influence how and what knowledge and identities are produced within and among particular sets of social relations" (Giroux & Simon, 1989: 239).

Rather than accepting modernist assumptions that education should satisfy market demand, it makes more sense to support students in their attempts to understand reality. Assessment dictates what students learn and focuses students' attention on assessment rather than on the learning process, thus creating a degree of conformity. It can be argued, therefore, that our society, particularly education, was conceived by courtesans to reinforce their skills: the notion of the apprentice and the master. It is not surprising that the education system does not see a need to change "when they have power, that power having being designed in their image" (Saul, 1992: 581).

Ira Shor (1980) suggests that students undergo a struggle for ownership of their learning. They have been lulled into some sense of complacency, by the circumstances of their everyday lives, and through the processes of the classroom, they begin to envision and strive for something different for themselves. In a constructivist, postmodern environment choices and power are distributed amongst the group and the role of the facilitator is one of support in creating conditions that produce new ways of learning, engaging and positing the possibilities for social struggle and solidarity. This encourages student autonomy rather than a mere "mimicry of the professorial style" (Shor, 1980: 103). Only when supportive learning environments are achieved can issues of assessment be problematized and reconstructed. This critical point must be reinforced. The issue of assessment cannot be addressed in isolation from the everyday practices of the classroom, particularly when such complex issues as power and relationships are implicated.

Furthermore, Shor is critical of the current assessment environment, which, he says, involves undemocratic approaches. "A standardized testing instrument brought in from the outside, or designed by the teacher separate from the class, would only contradict the emergence of students as subjects" (Shor, 1980: 112). Rather he promotes assessment as learning activities that are consistent with the democratic processes of the learning environment that promote critical thinking instead of standardized or short-answer tests (Shor, 1992: 144). These processes would challenge preconceived notions of education, which potentially restricted students from participating fully in their own learning; because students "are denied the essence of democracy, which can be defined as co-governance in private and public life...(they) bring few democratic habits to the classroom because they have few opportunities to practise them in school" (Shor *op. cit.:* 168). Like Shor, it is not suggested that assessment be removed from learning situations because it is still a necessary part of education. It makes sense therefore, to draw on the synergies between the writings of Freire and Shor to link assessment and learning. In other words, personal meaning which students construct around any learning experience includes not only the information and the context, but the purpose, as understood by the students. Assessment and assessment of that learning should be seamlessly integrated into these meaningful learning experiences.

With the rapidly changing and democratized nature of the late modern society and its work environment, predetermined modernist approaches to assessment are no longer valid. Education must address the shifting attitudes, representations, and desires of today's youth, who Allan Luke (2000) describes as digital students: 'world kids' for whom identity formation is not the linear stage development of Piaget, not a model of identity based on some humanistic notions of a 'true' and 'real' self that is waiting to be uncovered. Rather, growing up involves a "hybridisation pastiche process of stitching together an identity like trying on of new types of clothes, "becoming your own hybrid, blending and shaping and putting together something that's a range of cultures" (Luke, *op. cit.*: 24). Irrespective of the views of educators and institutions, Luke points out that

> "the most at risk kids don't have to 'learn the basics' before they get online, therefore they are learning 'new kinds of analysis of the world where the critical literacies that will be needed will be how to navigate through that sea of text that crops up when doing an on-line search".
>
> (Luke *op. cit.:* 26)

Thus students today rely less on maps of modernism to construct an unchanging version of reality. Instead they navigate their way through a mass of information, no longer caught by closed narrative structures, to construct their own meanings and "narrative complexity [has given] way to design complexity; story [has given] way to a sensory environment" (Parkes, 1994: 50). Such changes require on-going assessment, which is increasingly viewed as an integral part of the teaching-learning process, as a feedback mechanism for teachers and students alike, not merely for accountability purposes.

2.4 Summary

This critique of educational philosophies recognizes that progressivism made advances beyond essentialism and behaviourism in teacher-student relations and teaching methodology. However, progressivism focused too heavily on the needs of the student, rather than on creating a better learning environment, as humanism espoused. As Saul (1992) states "we began the seventeenth century in the grip of blind logic and we end the twentieth century in the hands of blind reason, a sophisticated version of the former" (Saul, *op. cit*.: 581). In other words, the realities of the classroom are where those students who question, or refuse to conform to producing a specific vision of reality are considered a *danger* to the system. It is contended that assessment tends to be self-policing. It not only demands conformity, it openly disdains radical thought. Students are all deluded into believing that the end product attained is their reality; when in reality it comes from a perspective that is favourable to capitalism and corporatism. In other words the illusion or specific vision of reality has institutionalized students in their approaches to learning and assessment. Conversely, postmodern pedagogy and assessment must address the shifting attitudes; include informational technologies of this new generation of youth within the current historical, economic and cultural juncture. Realities are to be constructed and understood within new hybridized cultural practices in the bounds of a critical understanding of how students recognise others as subjects rather than

objects within supportive learning environments of assessment of this 'learning by doing'.

The conditions and problems of contemporary youth may be postmodern, but they will have to be engaged in a learning environment through which they become accountable to themselves and others rather than be direct instruments of world reformation. Thus a constructivist postmodern approach to assessment and learning seeks to revise its premises and traditional concepts based on Humanist ideology, to a process of developing a free, self-actualizing person in an environment of caring. A constructive postmodern ideal attempts to recover truths and values from various forms of pre-modern thought and practice by attempting to erase all boundaries, to undermine legitimacy and to dislodge the logic of the modernist state; that is to say encouraging critical thinking and creating learning environments that fulfill basic democratic ideals. The possibility is that students are able to assess critically rather than to be assessed on 'knowledge' which bears little resemblance to what they understand as reality. Thus, the relationship between learning and assessment can be enhanced as it centered on dialogic interactions; the roles of teacher and student are shared and all voices are validated. It fosters an integrated approach to theory and practice, or what Freire would preferably term as praxis - theory in action. Learning, says Freire (1984), is an act of knowing and requires the presence of two interrelated contexts in which "one is the context of authentic dialogue between students and educators as equally knowing subjects… the second is the real, concrete contexts of facts, the social reality in which people exist" (Freire, 1989: 49). Therefore, it must value and validate the experience students bring to the learning environment and importantly, situate this experience and the learning journey at the centre of the experience. Such an approach no doubt creates challenges and discomfort but opens up creative possibilities for aligning learning and assessment.

Furthermore, constructivist-postmodernist education in a humanist setting is not about the transmission of 'good books' or grand narratives, but more about creating conditions and contexts for students' expression, interpretation of the spectacle, the imaginary through which reality is knowable and livable. In other words, it provides environments in which thinking is creative and critical: 'thinking that is concerned about the world is concerned with reality, and does not take place in an ivory tower

isolation" (Freire, 1984: 64). To reiterate, Freire suggested that learning, the environment and assessment are intrinsically linked to student realities and lives. If students are free from the constraints of rationality (specific visions of reality), nothing separates truth from self-delusion. For example, students learn how to ride a bike or learn to fish by discovering and experimenting. Their own realities are their own understanding of their performance. An assessor merely attempts to support their connectedness between discovering and experimenting and the construction of their realities. The intention is to validate student perspectives, to embed assessment in meaningful situations and contexts, and to promote critical reflection and relativity. In such an environment, students will be better placed to examine their own contexts and behaviours and to understand their own realities. Hence, a constructivist-postmodern approach to assessment respects students' ways of understanding and learning and incorporating them into the educational process. This shift is not merely a modification of current educational practices; it is a transformation of assumptions about students, learning environments and the kinds of interactions that lead to understanding and meaning. Assessment becomes a matter of evaluating progress over time, a video rather than a snapshot to reflect holistic learning. Rather than focusing strictly on the product of learning, assessment helps create the conditions for the process of learning as well as the product of that process.

2.5 Assumptions of Knowledge

One of the most fundamental questions raised by educators when discussing the value of assessment is what constitutes knowledge and what are the assumptions that students must have about knowledge in order to demonstrate assessment of that learning. Based upon the logic of scientific inquiry and methodology with its explanation and interpretation, educators assume that the acquisition of knowledge is paramount when assessing the student. It is therefore assumed that, "knowledge means that certain statements are true and they are believed to be true and that there is evidence to justify the belief that they are true" (O'Connor, 1957: 72).

Educators and stakeholders, however, view knowledge as a social construction embodying particular interests and assumptions. Knowledge in this instance becomes valuable because it is legitimized by education and assessment. According to Giroux (1988: 5) one must consider what gets labeled as high status knowledge in

schools and university, and thus provide legitimacy to certain forms of knowledge and social practices. In other words assessment controls, distributes and legitimates certain forms of knowledge as cultural capital. Giroux postulates further that education [and assessment] is primarily concerned with what to question and it does not question relationships between knowledge and power or between culture and politics. If attaining knowledge is knowing and knowing is a conscious judgment, then how can it be argued that it is not? For example, a dog knows its master but it does not know or can reason that any statements that the master makes are 'true'. Much the same applies to assessment where knowing is a matter of knowing what. Certainly, students use appropriate means to demonstrate what they have learnt and via the transmission of knowledge, but there is little assessment of why they understand.

The main concern with assessment is the grounds on which claims of the students' acquisition of knowledge are made, as it were in terms of the award of grades or outcomes to prepare them for the 'old world' which places students "at the centre of the flow of information in order to control or collect it" (Saul, 1992: 49). For example, major stakeholders in our educational institutions can no longer deceive themselves into believing that assessment is in the interest of the student when in reality it is "about the status of truth and the economic and political role it plays" (Foucault, 1972-77: 132). The disagreement, therefore, is about the application of the word, rather than its meaning. The argument is directed, not against the way in which we assess students, but against the assumptions of knowledge set by assessment. Aristotle realised that we need to make a careful distinction between a description of something and its definition. He believed when we describe something we are not really saying anything about what it really is, whereas an explanation entails a convincing definition of what it is and often its function. In terms of assessment, the description of assessment in postmodernist terms must reinterpret the complex ecology of relationships in the environment to avoid oppressive power relations and create a negotiable curriculum, including assessment equally owned by facilitator and student, whereas a consensus definition is thus: assessment is a process used for obtaining information that is used to make decisions about students, curricula and programs and education policy. To explain, the

description given tends to be relative and refers to qualitative assessment observations of the students in the process of acquiring knowledge to make meaning, whereas the definition is abstract and is relative to quantitative assessment: measures of the students acquiring knowledge for the purpose of productivity. Ayer (1956: 35) states that the necessary and sufficient conditions for knowing that something is the case is firstly, what one is said to know to be true, secondly that one be sure of it, and thirdly that one should have the right to be sure. In other words, assessment for learning or knowing something is about having conditions that enable students to justify their own interpretation of the real world.

Yet, this view of assessment that is "to conceive of knowledge as a collection of information seems to rob the concept of all of its life. Knowledge resides in the user and not in the collection. It is how the user (student) reacts to a collection of information that matters" Churchman (1971: 10). Churchman clearly states the importance of the students creating their own knowledge. St. Thomas Aquinas (c.1225-1274), like Plato, believed that teachers created conditions for students to acquire knowledge through their own exploration. In his view, students acquire knowledge through sense perception, in other words, "their power to know things comes through intellect and understanding" (Bourke, 1960: 3). Aquinas emphatically stated that teachers should not overwhelm students otherwise their acquired knowledge "would be a little bit of everything and knowledge of nothing" (Specimen Pages from the *Summa Theologica* of St. Thomas Aquinas p2). To follow his logic of how a teacher guides along the path of reasoning is to compare a teacher with a doctor. When individuals learn something unaided, this is discovery (*inventio*) but when they are helped by a teacher (as a patient is helped by a doctor) this learning is (*disciplina*). In other words, discovery, be it assisted or not, nonetheless supports the students in their attempts to make sense of the real world. Exploratory learning occurs when understanding (*per se nota* – self-evident) relates to particular situations (*ad determinatas materias* – constructing reality). (Bourke, 1960).

Whilst assessment of learning determines learning as being the transmission of factual data and skills from a teacher to a student, then the concept of knowledge as being a stockable and transferable entity is valid. This view is also based on the construct of knowledge as being 'certain' (Drane, 2000). Unfortunately, this concept

of knowledge as being tangible and transferable has a substantial impact on how learning is assimilated into assessment and thus viewed as assessment of learning rather than assessment for learning.

One fundamental question when valuing assessment is whether knowledge students must have is distinguishable from opinion, fact, truth or perspective? It can be argued that knowledge belongs only to the realm of theory, while students' attempts to understand reality are based on their perspectives. Progress and development of students, therefore, depend on them and their learning conditions, and for them to understand their versions of reality they need dynamic conditions for these to evolve otherwise they will always be in a state of being. Hence, it becomes plausible to envision the students on a journey without a final destination yet designated. To illustrate "the impact on Darwinian thought on the concept of progress can not be overstated: if all things are in a state of change, if flux is the essential characteristic of existence and reality, then the ends of life – or of education can not be fixed and final" (Brauner & Burns, 1965: 66). Thus, the validity of the assessor's understanding of the students' understanding of reality is in reasoning that they accept and can then be understood as a major factor in the reliability of that reasoning. This is best summed up by Dewey:

> If one looks at the history of knowledge, it is plain that at the beginning men tried to know because they had to do so in order to live. In the absence of that organic guidance given by their structure to other animals, man had to find out what he was about, and he could find out only by studying the environment, which constituted the means, obstacles, and results of his behaviour.
>
> (Dewey, 1960: 38)

Furthermore, Dewey claims "as long as the notion persists that knowledge is a disclosure or reality, or reality prior to an independence of knowing, and that knowing is independent of a purpose …then its significant values will come as a shock (Dewey, 1960: 44). The crux of the problem, Dewey believed, was to contest the assumptions of knowledge based on traditions to which the valid status of values must be maintained: the first, that certainty and security can be found only in the fixed and unchanging; the second, is that knowledge is the only road which is intrinsically stable and certain; the third, that practical activity is an inferior sort of thing. The problems he was alluding to was validating testing, assessment of

learning based on these assumptions. According to Wilson and Daviss (1995: 139) testing systems rarely "disclose the reasons for their results, and similarly, no classroom observation can properly measure the effects of a given classroom process on learning". Thus, the argument is that we cannot know any empirical statements to be true, so in terms of assessment "knowing should not be represented as a matter of being in some infallible state of consciousness: for there cannot be such states" (Ayer, 1956: 22). It is very much a matter of understanding, interpretative and revealing comparison. It also involves a degree of critical reflectiveness on the part of the students to consider the distinction between knowledge and what may only pass for knowledge, and between understanding and misconception.

2.6 So where does this leave us?

Based on this critique of several learning theories, it is evident that one of the key problems in assessment is that the system fails students, in that it does not value the process of learning, as it does not see students as Piaget (1929) did, as scientists creating their own sense of the world. In a constructivist-postmodern and humanistic learning environment, students interpret and act according to conceptual notions that are developed in an interaction within the environment. Yet assessment lags behind these notions of learning because of the belief that education, especially assessment, matches industrial needs for the training of basic skills within the work force, thus learning becomes more about acquiring knowledge and skills to complement industry. According to Braumer and Burns (1964: 105) the workplace is carefully designed "to ensure activities are *well regulated* so industry proceeds smoothly and schools serve the workplace directly by training talent and the young absorb the rules of the game even before they set foot in the workplace" by means of the mechanisation (the industrial mode of production) and the bureaucratization (government intervention) for higher productivity output for increased input.

This massification of education initiated standardization (curricula) to ensure validation across subject and year level to replicate (behaviour). The reason for a standard curriculum (input), besides the market demand and the perceived market rests mainly in the desired product (output) that maintains specific beliefs of reality. As expressed by Durkheim (1938: 48) : "*la société ne peut vivre que s'il existe entre ses membres une suffisante homogénéité: l'éducation perpétue et renforce cette*

homogénéité en fixant d'avance dans l'âme de l'enfant les similitudes essentielles que réclame la vie collective". Assessment is about reproducing and perpetuating itself; for self-serving individualism and accountability. With homogenization is the division of knowledge into bits in order to achieve a higher productivity, thus the learning process is fragmented into subjects or eight key learning areas. This means that reality itself is fragmented in order to be mastered and possessed as items of knowledge. Consequently, the student is dislocated: theory is split from practice, learning from doing. Learning is considered an abstract process that takes place in the minds and that has to do exclusively with the absorption of data and manipulation of symbols in an abstract way. Hence, learning becomes an illusion of reality which assessment wishes students to produce and reproduce. As an observer rather than a teacher, the essence of Piaget was to see things differently. For example, an assessor can "believe no predictions, either positive or negative, are justified, and the only way to find out when and how various things can be taught is to try various ways of teaching them" (Piaget, 1963: 129-130).

According to Piaget, massification (market efficiency) of education is nothing more than coercion and "coercion is the worst of teaching methods" (Piaget, 1950: 28). For Piaget was not afraid to put forward his belief that education should be a school without coercion, where students actively experiment with a view to reconstructing for themselves what is to be understood. Piaget constantly advocated in his 'Director's Speeches' for the IBE Council the importance of the students active participation "a truth learnt is only a half-truth; the whole truth is reconquered, reconstructed and rediscovered by the pupil himself/herself" (Piaget, *op. cit.*: 35). Piaget did not fear controversy, particularly on this principal, for he states that in "most countries, however, the school turns out linguists, grammarians, historians and mathematicians but fails to encourage inquiry" (Piaget, *op. cit.*: 30), 'how to think'. When asked what then would be the role of books and textbooks in such a school, he replied that the ideal school would not have compulsory texts but rather only reference works. Reform of our education system is necessary and that change in assessment is the immediate concern of this study. We could use the analogy of assessment with Piaget's scientific research on experimental teaching:

> If experimental teaching seeks to remain a purely positivist science, i.e. confining itself to recognise facts but not seeking to explain them, confining itself to recognizing achievements but not ascertaining the reasons for them, it goes without saying that psychology is unnecessary […] but if experimental teaching seeks to understand what it discovers, explain the achievements it acknowledges, and grasp the reason for the greater effectiveness of certain methods compared with others, then, of course, it is essential to combine educational research with psychological research – in other words, to make constant use of educational psychology constantly and not merely to measure achievements in experimental teaching.
>
> (Piaget, 1966: 39).

It is possible then, to restore the ability of the students to construct their own reality by shifting the focus away from the concern with what is quantifiable towards our understanding of how people learn. In other words, assessment of learning is only measuring students' productivity. Yet those quantifiable measures rarely disclose the reasons for productivity or lack thereof. Wilson and Davis (1995:140) state that tests taken by students to measure their outputs emphasized and mutually reinforced low-level thinking and knowledge and were found to have no connection with the real world because they do not promote independent thought or independent actions.

It is contended that mandatory learning of specific content for assessment prevents thinking and connectedness to real world situations. Education should not be about the transference of knowledge but rather the collaborative and collective production of knowledge grounded in the reality of students' lives (Freire, 1984). The logic for the denial of democratic environments stems from a belief that in the crowded classroom of any learning institution it is impossible to treat students as individuals, overcome peer pressure for conformity let alone consider individual differences in learning. The establishment of self-interest as the prime driving force of assessment is the key to this corporative approach. That is to say, the commercial element in education at this time is even stronger. For now, instead of trying to distance themselves from their commercial rivals, the universities are eagerly joining forces with them, lending their brand names to profit-making enterprise in exchange for a piece of the action. Hence, educative postmodernism is the logic of late capitalism, where the culture of consumption has taken over from the culture of production and the explosion of information technology, and in particular cyber culture and virtual reality have increased a sense of the possible diversification of experience. Yet in

reality, education still confuses students' decision making with administration, assessment with accounting: in other words 'normalizing' (a type of sublimation), putting the anomalous set of practices and so masking the defect, and creating the illusion.

2.7 Accountability in Education

Presently the Australian Government is deploying accountability initiatives to forge integrated, systematic approaches to education reform. Education accountability, it is argued is a direct response to the public's demand for improved educational outcomes. In July 1996, Ministers for Education in States, Territories and the Commonwealth agreed that "every child leaving primary school should be numerate, and be able to read, write and spell at an appropriate level". Ministers agreed to develop national benchmarks for use in reporting minimum acceptable standards of literacy and numeracy achievement, in support of *The Adelaide Declaration on National Goals for Schooling in the Twenty-First Century* (1999). Since 1996, benchmarks for secondary schools have been introduced for Year 7, 9 and a citizenship test for Year 10 students. Alan Barcan, *News Weekly,* 24 March, 2001 states that most parents seeking information about their child's academic progress still look for two old-fashioned items - a mark (out of 10 or 100) or a grade (A, B, C or High Distinction, Distinction, Credit, Pass) which suggests an absolute standard and place in class, which suggests a relative or comparative standard. In trying to meet the needs of all the stakeholders, in terms of accountability, Outcomes-based education, perceived as a multifaceted concept was introduced in 1994 to improve assessment and reporting. However, Barcan (2001) contends that many stakeholders believe it can cater for genuine academic work or low-level, activity-centred, mindless education. Yet according to *The Adelaide Declaration*, "schools are providing a supportive and nurturing environment that encourages the development of students' self-worth, enthusiasm for learning and optimism for the future" (2005: 1).

However, in Outcomes-based education, the increased educational focus is upon common learning experiences that lead to mastery of core competencies (Resnick, 1995b) and can be neither "re-produced" nor "mass produced" amongst different individuals. In constructivist-postmodern terms, however, learning cannot be

'reproduced' as it is different from and for individual students. The increased emphasis upon the conceptual fragmentation of the world, of people, of life, and of knowledge is further reflected in the "benchmarks" (national standards or performance indicators) becoming further encased, if not entombed, within the structures and organizational framework of managerial assessment. Students are required to recall, replicate, manipulate, understand, or demonstrate their understanding of truths and the assessor will measure their product against that standard. Hence, standards and performance levels are synonymous with assessment and reporting systems. To this end, assessment is "increasingly recognised as political: having real effects on the distribution of power and advancement of particular interest [this] narrow protectionism is eschewed and the new skills are appropriately taught to effectively monitor students, teachers and the system" (Walsh, 1993: 57).

Accountability systems that set performance standards or goals also monitor the achievement of those goals, and report results to the public. Papert (1991) states: "it is encouraging to talk about diversity; to see the digital presence as a new approach to learning" (Papert, *op. cit.*: 1). However, at the same time, Papert believes accountability systems impose standards and standardized tests which are not true to the very idea of diversity. In fact, in his view, they are pushing us back to the Nineteenth century concepts of what the appropriate knowledge a young person should have:

> And it seems to us just patently absurd that as we move into the Twenty-First century we should be attaching importance to tests whose content, let alone the very idea of these tests, is inherited from the 19th century.
>
> (Papert, *ibid.*)

In Australia, the 'Back to the Basics' movement in education that 'benchmarks' ushered in has the characteristics of a traditionalist movement, born again to the virtues of capitalism. According to Jeannie Oakes (1985: 173) in her book *Keeping Track,* tracking is a governmental action that classifies and separates students and thereby determines the amount, the quality, and even the failure of government service (education) that students received. The belief is that "benchmarks are a prelude to national testing and the tying of public funding of schools to testing"

(Luke, 1997: 7). The rush to 'test' therefore has again become the dominant agenda for assessment in terms of what should be learned at different year levels. Subsequently these assessment practices 'narrow and limit the capacity of teachers and school communities to adjust to the challenges of new workplaces, new technologies, new literate practices, and institutions' (Luke, *op. cit.*: 10). It is as argued here, a move to limit students to construct a specific vision of reality rather than support them in their attempts to understand their own reality.

'Accountability' currently means requiring students to take and pass rigorous tests before they are permitted to function in the 'real world'. These standardized tests have been introduced to counter what is perceived as the failure of the education system. What worries us is that 'benchmark' testing may be driving education backward rather than forward with a one-size-fits-all approach to student assessment and school accountability. Those who are dubious about the value of standardized tests in general believe "the risk is that the very limitations of the benchmarks become major liabilities for the educational system - which the descriptive minima will become prescriptive maxima" (Luke, 1997: 8) because it has a deleterious impact on the development of the student. Homogenizing the educational system with 'benchmark' tests and state-mandated curricula will not rescue perceptions about 'failing students', but it could destroy models of exploratory learning environments from existing that have the potential to support students make sense of their world.

It is axiomatic in curriculum theory that what counts as knowledge, practice, skill, and competence is driven by assessment systems (Bernstein, 1990 cited in Luke 1998). According to Luke, this is increasingly the case in an educational and public sector environment where 'performativity or disappearance' is the order of the day: where the institutional imperative is to produce visible evidence of economic efficacy. Starting from the self-evident proposition that assessment and learning must be interactive; educators need to know about their students' progress and learning so that they can create opportunities to find out what they need to know in order to understand students' construction of reality. Thus this study looks at aspects of learning environments enhancing the relationship between learning and students'

own assessment by creating conditions which assist students in assessing the enabling power of the strategies (solutions) which they apply in the context of their learning activities. In the words of C.W. Mills (1979: 370), they are facilitators who can assist students get "in touch with the realities of themselves and their world". In this way, the task of the facilitator is assisting students in developing and using tools rather than giving them the information (tools).

Thomas Gilovich explains that "we humans seem to be extremely good at generating ideas, theories and explanations that have the ring of plausibility. We may be relatively deficient however in evaluating and testing our ideas once they are formed" (Gilovich 1991: 59). Thus our questions are:

1. What principals would form a theoretical framework of an environment enabling learning by exploration of different ways of approaching problems?
2. How could an exploratory learning model help us to link assessment and learning in a way that would not threaten the negotiation basis of learning?

2.8 Learning Environments

In learning environments, knowledge is often abstract, out of context and learning can often be unintentional rather than deliberate. Lave (1988) argues that learning as it normally occurs is a function of the activity, context and culture in which it occurs, the learning environment. In learning environments that offer discovery learning, situated learning, constructivist learning or Socratic learning, there was a gradual acquisition of knowledge and skills as novices learned from experts in the context of everyday activities.

2.8.1 Discovery Learning Environments

Papert (1980) claimed: "you can't teach people everything they need to know. The best you can do is position them where they can find what they need to know when they need to know it." Although he never used the term discovery learning, Papert felt that children should be allowed to 'teach themselves'. In his early research he used computers as instruments for learning and for enhancing creativity. Today Papert is considered the world's foremost expert on how technology can provide new ways to learn. He believed that the 'computer cultures' of the future will be different

from all ‘precomputer cultures’ in respects that are more likely to “impinge on very young children than the differences between New York and the Kalahari Desert” (Papert, 1980). Reflecting the Piagetian concept of disequilibrium, he explained that "in a such an environment, new ideas are often acquired as a means of satisfying a personal need to do something one could not do before" (Papert, 1980: 74). Papert felt that children need great flexibility to develop their own "powerful ideas" or insights about new concepts. In Piaget’s terms “no matter what kinds of discovery you are concerned with, you must never lose sight of the importance of the antecedent explorations of the field” (Shulman & Keislar, 1966: 29). More precisely, this study draws on the combination of similar precepts. It is the combination that offers an optimistic vision for aligning learning and assessment that supports inquiry — exploratory learning environments. Among those the most central to theories of natural learning and supportive learning environments is Paulo Freire, but also represented are Dewey, Rousseau, Kant and Piaget, although Piaget did not focus on education per se. However, in the terms of understanding Piaget believes that if children are given opportunities to learn and engage in a variety of activities, they will assimilate and accommodate information, thus leading to a new and broader understanding of their environment and their place in that environment (Piaget & Inhelder, 1969: 4-19). Piaget’s work focused on development of the student (linking experience with learning), whereas the underlying theme in the Literature reviewed was on the progress of the student in linearized terms (linking standardized outcomes at specific stages of learning to year levels).

2.8.2 Situated Learning Environments

Freire (1970) in Pedagogy of the Oppressed was motivated by a desire to encourage students to make the most of their situations in order to construct their own meaning of the world. He developed a method, which could help students to rediscover their lost sense of worth and dignity, a method that would awaken students to the realization of their potential as creators of knowledge. In other words, a praxis that supports them in their attempts to understand their realities and according to Marx (1845), [students] must prove their truths, i.e. the reality and power, this understanding of their thinking in practice. Freire’s frame of reference was his observations of how students could function within their own realities and how they

attempted to make meaning from educational situations that were not only oppressive but also not relevant to them. Building on Freire's perspectives enables a philosophy of assessment with a more inclusive vision, to connect assessment directly to democratization and the changing of social relations in the direction of equality and social justice. Learning environments that enable:

- Problem-posing: to create critical awareness through *experienc*e-based learning (sharing through discussions)
- Analysis: to reflect one's own situation of life and find out what to do about *understanding* the real world.
- Reality; connecting experience with understanding for students to make sense of the world.

Freire developed his philosophy after his assessment of literacy programs with rural adults in Brazil, which he stated as being irrelevant and did not allow the student to connect and utilize familiar situations that could advance meaning and facilitate students' reality.

2.8.3 Constructivist Learning Environments

Similarly, Dewey's views on the environment as central to learning is best summed up by his comment "as man's [the students'] first natural impulse is to measure himself [themselves] upon his [their] environment, to find in every object he [they] see the qualities that may concern him [them]. So this first study is a kind of experimental physics for his [their] own preservation […] to substitute books for them does not teach us to reason; it teaches us to use the reason of others rather than our own it teaches us to believe much and to know little" (Dewey, 1915: 11). Dewey also reflects on Rousseau's understanding of the senses as a sort of gateway and avenue through which impressions built up knowledge pictures and further actions had children adapting to their environment rather than having only a passive influence (Dewey, *ibid.*: 12). Hence, Rousseau believed the child must be allowed to learn about the world by the simple process of interacting with its environment. For instance, "register the essential lesson of the relationship between its physical capacities and its surroundings; for the key to all the liberty and happiness…must be

learnt first at the physical level" (Broome on Rousseau, 1963: 85). To reiterate, being immersed in an exploratory environment facilitates learning. 'Learning by doing' is arguably the most efficient and effective form of exchange between the students, the environment and the educators. Dewey (1951: 17) concurs with Rousseau's teaching that education is a process of natural growth and furthermore, massification of education is nothing more than narrowing opportunities for discovery until curiosity is dulled. Students are coerced into accepting an assessor assessment of their learning as being valid.

2.8.4 Features of an Exploratory Learning Environment

Exploratory learning or natural learning is assuming responsibility, inquiring, asking questions, seeking answers, analysing information, which lead to more questions. Thus, reality for the student is their construction and not a restricted specific vision of reality. In other words, facilitators do not guide the student towards some predefined reality, but offer stimulating environments that support students' exploration, creation and the going beyond information given. Exploratory learning environments involve students in a variety of activities that are challenging, promote engaged learning and draw on culture, life experiences and prior knowledge of the students but more importantly build understanding from in-depth investigation, exploration and discovery**.** So too does working with others in situations where shared knowledge and understanding and construction are deeply embedded to facilitate real world situations. Recent advances in technology have shifted classroom learning from a passive mode to a new engaged model in which students are doers as well as thinkers. The aim of the exploratory learning environments, according to Sydney University Virtual Campus (Frohlich, Sudweeks, & Simoff, 1998) is to stimulate active, creative and exploratory learning. Thus their exploratory learning model is based on the belief that students make meaning when they are active participants in what they are studying. Being actively engaged in the learning process means students are constructing their own reality, thinking critically, and learning within situations that are meaningful to them. When students are presented with investigative tasks and allowed to explore independent perspectives, they attempt to understand their own vision of reality. According to (Bereiter & Scardamalia, 1989) exploratory learning environments can be stimulating multifaceted learning

environments that enable students to discover for themselves, be engaged in critical dialogue and to connect and understand the real world.

2.8.5 Rationale for the ELE Framework

It is more than a 100 years since John Dewey began arguing for the kind of change that would move schools away from authoritarian classrooms with abstract notions to environments in which learning is achieved through exploration, experimentation, and exposure to the real world. In his book, *The Connected Family*, Papert (1996) says "computers will be the pivotal force for change outside the control of schools and outside the schools' tendency to force new ideas into old ways". Already students use their computer skills to navigate and use information to make sense of their world. As Piaget (1954) states children are motivated to behave in a particular way in order to negotiate their environment comfortably. When children adopt the attitudes and behaviours of the society they inhabit, they are rewarded with a sense of belonging. Children who do not adopt the norms of their culture often have a sense of discomfort or dissatisfaction with the environment. In the established traditions of schema theory and Piaget's stages of cognitive development, it is clear that one must work to understand one's place in the surrounding environment and how 'ideologies' fit into the existing structure (Livingstone, 1990: 139; Atkinson, 1993: 83). Therefore, classrooms need to be natural learning environments in which students are "a community of people with diverse knowledge rather than with the homogenized, age-segregated community called a 'class'" (Papert, 1996). This research has shown that schools are still based on an assembly-line model. The education system does however, accept new ways of learning, however assessment, along the assembly lines is well established and the system is not going to give up without a struggle, despite knowing that it is coming to an end. It is time for incorporating these new ways of learning and rich learning experiences for students in environments that support both assessment and learning. In other words, it is learning environments which the students can construct to accord with their own realities, without distorting this aspiration by assessment.

Most learning theories have difficulty in providing for environments that support students because of accountability and its control of observable, measurable facts. Nevertheless, behaviourists attach primary importance to the learning environment:

> Here education hopes to focus on total human behaviour…rather than one aspect of behaviour; here education hopes to focus upon experience, from which both the means and ends of education are drawn; and here, above all, education hopes to focus upon intellectual behaviour – the 'training of the mind' for behaviour unguided by intellect is aimless and unproductive…and when examined is incapable of contributing to the improvement of the individual or social life.
>
> (Brauner & Burns, 1965: 53)

Reality for the student then, is an assessment of how they act and behave in an educational setting. Essentialists, perennialists are more focused on how students learn the material being presented to them. Yet, constructivists and postmodernists believe students' ability to understand is enhanced when they are connected with situations which help them understand the 'why, how, where and when'. Take for example the context in which something is understood is important for creating a relationship between information, the student and the environment: creation of learning environments that allow and encourage students to make connections with previously learned material. Discovery learning is "an approach to instruction which enables students to interact with their environment, by exploring and manipulating objects, wrestling with questions and controversies, or performing experiments" (Ormrod, 1995: 442).

In the context of assessment, this approach allows students to use the process of inquiry as a means for them to discover their own reality, the process of learning as well as the product of that process; rather than *acquiring* as the mastery and possession of some fixed body of knowledge being a specific view of reality, simply the end product of that process. Clearly, assessment can mean little more than providing students with opportunities and conditions that enable them "to distinguish beliefs grounded in experience from those imposed by authority and to form judgments based on an analysis of data yielded by experience instead of mindlessly accepting judgments (prejudgments; prejudices) offered to them: (Brauner & Burns, 1965: 52) in short it is ownership of their learning.

Engaging students in a variety of contextual situations and giving them freedom to explore was a fundamental pedagogical position in Immanuel Kant's (1781) view of education. In *On Pedagogics* (Kant, 1803: 40) "the individual learns most thoroughly and best retains those things which he learns, as it were, for [them]selves… the principal needed therefore is to teach children to think and not train them like animals". Kant, a constructivist, also believed that education of the future must be based on the Socratic Method. His logic here was that individuals must make use of their own understanding despite illusions which challenge reality. Experience is something of which we are conscious. It is the first result of our comprehension, but it is not the limit of our understanding, since it stimulates our faculty for reasoning, but does not satisfy our desire for knowledge. Kant in *Critiques of Pure and Practical Reason* presents the idea that individuals must determine the good subjectively for themselves.

Research into theories of learning, as suggested here, has not yet produced a successful theory for exploratory learning environments. There have been models of explorative learning such as E-Slate (Koutlis, Kynigos, Kyrimis, Tsironis Vasiliou 1997) which is an exploratory learning environment that builds on a component based approach. Computer Based Learning (CBL), and its related methods, such as Computer Assisted Instruction (CAI), Internet Based Learning (IBL), and its corresponding variants which assess a wider range of knowledge and abilities; the ISIS-Tutor system which provides an example of integrating hypermedia technology into an intelligent learning environment just to list a few examples which allow students to direct their own learning. However, the emphasis despite the process of discovery, or guided discovery, is nonetheless to assess the students on mastery of facts, concepts, and procedures. This is because assessment outcome measures of learning are focused on basic or core knowledge and skills. According to Wood, Underwood and Avis (1999: 102-103) in their studies of CAL in general and ILS "the assessment of performance which underpins CAL or ILS is that of a traditional kind. Since the models used to characterise student knowledge are based on these assessments, they constrain the definition of tutorial goals and the planning of routes through the teaching materials. So, any limitations on assessments are likely to be reflected in the restricted range of learning goals and pathways that ILS can support".

In conclusion, Wood (et al. 1999: 104) stated that "either one accepts that such learning environments have no place in the classroom at all, or one accepts that they must be integrated alongside other teaching and learning practices if they are to work as a significant contributor to learning and understanding".

2.8.6 Learning and Assessment in an ELE

The starting point for our frame of reference is the belief in designing an inquiring and supportive learning experience that focuses on both the process of learning and the product of that process. Essentially the models of communication to be employed are the facilitator as the assessor and students in situational contexts from which to make meaning. Over the last four decades educational learning theories have evolved from behaviourism through cognitive information processing to the current emphasis on constructivism and postmodernism. The main pedagogical components commonly associated with a constructivist learning context are: a cognitively engaged student who actively seeks to explore his or her environment for new information, hands-on interaction with the materials of the task, problem-solving contexts, and human interactions during the process. Postmodernism encourages students to understand that reality is not *entirely* a human construction but rather is the product of an *interaction* between our ideas about the world and our experience of the world. Thus, the main pedagogical means of a postmodern learning situation are: developing a 'working understanding' of reality and life, one which suits students' purposes and the importance of educators in *motivating* and *facilitating* learning. Focusing on constructivist and postmodern approaches to learning, assessment then will incorporate not only the product of the process but the process of learning as well as the product. Placing the student in a variety of contexts optimizes learning conditions for students and encourages them to make sense of their world. Studies have found that higher order thinking skills are not acquired through transference, but rather through students' active involvement with information (Collins Brown & Newman, 1989, Resnick, 1987). Respectively, assessment needs to be critical in its approach otherwise it encourages convergent rather than divergent thinking. It takes a very creative educator to implement a constructivist-postmodern pedagogy with assessment rooted in behaviourist theories. This means that increasing use of

behaviourist assessment tools will likely, at least in the short run, result in a movement away from constructivism and postmodernism in classrooms.

Based on this research and experience, it is our belief that students construct their own understanding of knowledge as a result of reflecting on their experiences. Exploratory Learning Environments, therefore enable links, i.e. thought with activity, focusing on the context-embedded, interpretive process of knowing what to do. Students construct their own understanding of the world they live in and "emphasis on discovery in learning has precisely the effect on the student of leading them to organise what they have been encountering in a manner to discover regularity and relatedness" (Bruner, 1961).

"The principal goal of education is to create students who are capable of doing new things, not simply of repeating what other generations have done, [people] who are creative, inventive and discoverers" (Piaget, 1973). Piaget, when wanting to understand logical reasoning or creativity used two measures only: a) the *number* of different ideas used and b) the *uniqueness* of ideas used (Maccoby & Jacklin 1974). The real paradox with assessment lies in the fact that education has assumed social, political and moral responsibilities for perpetuating the 'old world' (*what* the product *is relevant* to); whereas learning seeks to develop inventiveness and intuitiveness through discovery (*what is relevant t*o the student).

Our theoretical perspective on exploratory learning environments is similar to those developed by constructionist learning environments in that the constructivist conceptions of learning begun to have a great impact on the design of the learning environment. Constructivist conceptions of learning assume that knowledge is individually constructed and socially co-constructed by the learners on the basis of their interpretations of experiences in the world (Jonassen, 1998). Vygotsky (1962) talked about children being like apprentices; collaborative construction of knowledge through social negotiation, not competition among students for recognition. Children do not just develop in a vacuum, instead they watch and act like apprentices to older children and adults. According to Piaget (1965), every behaviour and thought occurs to enable individuals to adapt to the environment in increasingly satisfactory ways. A key component of cognitive developmental theory centres on how children

understand and categorize the world around them (Hargreaves & Colley, 1986). In essence, exploratory learning environments value personal autonomy, generativity, reflectivity, active engagement, personal relevance and cultural pluralism (Sherry, et al. 2000: 109). In other words, inquiry helps immerse students into situations and this is the best way to learn. Students are engaged in a continuous process of reality construction in an environment that reflects the context in which opportunities will be created in situ.

The Exploratory Learning Environment (ELE) sets up a framework (ELE framework) where curriculum function as guidelines supporting expansive learning, by providing opportunities for students to engage in environments that support their articulation, explication and defend their ideas and hidden motives. Students are able to manage meaning amid a high degree of uncertainty about how to accept and have ownership of their learning. The key features of the ELE are that conditions are created which:

1. facilitate and support learning
2. engage students in higher level cognitive activities
3. provide students with opportunities and means for motivating and effective self-directed learning
4. enable learning by doing
5. support assessment of learning by focusing the process of learning through constant and constructive feedback

In short, students' products are their own understanding of reality. In this way, assessment of learning becomes more valid as students are empowered to construct and understand by shaping their own understandings about their world. Page (1885) made this observation:

> It is always a very difficult question for the teacher to settle, "how far shall I help the pupil and how far shall the pupil be required to help himself?" […] The true way is to neither discourage inquiry nor answer the question. Converse with the scholar a little…go just so far as to enlighten him a little and put him on the scent, then leave him to achieve the victory for [themselves].
>
> (Page in Bruner, 1973)

This excerpt, first written in 1847, dramatizes how Bruner's (1973) instruction should be designed to facilitate extrapolation and or fill in the gaps going beyond the information given. According to Piaget (1929) children will provide different explanations of reality at different stages of cognitive development, and Dewey in his *Schools of Tomorrow* in his frequent criticism of education stated "what the pupil really needs is not exact information …but how to find out for himself. To find out how to make knowledge when it is needed is the true end of the acquisition of information in school, not the information itself" (Dewey, 1915: 16).

It is argued that exploratory learning is a context that gives students opportunities to direct their own learning as they explore and construct their own realities. It disestablishes assessment illusions of reality because assumptions are subject to disapproval, or at least refinement. That means, traditional questioning for responses that cover the content and process. These objectives dictate the nature of assessment in favour of observation of students identifying (*what they know*) analysing (*what they need to know*) rather than connecting students with the situation or context to generate their questions **(***how we can know them*) in order for them to produce their own product (*their attempts to understand their reality*).

2.9 Summary of Chapter 2

We have reviewed several learning theories that form the theoretical basis and the rationale for our Exploratory Learning Environment model which sets up a Exploratory Learning Framework. John Dewey (1859-1952) and William Kilpatrick (1872-1965) believed that environments which parallel the real world create conditions for students to be more flexible in constructing their own place in the world. Jerome Bruner (1986) stated that the environment is the key to learning. In his view 'there should be new ways for learners to analyse their environments and challenge perceptions, myths and illusions that take away from 'discovery learning' (Bruner, 1986: 138). Exploration and discovery invites the student to think, go beyond the given information and to discover truths that are to be understood.

In a constructivist environment, Ernst von Glaserfeld (1995) says it becomes clear that the ways students perceive their environment may be very different from those ways intended by their educators, which "includes curricula, textbooks, didactic

props including assessment tasks they are given" (Fosnot, 1996: 8). Thus educators need to not only make changes in learning but in assessment if they are to have an understanding of the experiences and "conceptual relations the students "possess at the moment" (Fosnot, *op. cit.*: 7). Thus, the environment becomes a place in which the student interacts with a variety of resources.

A postmodernist approach to assessment enables students to create their own reality; to use critical thinking skills, inquiry, question-asking, and to handle controversy and contradiction. Understanding then is the *'process of that product'* an *interaction* between students' ideas about the world and their experience of the world, and assessment from the vantage point of experience, culture, ideas, interests, needs and values. As E.T. Gendlin (1997) states, "all experience is influenced by our concepts: we "see" things, even physical things, through cultural lenses".

From this account, our findings from the Literature Review suggested that exploratory learning environments have the potential to support students make sense of their world. This is best summarized by von Glaserfeld's (1995) contention that educators' understanding of supportive learning environments and students' experiences enable them to scaffold their pedagogy in ways that support learning, in this case, assessment of their learning. As Dewey writes, as we alter our relationship with our environment, we ourselves are made different by practice and experience and every belief should be evaluated to establish reality. Accordingly, Exploratory Learning Environments enable students to assess outcomes, learning goals or their own productivity. Development is not a simple linear process as suggested by current assessment practices. Learning reflects a broad continuum of development, which is dependent on environment and context.

The evolution of assessment over the past one hundred years has led to the view that school improvements require:

- higher achievement *standards,*
- ensuring those expectations meet rigorous assessments, and
- the expectation of accountability for student achievement, as reflected in test outcomes and benchmarks.

Thus, an Exploratory Learning Environment model sets up a framework to develop and implement learning and assessment in a learning environment, which is based on a set of ideas and theories referred to as humanism, constructivism and postmodernism, which it is believed will enhance the relationship between learning and assessment by supporting learning and enabling educators to scaffold their pedagogy to promote and document the process of learning. Exploratory and supportive learning environments are gaining momentum. Educators have realized that for students to be successful in the twenty first century they need to be lifelong students. To support students in their attempts to understand the real world requires a different approach to assessing learning. When students' products are processes of their own understanding of reality then assessment is enhanced as this model would stress the process of learning rather than the results. Therefore, an Exploratory Learning Environment would be a more valid process of assessment as students would be empowered to construct and create their personal view of the world. Hence, assessment is more likely to reflect the diversity of students and realities of their lives as they are engaged in the process of understanding their performance or measuring their own productivity. This involves facilitating students in exploring things for themselves. Learning and assessment are interwoven and serve as self-analysis tools, whilst environments provide opportunities that help students interpret the multiple perspectives of the world. Thus, the ELE would support choices that facilitators make by providing pathways, situations, contexts and places for students to understand, to share with others and the world.

Chapter 3 – Methodology

3.0 Introduction

This chapter describes the methods used in the study. Included in this section are the research questions, descriptions of the research design, survey instruments, the research population, the process for data collection, and the analysis plan. First the research questions are outlined and the research design used to answer them is explained. Explanations of the ELE and its use in secondary schools are followed by an overview of the study, which is grouped chronologically and then rearranged according to the research questions they address. Details are given of surveys and interviews used for additional data collection. The chapter concludes with a general overview of the analysis.

3.1 Research Design

The general research question asks whether an exploratory learning environment can enhance the relationship between learning and assessment. Specifically, the study will investigate the following questions:

1. What principals would form a theoretical framework of an environment enabling learning by exploration of different ways of approaching problems?
2. How could an exploratory learning model help us to link assessment and learning in a way that would not threaten the negotiation basis of learning?

The literature reviewed examined learning theories and learning environments which detail how to design and implement these, but ignore the place of learning in the process of assessment. Through this investigation we have come to believe that environments can indeed be powerful and motivating tools for assessing learning. But can we demonstrate that exploratory learning environments enhance the relationship between learning and assessment? It is frequently asserted that environments boost engagement and facilitate learning. But when we explored this field further, (e.g. Dewey, 1939, Freire 1993, Vygotsky, 1978, Gagne, 1985, Rousseau, 1972, Giroux, 1995, Kolb, 1984, Lave & Wenger, 1991, and by analysing Wang, Reynolds, & Walberg, 1994) “what works and what doesn't work: the case for

an inclusive system" a rethinking policy on changing how and what happens in schools, it became clear that practice of assessment ignores the learning process. These studies have influenced many of the current situated learning conditions; however the researcher found little evidence connecting learning and assessment in contexts and the context of classrooms that can assist improvement in assessment of learning. This lack of inclusiveness has meant that while Dewey et al. have been enormously influential in education for many years, assessment has lagged behind.

The research sought to investigate the nature of a purposely-designed exploratory learning environment based on humanist-constructivist-postmodern learning, and to explore students' perceptions of assessment and the learning environment in depth. The use of a qualitative methodology was considered more suitable for this purpose because of its compatibility with the theoretical framework and the nature of the research aims. The methodology was guided by the principals of ethnographic inquiry outlined by researchers such as Geertz (1973), Goetz and LeCompte (1984), Wolcott (1988) and Goto (1997).

According to Spradley (1979), ethnography is "the work of describing a culture" (1979: 3). Although this approach is commonly used by anthropologists to study exotic cultures and primitive societies, Spradley suggests that it is a useful tool for "understanding how other people see their experience" (Spradley, *op. cit.*: 4). He emphasizes, however, that "rather than studying people, ethnography means learning from people" (Spradley, *op. cit.*: 3). Ethnographic research has broad implications for many fields, including education. Educators can use this approach to understand students' needs, experiences, viewpoints and goals. Such information can enable them to design useful and worthwhile learning environments and ultimately improve student learning. Kantor, Kirby and Goetz (1981: 305) address this point along with collaboration between teachers and researchers:

> Experienced teachers have knowledge of students in classroom settings which make them potentially strong researchers: ethnography allows them to use that knowledge and open opportunities for dialogue between teachers and researchers.
>
> (Kantor, Kirby & Goetz, *ibid.*)

Moreover, we have moved away from 'natural learning environments' to classrooms which narrow learning opportunities and experiences. What we wanted to find out was if there was a difference between learning as 'having an experience' and learning as 'knowing an experience'? Experience, therefore, can be quite a problematic notion. For Dewey (1916, 1929, 1938a) experience is an active transaction that coordinates doing and undergoing. In other words, as Dewey (1929) states, this means distinguishing between two senses of the word 'having an experience' and 'knowing an experience'. As Boud et al. (1996: 6) explains 'having' points to the immediacy of contact with the events of life; 'knowing' to the interpretation of the events. Sometimes experience and assessment of that learning experience can be seen just in the former sense. Our Exploratory Learning Environment framework endeavours to approach experience at two levels: primary experience is what occurs through a minimum of incidental reflection, and secondary 'reflective' experience through 'the intervention of systematic thinking' (Dewey, 1929: 4). Thus the process of exploration involves reflection on learning experiences. In this way, learning and assessment can be united. Writers on experiential learning like Boud (et al. 1993) have tended to follow the line that "experience has within it judgment, thought and connectedness with other experience". Oakshott (1933: 9) has argued that 'experiencing' and 'what is experienced' "stand to one another in the most complete interdependence; they comprise a single whole". Säljö (1979), concurs and states that

1. Learning is making sense of abstracting meaning.
2. Learning involves relating parts of the contexts to each other and to the real world.
3. Learning as interpreting and understanding reality in different ways. (quoted in Ramsden 1992: 26)

These assumptions look to the 'internal' or personal aspect of learning. Learning is seen as something that you do in order to understand the real world. In some ways the difference here involves what Gilbert Ryle (1949) has termed 'knowing'. Learning 'how to think' is not like learning 'what to think' or acquiring information. Truths can be imparted: how students as thinkers process information (how), whereas processes can only be inculcated (what): students need not understand the relevance

and logic of what information they learn to absorb. In other words, students "who conceive of learning as understanding reality are also able to see it as increasing their knowledge" (Ramsden, 1992: 27). Thus assessment of learning needs to include not only the product of learning but the process of learning.

In an attempt to further clarify the meaning of learning by exploration and experience, and to provide a rationale for the exploratory learning environment, the researcher felt it valuable to focus on how the environment contributes to the learning process (the independent variable) and look primarily at the end product in that process, how the student reflects on that process of learning (the dependent variable). We would offer strategies which assist students in assessing the enabling power of the strategies (solutions) which they apply in the context of their learning activities (connecting assessment with learning), to investigate is the link between the realities students construct in an exploratory learning environment compared with the kinds of experiences we control for students in a non-exploratory environment.

Thus, the researcher conducted an ethnographic study of how assessment may influence learning in Exploratory Learning Environments and advance a theoretical framework through which the findings can be interpreted. A fundamental assumption guiding the work is that the articulation of such a framework, if it is to be productive, should rest on a detailed analysis and understanding of specific instances of learning and assessment. The purpose of the research was to design and implement a model that sets up a framework where curriculum functions as guidelines supporting expansive learning using humanist, constructivist and postmodern principals to determine:

1. Would an Exploratory Learning Environment Framework, using theoretical perspectives from humanist, constructivist, and postmodern learning theories set up a framework where curriculum functions as guidelines supporting expansive learning rather than constraints limiting students' exploratory opportunities?
2. Would an Exploratory Learning Environment (ELE) offer an environment which specifically enhances the relationship between learning and assessment?

Thus the specific research questions are:

1. What principals would form a theoretical framework of an environment enabling learning by exploration of different ways of approaching problems?
2. How could an exploratory learning model help us to link assessment and learning in a way that would not threaten the negotiation basis of learning?

3.1.1 Validity and Reliability

The researcher integrated qualitative and quantitative data to provide empirical documentation of the impact on an exploratory learning model in linking assessment to learning in a way that would not threaten the learning process. Taft (1988) describes validity as being a "quality of the conclusions and the processes through which these were reached" (Taft, 1988: 61). The ultimate purpose of conducting any research study is that it may contribute to the field of study. Two research issues that contribute to the success of a study are the validity and reliability of the data collection and the analysis to determine plausible conclusions. The use of qualitative and quantitative data for this research provides for multiple methods of data collection and analysis, thus contributing to the validity and reliability of the study through triangulation (Lincoln & Guba, 1985, Patton, 1990, Tashakkori & Teddlie, 1998).

Goetz and LeCompte (1984) describe the high degree of internal validity inherent in ethnographic research. They note that participant observation provides the "opportunity for continual data analysis and comparison to refine constructs and to ensure the match between scientific categories and participant reality" (Goetz & LeCompte, 1984: 221). It is also "conducted in natural settings that reflect the reality of the life experiences of participants more accurately than do more contrived or laboratory settings" (Goetz & LeCompte, *ibid.*). They argue as well that informant interviews are "less abstract than many instruments used in other research designs' (Goetz & LeCompte, *ibid.*). Thus, the vantage point for understanding human activities lies in the frame of reference of the participant in action (Burrel & Morgan, 1979). This approach highlights the importance of the act of understanding as

something which is personally experienced and which can thus be best understood from the inside, i.e. from the subjective experience of individuals.

Spradley (1980) further posits that because so much of any culture consists of implied understanding, interviewees often understand things they cannot articulate or express consciously. Thus, the role of the ethnographer "is to make inferences about what people know by listening carefully to what they say [and] by observing their behaviour" (Spradley, 1980: 11). This is why ethnographers must participate in the study as well as observe. In this study, the researcher is the participant/observer. As Spradley maintains, "participation allows you to experience activities directly, to get the feel of what events are like, and to record your own perceptions" (Spradley, *op. cit.*: 51).

As qualitative research relies heavily on induction and the product, some quantitative analysis has been provided to give a broader meaning to the results by describing the relationship between the variables. "If something exists, it exists in some amount. If it exists in some amount, then it is capable of being measured" (Rene Descartes, 1644: 2).

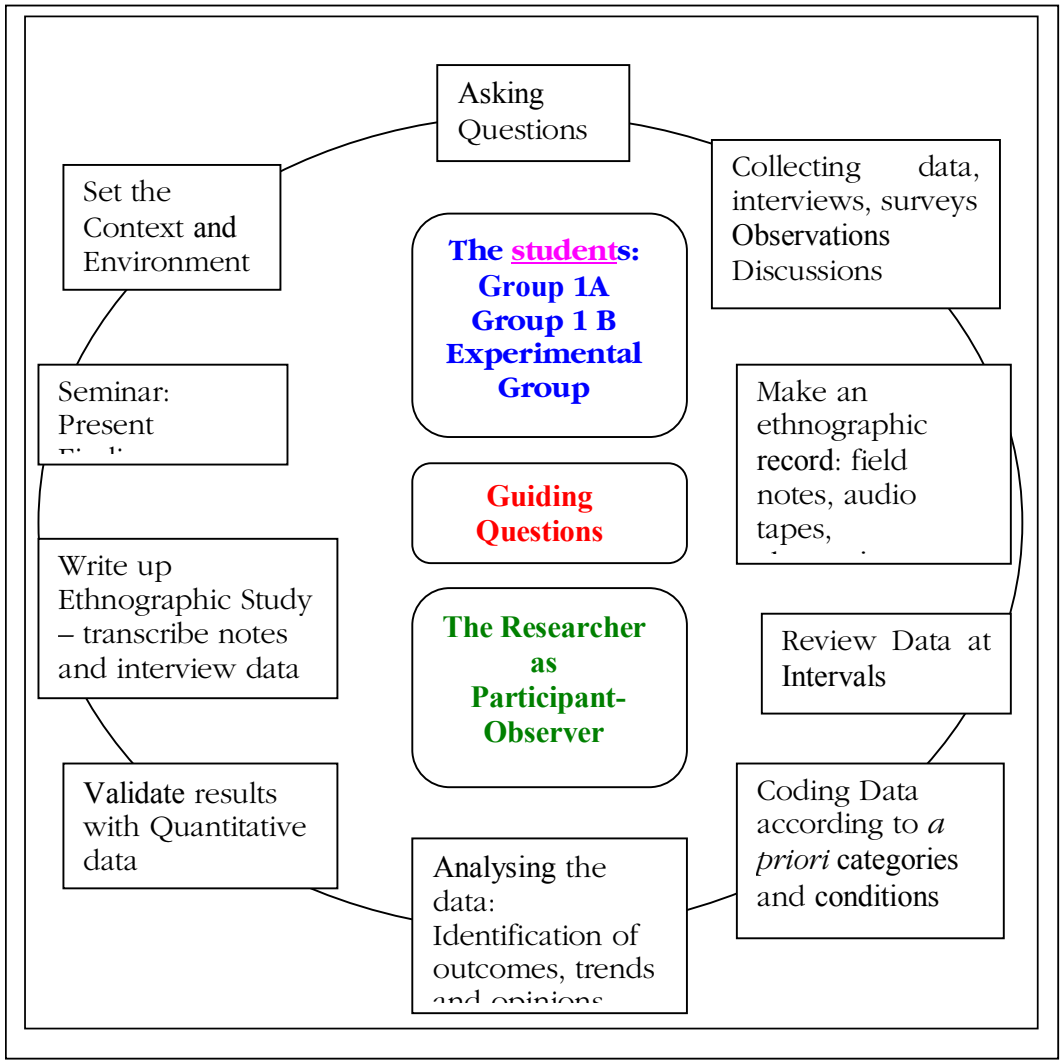
In this study, the participants will be secondary school students who received a prescribed set of instructions to follow before commencing this program. The maturation threat to acceptance of evaluation results which states that the performance would have improved - even if they did not experience the intervention - just because of the additional experience they would have gained with the passage of time, often occurs with post-test differences for the study groups, and in this study is addressed by the use of a comparison group similar in composition to the study groups. Introduction activities related to a common context and using similar types of activities assured consistency of the environment during the study and reduced location threat. The reliability of the study was established by a consistent structure of pre and post assessments, collection of data and an outline of procedures.

The quantitative data (pre, post assessments and self-assessment) and qualitative data (products, reflections, feedback surveys, interviews, and peer assessment rubric) underwent a quantitative analysis developed by Patton (1990) who writes that the

challenge of qualitative analysis is “to make sense of massive amounts of data, reduce the volume of information, identify significant patterns, and construct a framework for communication of the essence of what the data reveal” (Patton, 1990: 371-372).

The ethnographic research cycle of this inquiry showing the relationships of theory, data, research questions, and analyses is presented in Figure 1. We began with a guiding question which asks whether a specific kind of supportive learning environment can enhance the relationship between learning and assessment as well as ensuring processes to reflect on an understanding of anthropological method and perspective for viewing students and exploratory learning environments. This enabled consideration of the ways social practices were constructed, patterned, recognized, and integrated into systems of meaning.

Figure 1: The Ethnographic research cycle used in this study



3.2 Research Justification

From the beginning of this investigation the researcher was interested in an ethnographic research study, specifically one that would begin with the observation of students in their school environments. John Dewey theorized that learning should not only prepare one for life, but should also be an integral part of life itself. We wanted to (1) gain new insights into how the environment could be employed to benefit students, and (2) develop a research-based program that teachers could use when assessing learning or the product of that learning process. The Rationale for Assessment for Learning is included as Appendix A.

The purpose was to determine the possibility of applying a framework based on the theories of humanism (natural learning), constructivism and postmodernism to the design of an Exploratory Learning Environment for students, to investigate their interactions and validate their realities. Assessment of learning in this environment depends on explorations by students, such as the ability to formulate hypotheses, define problems, generate and evaluate alternatives, draw conclusions based on their findings, monitor their progress in the learning process and receive constructive feedback – the negotiated basis of learning. In response to these challenges, a functional framework, the ELE framework for the design of exploratory learning environments was created to enable curriculum to function as guidelines for supporting unrestrained exploratory learning opportunities. Thus, the Exploratory Learning Environment model, ELE for short, gave us the opportunity to apply and test these theories and understanding to 'real-life' contexts. Bruner (1960), states that one way to generate a course of action was to present contexts as a set of unknowns. Simulating contextual problems, problem solving and critical dialogue are some of the functions of the ELE. Bruner writes that class discussion enables students to think and share, and learning was an instrument for checking and improving the process (Bruner, *op. cit.*: 87). Rubrics (a set of scoring guidelines [criteria] for assessing the learning process and final product) were designed to provide feedback and to encourage students to take ownership of their learning and provide a tool for consistent and reliable assessment of learning by teachers. Levels of understanding move the student from *novice* to *expert* performance, through problem solving in real world contexts. Thus, the assessment tools, in this study, rubrics for assessing understanding and learning (Appendix C), peer assessment rubrics and self-assessment rubrics (Appendix D) recognise that understanding and learning is relevant to students' interpretation of information and sensory experiences which become integrated into existing meaning making structures. Understanding is, therefore, always evolving. Specifically then, the contexts and learning environments facilitate experiences which encourage mutual decision-making, and shared analysis amongst students (experiences that are valuable in the work world). Finally, Brown et al. (1989) believe that the closer the situated learning environment matches the workplace, the more likely the transfer of skills and knowledge to new contexts. Clearly, the proposition that understanding evolves is fundamentally motivating. This

position can be gleaned from Dewey's (1916) progressive inquiry approach, Bruner's (1961) discovery learning, Vygotsky's (1987) Zone of Proximal Development, and Lave and Wenger's (1991) situated cognition as a social learning theory. LeCompte and Preissle (1993) contended that: "the purpose of theories is to help us sort out our world, make sense of it, guide how we behave in it, and predict what might happen next" (LeCompte & Preissle, *op. cit*.: 120). How do we improve contexts and the context of classrooms? This is what we propose. The methodology (*Appendix N – The ELE Context Assessment Planner)* is composed of six steps, which involves 1) the rationale, 2) setting the context of the classroom, i.e. setting conditions which allow students to negotiate the terms of reference which inform their interpretations of the learning demands), 3) generate opportunities, 4) feedback loop, 5) assessment stages - connect learning with assessment, 6) evaluation and reflection. The methodology is guided by general principals for humanistic and constructivist learning environment. Assessment concepts have been developed from postmodern thought. Connections between summative (prove) and formative (improve) assessments are planned in advance with the aim of building a sequence of data that make it possible to analyse the learning process as a value link. The ELE methodology is summarised in Table 3:1.

Table 3:1: The ELE Methodology

<table>
<tr><td colspan="4">THE ELE METHODOLOGY</td></tr>
<tr><td colspan="4">Starting the Program</td></tr>
<tr><td colspan="4">1. Introduction: Rationale "assisting students to explore, engage, explain and elaborate will make learning a part of living, not just a preparation for it, and in so doing enhance the relationship between learning and assessment".

2. Environment Setting (including teacher/students)</td></tr>
<tr><td colspan="4">Setting the Context</td></tr>
<tr><td colspan="4">1. Set the context
2. Describe the Exploratory Learning Environment
3. Explain the process of learning and assessment
4. Assign tasks, handout on The Nature of Conflict
5. Define the problem
6. Confront, Challenge, Contest, Compare, Contrast, Construct, Connect</td></tr>
<tr><td colspan="4">Preplanning Summative Assessment and Feedback Loop</td></tr>
<tr><td>Hypothesis</td><td colspan="2">Learning Issues</td><td>Action Plan</td></tr>
<tr><td>Students' conjectures regarding the context – may involve causation, effect, possible resolutions</td><td colspan="2">Students' lists of what they know or understanding in order to generate their own questions to complete the assessment task</td><td>Things that need to be done in order to complete the process</td></tr>
<tr><td colspan="4">7. Reasoning, Exploring, Investigating, Discovering
8. Generate, Evaluate and choose a course of action
9. Teacher (Researcher) records observations of Environment include the date, time, place and as much detail as possible about what occurred, including significant verbatim details of conversations. Review data at intervals, with a view through the 'critical window' to direct the research towards further observations in order to clarify points or look for exceptions.
10. Collect Assessment Data prior to ELE Intervention and Set up Feedback Loop.</td></tr>
<tr><td colspan="4">Formative Assessment Stage</td></tr>
<tr><td>IDEAS (Hypothesis)</td><td>DATA</td><td>LEARNING ISSUES</td><td>ACTION PLAN</td></tr>
<tr><td>Reason/Expand/ Elaborate</td><td>Interpret/Evaluate/ Synthesize and Re Evaluate</td><td>Identify/Justify/ Validate</td><td>Make Meaning based on understanding of own reality</td></tr>
<tr><td colspan="4">11. Conduct Interviews: formal interviews consisting of a written list of questions to be covered in a particular order (see Appendix F). Informal interviews: try to get the students to speak freely with minimum control of their responses.
12. Continue to collect data through participant observation and feedback options</td></tr>
<tr><td colspan="4">Performance Presentation and Summative Assessment</td></tr>
<tr><td colspan="4">13. Students as well as Researcher (Teacher) to assess the 'product' being presented to the class. Hand out Peer Assessment Rubric (see Appendix D), Researcher's (Teacher's) Rubric (Appendix C) and Student Self-assessment Rubric (Appendix I).</td></tr>
<tr><td colspan="4">Evaluation and Reflection</td></tr>
<tr><td colspan="4">14. Self-assessment (followed by ELE Feedback Survey) for all participants
• Reasoning and Reflection on the process of learning and the 'product' of that process.
15. Reassess the process and complete the Student Self-assessment Rubric.
16. Review Methodology and analysis of data.</td></tr>
</table>

3.3 What is an Exploratory Learning Environment?

The term ELE stands for 'exploratory learning environment'. The design of the ELE model supports students' conceptual expansion, a worthwhile objective in all contexts. By creating conditions which allow students to negotiate the terms of reference helps them interpret learning demands by evaluating (negotiating) the enabling power of the strategies which they apply in their learning context. As Bruner noted: 'all meaning is negotiated; all knowledge is transactional' (quoted in Latchem, et al. 1993). Instead of providing information, channelling views of learning, the ELE model sets up a framework where curriculum functions as guidelines for contexts which support natural learning and a constructivist-postmodern approach to the learning process which emphasises activities like construction, representation, exploration, synthesis of information, communication and collaboration as crucial facets of learning. The Exploratory Learning Environment facilitates and supports learning; students engage in higher level cognitive activities like generating hypotheses and testing them, making generalisations and testing assumptions, finding relevance, making comparisons, classifying and (re)structuring information, discovering inter-relationships, constructing, creating and reaching conclusions following various paths.

The ELE provides students with an opportunity and a means for motivating and effective self-directed learning. Basically it offers a 'learning by doing' ideology when creating exploratory learning environments. Thus assessment for learning in such an environment strives to provide the feedback for motivated learning.

To explain, exploratory ('how to think' - for formative and summative assessment) and linear paths ('what to think' – for summative assessment) may fulfil the same learning objectives, but depending on whose version of reality, one might be more desirable than the other. To enhance the relationship between learning and assessment, the former is more desirable in terms of not only proving learning but improving understanding. For example, if you wanted to make sure that a student understood every stage of the Norman Invasion in 1066, a linear program might be more successful. If the context allowed the student to freely explore, how and why the Norman Invasion occurred in 1066, it would be better to have students explore

several sources at their own free will. In this situation, students would be able to explore concepts that interest them, in an order that they can appreciate, which will increase the learning and understanding of why the invasion occurred rather than when it occurred.

However it does not matter what kind of assessment students need to undertake, the case this study makes is that students are better prepared by features of the ELE in order for them to attain assessment goals. Thus, the ELE supports both the idea of a dynamic learning environment for active and personalised learning through experience, inquiry, experimentation and reflection and assessment of that learning which focuses on how students make meaning based on an understanding of their own reality.

The study was carried out in the context of an ELE at two secondary schools. Because data was collected in real learning environments, the research questions were addressed using products of students' performance, students' evaluations, semi-guided interviews, participant-observer reflections and feedback survey. Although the research questions could be answered more effectively using hypothesis-testing and the ethnographic approach, the research design nonetheless takes an eclectic approach, using both qualitative and quantitative methods of data collection, attempting to provide answers to the research questions.

Qualitative data were collected at two levels: firstly data were collected by student surveys and self-assessment rubric and secondly via semi-guided interviews with individual students. The student surveys, ELE feedback surveys and semi-guided interviews focused on students' views and perceptions of assessment in the ELE model, effectiveness of learning environments and traditional classrooms, the value of peer and self-assessment and suggestions for improvement in learning and assessment.

The quantitative data were the pre and post assessment scores on computer generated spreadsheets with data taken directly from pre intervention performance marks and marks from the ELE model. As the nature of this research was cumulative, some issues identified by students on early surveys or semi-guided interviews were

investigated in later surveys and interviews. Thus the quantitative data for the three groups came from pre intervention assessment marks or performance, ratings from the self-assessment rubrics and teachers' assessment rubrics of the students' final 'product', where novice to expert levels were assigned values. This research has been instrumental in promoting the use of assessment and the use of assessment in advancing learning.

The research was designed to be conducted in several interrelated stages. This will be organised in 3 parts which will cover:

1. *Part 1: Definition of the 10 Principals involved in Exploratory Learning Environment*

    - The first stage of the research was to identify the critical principals of exploratory learning environment from the research, debates and discussion generated from the literature

2. *Part 2: Research Design and creation of the ELE theoretical framework*

    - A framework was designed to incorporate the elements of exploratory learning environments (determined in Part 3.1). An Assessment for Learning Matrix was developed, as well as a Rubric for Understanding Peer and Self-assessment Rubrics for contexts in humanities from K-12, to articulate the link between criteria of judgment and those of the students together with suggestions for their implementation.

3. *Part 3: The implementation of the Exploratory Learning Model*

    - Part 3 of the research investigated students' perceptions of their experiences using an exploratory learning environment (ELE model) based on the created humanistic/constructivist/postmodern ELE theoretical framework to be implemented in a secondary school classroom environment.

3.3.1 Part 1: Definition of the 10 Principals involved in the ELE

The Exploratory Learning Environment theoretical framework offers a methodology that allows the environment to provide support and assistance to the students by presenting the context and opportunities for students' investigations, engagement and connectedness with real world situations. Learning-by-doing (exploration - natural learning) is an effective technique for learning, in particular for student self direction, pace, discovery and exploratory experiences. This technique enables students to make meaning and understand their own realities. As a strategy then, exploratory learning motivates students and generates high quality learning outcomes.

This statement is based on the premise that one learns more by actually doing, rather than by being told how to do it. Students learn best by doing, experimenting and involvement, as their personal involvement is crucial to their understanding of the real world. Students need to be challenged continuously, in order to build new pathways which are dependent upon the environment: exploratory environments that enable students to gain new knowledge that can be applied to previous experiences. Students will not only gain knowledge; they will also have knowledge about how to acquire knowledge and be able to critically evaluate new knowledge. Rogers and Freiberg (1994) claim that there is actually evidence based on research and decades of experience that learning is more effective with active students than with passive receivers; Rogers and Freiberg claim:

> The only person who is educated is the person who has learned how to learn; the person who has learned how to adapt and change; the person who has realized that no knowledge is secure, that only the process of seeking knowledge gives a basis for security. Changingness, reliance on process rather than on static knowledge, is the only thing that makes any sense as a goal for education in the modern world.
>
> (Rogers & Freiberg, *op. cit.*: 152)

Based on discussion of the approaches available, it was decided that the design of the ELE learning model should adopt a combination of approaches within the realm of humanism, constructivism and postmodernism, encouraging students to reflect on the process of learning as well as the product of that process. A summary of the design is reported in Table 3:2.

Assessment then should reflect these understandings by employing rubrics for quantifying understanding, peer and self-assessment rubrics which include performances and presentations in working towards the product of the process of learning, and using this measure over time to reveal change, growth, the capacity for students to improve the whole of their learning and that learning is a collaborative activity; its aim is wider, better-informed attention to learning by all parties with a stake in its improvement. The point of assessment in the ELE model, is not to gather data and return 'results'; it is a process that starts with the questions of decision-makers, that involves them in the gathering and interpreting of data, and that informs and helps guide continuous improvement. Such an approach aims for a more complete and accurate picture of learning, and therefore firmer bases for improving our students' educational experience.

Table 3:2: Different approaches to the design of learning experiences according to different educational paradigms.

Theory	**View of Learning**	**Facilitator's Role**	**Learning Activities**
Humanism **Theorists** Rousseau Maslow Gagne Carl Rogers	Humanism is generally associated with beliefs about freedom and autonomy and ideas that 'students are capable of making significant personal choices within the constraints imposed by heredity, personal history and environment' (Elias and Merriam 1980:118).	Facilitates development of the whole person	Student directed Choice Responsibility Inquiry based Discovery and Experimentation Cooperative learning
Constructivism (& ecology) **Theorists** Piaget Vygotsky Bruner Kolb Freeman	Constructivism is a philosophy of learning emphasising the 'process' not the 'product' and is founded on the premise that, by reflecting on our experiences, we construct our own understanding of the world we live in. Constructivists provide an environment that encourages students to connect and develop their understanding of reality.	Constructs learning situations and activities. Considers the historical context of learning and thinking.	Student oriented Flexibly constructed Exploration Highly interactive Exploratory Project based Collaborative Critically reflective
Postmodernism **Theorists** Freire Foucault Giroux	Postmodern education is about enabling students to create their own reality; use critical thinking skills, inquiry, question-asking and developing their own critical pedagogy.	Establishes conditions in which critical dialogue can occur.	Student centred Students are agents of change. Connectedness to real world Inquiry, invention and reinvention

Essentially, current literature on learning theories suggests that understanding from experiences is best gained in learning environments which feature some of the following principals. To enable assessment to be an integral part of that learning

process, these ten principals were adapted to ensure inclusiveness of learning and assessment when implementing Exploratory Learning Environments (ELE model):

1. **Supportive Environments** provide contextual situations for students to engage with the real world and are not restricted by subject or discipline boundaries and which in the past may be linked to their prior understanding. As students understand at different paces, supportive environments nurture all learning styles. The control of the environment is left completely to the student.

2. **Exploration** encourages students to initiate and create their own realities and manipulate information and ideas in ways that promote meaning and understanding, and can confidently and coherently communicate ideas, arguments and explanations which augment the students' experiences and hence their personal understandings of the real world.

3. **Experimentation** emphasizes insights, critical thinking - hypotheses to make connections and disclose relationships and meaningfulness – relating new to existing experience.

4. **Experience/Discovery** provides opportunities for students to experience and discover, to test alternatives experimentally. By understanding themselves in different situations, students restructure thoughts, perceptions and actions into a more integrated, coherent whole.

5. **Inquiry** encourages meaningful learning through abstract thinking, reasoning interpretation, analysis organizing and problem-solving.

6. **Critical Dialogue** is a process that arises out of interaction that enables students to discover other people's viewpoints and, in so doing, better appreciate their own understanding. Discussion always precedes written explanation, because it helps to think about and

contextualize situations. In other words, critical dialogue gives the means, ability, or opportunity to do.

7. **Reflection and Culture as a process of meaning** provides opportunities for students to appreciate cultures, create positive relationships and help create their own reality with a sense of community. Culture is best approached through language.

8. **Feedback or self and peer assessment** promotes reflection and self discovery to encourage students' own construction of reality. Through regular assessment students gain confidence and a greater awareness of the real world and their own realities.

9. **Cooperative learning** through encouraging group activities and sharing discovery learning. Students are responsible for one another's learning as well as their own and this can increase interest among the participants and promote critical thinking. Hence shared learning provides opportunity to engage in discussion, take responsibility for one's own learning, and thus become critical thinkers (Totten, Sills, Digby & Russ, 1991).

10. **ICTs** supporting communication for co-discovery and information access. Students' answers to questions or problems can be evaluated immediately.

Table 3:3 provides a checklist of guidelines for the implementation of exploratory learning environments. Assessment works best when it is ongoing not periodic. Assessment is a process which is cumulative and improvement in the process of learning is best fostered when assessment entails a linked series of activities undertaken over time. This may mean tracking the process of individual students, or of cohorts of students. The intention is to monitor progress towards intended expectations in a spirit of continuous improvement. Thus learning provides contexts and environments (Column A) which facilitate the conditions for students to explore, engage, examine, explain and evaluate their understandings. The flow on effect is increased opportunities (Column B) for students to apply concepts, principals, and

modes of inquiry that assessment values and which can be reported, monitored and feedback for improvement in learning.

Column A lists the principals involved in exploratory learning and assessment. Column B shows what humanism, constructivism and postmodernism bring to the ELE model and provides examples of how the ELE framework can be implemented to support expansive learning. The examples in Column C illustrate interpretations of learning that might be shared with other educators and used for assessment, reporting and certifying students' progress. It will be seen that assessment will become, over time, a process of substantiating how students not only construct meaning but can apply their understanding to real world situations.

Table 3:3: Principals of exploratory learning environments with supporting ELE framework for implementation and assessment

Column A	Column B	Column C
Principals of the ELE model	**What humanism, constructivism and postmodernism brings to ELE**	**What ELE brings to assessment**
Supportive Environments	Students construct meaning from what they understand if they are engaged in 'doing the activity'. An environment in which learning is an integrated whole and their understanding as a life long project.	Assessment opportunities are created to observe how students apply their understandings in new and unfamiliar situations.
Exploration	Learning is a problem solving process. When engaged in purposeful learning, problems are encountered and explored in detail	Assessment is continuous, activities are open-ended, providing students with opportunities to demonstrate the extent of their learning and understanding
Experimentation	Through experimentation, the students are actively involved in searching for meaning and the construction of their own realities. Reconstructing what they know and can do to take on new challenges provided by the new experience. Synergy gained from meshing the past with issues of the present and future.	Assessing understanding involves providing opportunities for students to demonstrate what they know and to put their learning into practice, i.e. their own reality. Thus, assessment challenges students' past, present understandings and experiences and is translated into a tool for students to create their own realities.
Experience/ Discovery	Students are encouraged to experience, to discover and to act upon the discovery, to plan, investigate and make choices. Learning results from the experience - the experiential continuum	Assessment is in itself a central learning experience and that inquiry is more student centered, it focuses on student investigation of how and where they access information to understand their experiences.
Inquiry	Students derive satisfaction from self constructed knowledge and curiosity about the contexts. .	Assessment encourages students to invent simulated real worlds to make meaning and connect with the real world.
Critical Dialogue	Encourages students to become more critical toward commonly accepted truisms. Assists students determine or focus their contexts	Assessment encourages students to question and reflect on their learning. As part of the reflective process students make connections between the unknown and the known.
Reflection and Culture as a process of meaning	Creates situations for students to examine, understand and value differences as well as experiences that extend the range of contexts.	Assessment facilitates self-evaluation by the educator and student, of posing potential questions, of challenging outcomes, of supporting and recognizing differences
Feedback/ Assessment	Feedback on the students' performance is given and contributes to assessment for learning	Assessment promotes the development of students who are flexible, and who can connect and adapt to the changes in the real world.
Cooperative Learning	Students work in groups to negotiate and solve problems. It is for the teacher to recognise the importance of the experiences and perspectives of the student in learning	Assessment includes evidence of the work of groups as well as individuals. Group or class discussions enable co-discoveries and make for exploring other interests.
ICTs	Assist students in the organisation and presentation of information	Assessment includes the use of ICTs as a tool for learning and understanding.

The ELE model is about creating conditions allowing students to negotiate the terms of reference which inform their interpretations of the learning demands and with such understanding comes the capacity to improve the whole of their learning.

3.3.2 Part 2: Research Design of the ELE theoretical framework

There are three main steps in designing the ELE theoretical framework for the ELE learning model

1. Learning outcomes and goals (*ELE Context Assessment Planner – Appendix N)* which students are expected to demonstrate are negotiated by the students at the onset of the trial/study. Set the learning context of the ELE learning model to enable exploratory learning opportunities

2. Examples of exploration operations include *Contemplate* (speculate about and experiment with a variety of ideas to invent theories), *Insight* (be able to advance inquiry, hypothesise and make conclusions based on inferences), *Justify* (is able to interpret, evaluate and justify all claims with convincing arguments and compelling evidence) and *Communicate* (can elucidate and connect experiences to real world situations and transfer understanding to new situations). Assessing Learning (*Matrix – Appendix B).*

3. Assessing and validating learning is found in the students' ability to explain in their own words, with examples, the meaning, relevance, significance of their understanding based on views of natural learning advocated by Rousseau and Dewey. *(Rubric for Understanding - Appendix C), ELE Participant Observer Sheet (Appendix L), ELE Observation Assessment Rubric (Appendix M), Peer Assessment (Appendix D) and Student Self-assessment Rubric (Appendix I).*

Exploratory Learning Environment Learning Model Design

Once the principals for an exploratory learning environment and guidelines for their implementation were established, a contextual focus was developed which

operationalised the principals of the Exploratory learning model (Table 3:4). While the context for the development of the framework was not critical, the domain or theme of '*conflict'* was chosen and proved to be particularly appropriate and favourable with students. Before ELE intervention, students in each of the study groups would be given the opportunity to negotiate contexts or themes they were interested in. Some educators have expressed concern that despite the emphasis in curriculum on student centred learning, teachers frequently revert to methods derived solely from their own experiences (Lampert & Ball, 1998) and teach content 'driven by texts and tests'. There is no easy way to assess learning but the ELE makes valid assessment possible, because it encourages students to reflect on the process of learning as well as the assessor. The Exploratory Learning Environment could be used as a tool to address these concerns because it links both the contexts and the learning expectations and outcomes. Assessing learning comprises a continuum of activities, each with an identifiable purpose and clear implications that enable educators to attain positive outcomes for all students. When Column A and Column B (Table 3:3) are used together to inform (prove) and advance (improve) the process of assessment and learning, they must be partnered if it is to enhance the relationship between learning and assessment (Column C in Table 3:3). The ELE would focus on assessment of learning in classrooms (P-12), and is designed primarily for humanities with some application to science. (See Figure 3 for an annotated graphic of the main interface).

Learning Outcomes

The design of this environment is meant to motivate and stimulate, and hence engage students in the process of learning as well as the product of that process. Nothing is simplified or pre-specified for the student. Hence this is an exploratory learning environment with scaffolding designed to support the student in constructing their own reality. Within the context of this exploratory learning environment, there are outcomes related to self-directed learning and ownership of that learning (ELE Context Assessment Planner – *Appendix N*). Students need to be able to develop strategies for deciding, understanding and evaluating from resources and information relevant to those issues. The entire exploratory learning process is designed to assist and support students in developing hypothetico-deductive problem solving responses

which centre on hypothesis generation and evaluation. Since the students have responsibility for their inquiries, there is no guarantee that all responses will be resolved. However, any given hypothesis occurs in several problems, and hence if it does not arise in one, it will almost certainly arise in one of the other hypotheses or solutions. Thus, the outcomes of the program enable students to investigate (know) and construct their own version of their understanding of the real world (show) and summarised as:

> learning environments play a catalytic role in opening the minds of educators to new ideas about students, learning, and the role of assessment in the learning process. *(Appendix O – Democratic Principals of Learning)*

Without this form of reflection, the potential of learning environments will never be realised.

Learning Contexts

The purpose of this research was to develop a theoretical framework for the design of an exploratory learning model for investigating whether students' exploratory opportunities enhance the information basis which they create for evaluating subsequent learning demands. Our hypothesis posited, therefore, that the mean scores on the post test of students in the Experimental and Groups A and B using the ELE model will exceed the mean score of the pre test of the students in these groups using traditional learning environments. The learning contexts and unit outline supports unrestrained student explorations and is to be given and explained to the study groups (Table 3:4). Through questioning and negotiation, it is anticipated that students will engage and think about the nature of conflict. Drawing on prior knowledge, students pose questions that motivate them to explore further investigation. Students are to construct two lists, *what I know* and *questions I have*. The students develop their explanations and the researcher will explain how to use these explorations to elaborate their explanations across various conflicts. Assessment rubrics for learning, peer assessment and student self-assessment rubrics will be distributed and explained how these will allow them to reflect back and assess the process and value of their work and for the researcher to assess their progress in an ongoing way. The students will critique their ideas on the basis of evidence. Through class discussion, the researcher anticipates being able to assess and evaluate students' thinking and use this information to help assess learning.

Before beginning the study, students will be encouraged to actively participate during the sessions in ways that further their work and the work of the group. The benefits of helping to promote one another's learning and success by providing assistance, support, and encouragement to team members, will be explained as part of the periodic peer and self-assessments to determine the process of learning over time.

Table 3:4: ELE –Learning context and unit outline of *Conflict*

<table>
<tr><td>YEARS 8 - 10</td><td>DURATION – 8 weeks</td></tr>
<tr><td>EXPLORING AND UNDERSTANDING CONTEXTS</td><td>CONSTRUCTING OWN REALITIES</td></tr>
<tr><td colspan="2">Project Question: How would you deal with different types of conflict and why?</td></tr>
<tr><td colspan="2">Develop your own area of interest and formulate questions that you want answered.</td></tr>
<tr><td>Means_
Internet – search engines – “conflict” - Modern day Conflicts
Local, National, International –

Novels – The Wave, Across the Barricades, Lord of the Flies, The Crucible, The Chant of Jimmy Blacksmith, Rabbit Proof Fence, To Kill a Mockingbird, Deadly Una, Romeo and Juliet, Mary Shelley’s Frankenstein, etc.

Poetry – War Poetry, Wilfred Owen, Siegfried Sassoon, Kenneth Slessor, Bruce Dawe, Dylan Thomas etc.

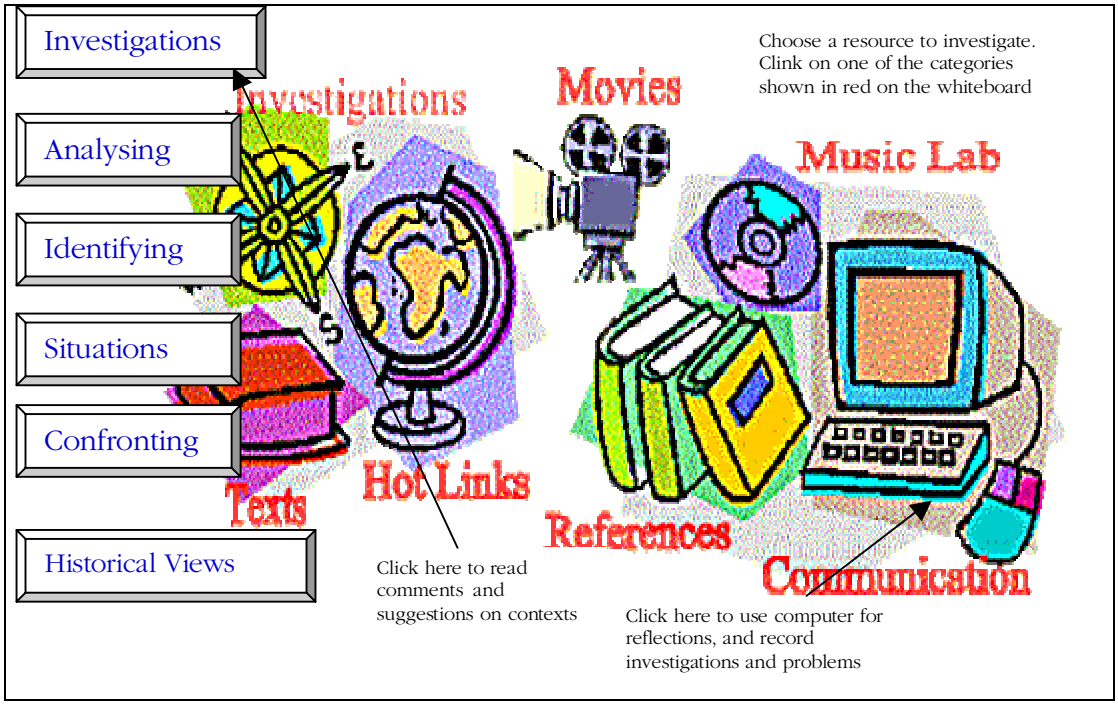
Films – Gallipoli, Romeo and Juliet, Lord of the Flies, Frankenstein, Crucible, To Kill a Mockingbird, Australian Rules, Fringe Dwellers, The Chant of Jimmy Blacksmith, Rabbit Proof Fence.

Music – Protest songs – Bob Dylan, John Lennon, Sting, Eric Bogle, U2.

Posters – War Posters, Advertisements etc</td><td>Valid Assessment: Feedback

✓ Observation
✓ Personal Reflection
✓ Questions generated
✓ Hypotheses raised
✓ Performance/production
✓ Peer or self-assessment
✓ Interviews/conferences
✓ Essay
✓ Assignments
✓ Projects
✓ Quizzes
✓ Role plays
✓ Media Presentations -Films
✓ Simulation games
✓ Speech or seminar
✓ Anthology of poems/songs
✓ Artwork
✓ Song Lyrics</td></tr>
<tr><td>The above MEANS are only a suggested beginning – you decide ….</td><td>Choose at least 3 different types of presentations</td></tr>
</table>

Figure 2: The main interface of the ELE assessment program



Implementing the ELE Framework using the context of Conflict

The program will comprise six different activities to take place over an eight-week period. Each activity will be based upon six central tenets: understanding, inquiry, investigation, interpretation, communication and consideration. Activities were analysed to determine if they enabled exploratory-based learning using a set of guiding questions based on the theories of Humanism, Constructivism and Postmodernism (Table 3:2) and to assure that they met the six central tenets for understanding (Table 3:5).

Activity One: Interdependence. This activity begins by brainstorming the notion of conflict to establish relationships between different types of conflict

Activity Two: Analysing Conflict. This activity is designed to help students understand the function of conflict in relation to their world.

Activity Three: Growth and Development. This activity is designed for students to identify the phenomena of conflict.

Activity Four: Situations. In this activity, students will be asked to examine and create situations or simulate pre-existing situations. Before creating scenarios, the students explored different situations nationally and globally.

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Activity Five: Conflict as a dominant feature. The focus of this activity is to confront the issue and an awareness of everyday conflict. Data will be collected and presented to demonstrate the nature of conflict. The results of students' explorations are to be reported to the class and with feedback.

Activity Six: Historical View. The historical impact of conflict will be explored in this component of the unit with elaborations and the re(structuring) of information by comparing, contrasting and contesting data. Choose a course of action.

'**Product of the Process'**. The final phase provides students with a setting in which they conduct individual and collaborative research with the intention of presenting and sharing their 'final product' with the class.

These activities create exploratory learning experiences that enable exploration engagement, explanation, elaboration, and evaluation and excitement, to motivate learning as the environment becomes dynamic and conducive to learning. Current learning environments are based on existing curricula that are teacher directed. In most cases students are not challenged to construct their own realities, nor asked to demonstrate their understanding through meaningful assessments. In this paradigm, however, learning emphasizes the process and not the product. How one arrives at a particular response, and not the retrieval of a learned response, is what is important. Learning is a process of constructing meaningful representations, of making sense of one's reality. In this process, students' errors are seen in a positive light and assessment then is a means of gaining insight into how they are organizing their experiential world.

3.3.3 Part 3: The implementation of the ELE Model

The research sought to investigate the nature of a purposely-designed exploratory learning environment based on humanist, constructivist and postmodern learning, and to explore students' perceptions of assessment in such an environment to understand the relationship between Learning and Assessment. Care was taken to ensure that the

learning environments simulated real life situations. For instance, the reading area of the classroom may resemble a library room, and the writing centre may have several networked computers available for students to communicate their understandings. The computer centre may also have computer simulations for improving problem-solving, creative thinking, and teamwork, as well as providing practice in several academic areas. Thus an intended outcome of the study was enhancing the relationship between assessment and learning. Other expected outcomes of the study would be to increase student motivation, engagement and responsibility for learning and validating students' realities. Exploratory learning is an approach to structuring the environment which enables students' explorations to be a process of examining (assessing) their own criteria of judgment (i.e. the enabling power of the strategies (solutions) which they apply in the context of their learning activities. Permission to conduct this research was obtained from the principals at both schools.

3.3.4 The participants

The research focused on two groups of students in Year 10 (N=52) and an Experimental Group of Year 8 (N=28) and how these students engaged in learning while situated in exploratory learning environments. The research was conducted in two secondary schools. One school was a government school and was located in a less advantaged socio-economic area. It had an enrolment of 920 students. The other was a non-government school, located in more advantaged socio-economic area with an enrolment of 1600 students. Both schools were co-educational and had mixed abilities classes.

The sampling choice was made on conceptual grounds, not representative, and focused on the 'typical case' as selected by the researcher (LeCompte & Preissle, 1993; Miles & Huberman, 1994). Students could work independently and for any collaborative undertakings, students formed into groups of their own choosing prior to selection to maximise collaborative interactions. The study was conducted with the researcher in the role of 'participant-observer' (as defined by Gold, 1969) and was introduced to the groups as an active participant with limited involvement in the activities in the classroom beyond implementing the ELE model, field notes, observation, data collection and assessment. A participant-observer attempts to

assume the role of the students under study and to experience their thoughts, feelings and actions. The data serve two purposes: the first is to provide baseline data for intervention and control learning environments and the second, to provide input for discussions re the relationship between learning and assessment.

3.4 Data Collection

Several types of data were collected in this study including (a) final products, being assessment tasks submitted at conclusion of the study (b) observational field notes (documented in a journal and based on informal discussions with students), classroom observations and observation assessment rubric (Appendix M); (c) informal interviews with the students; (d) student feedback survey; (e) participant-observer reflections (Appendix L). The researcher developed a taxonomy of questioning based on the operation of process adapted from the Taxonomy of Personal Engagement (Morgan and Saxton, 1978) and Bloom's Taxonomy which shows different stages of student involvement in the study, in particular how students can be guided to recognize their inner self-confidence, which can be channeled into a willingness to be challenged more.

The context of conflict enabling exploratory learning opportunities was presented to the students using a Taxonomy of Personal Engagement (Table 3:5). It is different from Bloom's Taxonomy in that it incorporates learning within supportive environments, whilst providing opportunities for assessment of learning. This taxonomy is a useful framework in the ELE in that it sets up curriculum to function as contexts for a communications system in which students interact with facilitators and peers and promotes higher order thinking and interactivity thereby creating conditions for students to make meaning and understand their own constructed realities. A predominant feature of the Taxonomy of Personal Engagement is that it allows the facilitator to present to students a conceptual structure from which users are free to explore and understand the importance of control of learning self-evaluation and assessment of the process of learning.

The following suggestions, in Tables 3:5 and 3:6 are designed not to limit the scope of the contexts and sequence activities so as to enable students' autonomy in the learning process as well as the product of that process.

Table 3:5: Taxonomy of Personal Engagement for Assessment for Learning in the ELE

ASSUMPTIONS/ TENETS	**Active Learning Domain**	**The Role of Exploration**
UNDERSTANDING	**1. Explore**	being curious about the contexts and speculate about, and experiments with a variety of ideas to formulate premises. Thinking 'how to think'
INQUIRY	**2. Engaging**	wanting to inquire, and to take responsibility for own learning
INVESTIGATION	**3. Discover/ Examine**	Enables students to experience the excitement of discovering their own ideas and experiment
INTERPRETATION	**4. Validating/ Explain**	Clarifies and justifies all claims and assertions with compelling evidence – synthesise and re-evaluate
COMMUNICATION	**5. Internalising/ Elaborate**	merging prior experiences (what is already owned) with present experiences (transfer to everyday situations) resulting in understanding and constructing own reality
CONSIDERATION	**6. Evaluating**	Experiences are applied, analysed, synthesised, assessed by the students and a reflection of the process of learning and the 'product of that process'.

The Taxonomy of Personal Engagement acts as a guide for creating opportunities in the ELE framework for sustaining students' engagement within contexts, and enables feedback of the 'product' of that process of learning. Suggested means for assessing learning:

1. What questions will enable students to explore and define problems? (**Explore/Understanding**)
2. What questions will generate inquiry and active involvement, where their ideas become an important part of the process? (**Engaging/Inquiry**)
3. What questions will enable them to confront and challenge, and create opportunities for them to inquire, formulate and reflect on their assertions? (**Discovering/Investigation**)

4. What questions will encourage them to explain and express their new understanding to others and further adapt their ideas in light of the feedback they receive? (**Validating/Interpretation**)
5. What questions will create an environment in which they will have opportunities to make meaning based on an understanding of their experiences, values and own reality in relation to the film texts and contexts? (**Internalising/Communication**)
6. What questions will provide students with opportunities to contest, compare and contrast their new thinking in different ways? What opportunities will enable them to formulate new questions which arise from their new understanding? (**Evaluating/Consideration**)

In the Vygotskian tradition, the researcher believes that it is important to name and repeatedly use the question types that are situationally useful, such as

- What about the question that would encourage anybody to want to pursue it and in this particular context?
- What 'work' will pursuing the questionners do in our immediate context (our inquiry, problem, task or dialogue)?

In asking the questions the researcher will ensure that they require more than

a) recall or reproduction of a skill or process; and that
b) the students will benefit from attempting to answer them and the educator will learn more about the students from their attempts; and
c) that the questions are open; that is there may be several acceptable responses.

3.4.1 Students as Questionners or Inquisitors

Of course, the point of the ELE is for the educator to guide and assist students to ask questions. The above are proposed generic questions that tend to engage students across various disciplines and situations. The ultimate goal is for students to begin asking and pursuing these general questions on their own – only in this way can they become independent questionners and inquirers.

Whilst the ELE proposes giving students ownership of the problem and the solution process, the critical goal is to support the students in becoming effective inquirers. It is essential to value and challenge students' thinking. This is done by inquiring at the 'leading edge' of the students' thinking (Fosnot, 1989). It is different from the widely used Socratic Method wherein the educator has the 'right' answer and it is the students' task to guess/deduce through logical questioning that correct answer. The concept of a learning scaffold and the Zone of Proximal Development, as described by Vygotsky (1978), is a more accurate representation of the learning exchange/interaction between an educator and student. Thus, students use a variety of information resources (all media types) and instructional material (all media types) as sources of information or points of reference.

An important aspect of the ELE is to develop the process of self-regulation to become independent students, by modelling reflective thinking throughout the learning process and support students in reflecting on that process of learning as well as the product of that learning (Clift, Houston & Pugach, 1990; Schon, 1987).

Thus the conflict unit has all of the essential features of classroom inquiry and self directed exploration. Students should identify questions of their own interest about conflict around which to design an investigation. The questions will derive from their own understanding of the characteristics and environments of conflict and their curiosity about the nature of conflict, and so the question they choose should engage them thoroughly. As they developed answers to their questions, the researcher will help them understand that they need evidence and what the nature of that evidence needs to be. They should look for evidence through their careful observations and any information that they find. As they collect their evidence, they build their cases for explanations that address their questions. Throughout the investigations, students should develop their own explanations using the evidence they collect and compare them with published explanations from books, media sources, library books and the Internet. Finally, the students are to communicate their learning in a variety of ways, clarifying what they did, what results they achieved, and how they know the findings are valid and relate these to their understanding of the real world. This communication also serves as an assessment of the students' understandings of the nature of conflict and their aptitude for exploration and inquiry.

After eight weeks, the groups will present their 'final products' and their explanation of the factors they have studied on the nature of conflict. As students listen to the different groups, they should be able to identify, recognize and analyze alternative explanations and perspectives for conflict and resolutions. They will then review what they know, weigh the evidence for different explanations, and examine the logic of the different group presentations. They can challenge each others' findings, elaborating on their own understanding as they help each other learn more about their particular cases and forces of conflict and form the view that many perspectives have to be considered in any explanation for conflict.

Table 3:6: Applying the Taxonomy of Personal Engagement in the ELE

Level	**Useful Verbs**	**Sample Question**	**Some Potential Activities and Products**
E X P L O R E	Discover Challenge Investigate Inquire Identify Distinguish Write	*Creating own realities* Recognize different types of conflict; and identify why there are problems; Can we make any generalizations about the nature of conflict Can we be a victim of conflict or create the conflict by choice? Identify the basic elements that you expect in conflict	*Understanding/Discussion* Recalling and Identifying "Who does what to whom, when, where, how, and why?" about any given 'conflict', and then to synthesize those answers into a simple informative, grammatical, and long summary sentence.
E N G A G E	Link Associate Relate Imagine Predict Formulate	*Critical Dialogue* "Predicting discussion" (Hyman, 1980) What are the essential features and conditions of this situation? Given this situation, what do you think will happen as a result of it? What facts and generalization support your prediction?	*Inquiry* Brainstorm ideas Mind Mapping *Concept Map* - Make connections between ideas that seem unrelated. Link situations to some historical-social contexts

D I S C O V E R Y	Create Invent Construct Compose Describe Produce Perform Elaborate	*Abstract Thinking, Logic and Reasoning* Predict what can be found in similar circumstances. If the predicted situation occurs, what will happen next? Based on the information and predictions before us, what are the probable consequences you now see? What will lead us from the current situation to the one you predicted?	*Investigation* Raise Hypotheses Use imagination freely, combining ideas or information in new ways Create and implement a solution; watch to see how well solution works. Media Investigations Simulation games Anthologies
V A L I D A T E	Analyse Examine Explain Devise Compare Classify Solve Illustrate	*Problem solving/Challenge* a) How is ... an example of...? b) How is ... related to...? c) Why is... significant? d) What are the parts or features of ….? e) Classify ... according to... f) outline/diagram ... g) How does ... compare /contrast with...? h) What evidence can you list for...?	*Interpretation* Applying understanding to produce some arguments and counter-arguments Personal Reflections Seminar Interviews/Conferences Projects
I N T E R N A L	Connect Choose Decide Assess Discuss Separate Define Show	*Synthesis/Connectedness* 1. What are some underlying assumptions? 2. Is there any evidence of deliberate bias, such as choice of sources or interpretations? 3. What would you predict/infer from...? 4. What ideas can you add to...? 5. What might happen if you combined...? 6. What solutions would you suggest for..?	*Communication* Translating from one medium to another Describing in one's own words Generate alternatives and gather information about them; Weigh pros and cons; choose best alternative; plan how to carry out choice.

E V A L U A T E	Judge Select Justify Debate Verify Argue Recommend Rate	*Reflect on 'product'* 1. Evaluate the 'conflict'…is it an important issue? 2. Do you agree that...? 3. What do you think about...? 4. What is the most important...? 5. Place the following in order of priority ... 6. How would you decide about...? 7. What criteria would you use to assess...?	*Consideration* Students need to receive appropriate feedback early and often. They also need to learn how to assess their own learning. Mutual feedback – "close the loop." Let students know what they learned from the assessments and what difference that information will make, and how they can use that information to improve learning.

3.4.2 Pre and Post Intervention Data

Quantitative data would provide the researcher with numerical values from which to draw conclusions. In this study, pre and post intervention data will be obtained to determine the difference in the students' ability to make meaning based on an understanding of their own reality before and after intercession. Students' outcomes on similar situational contexts will be obtained and used as a baseline for both pre and post tests and the assessment of the final 'product' will be used to validate the process of learning in an exploratory learning environment and the 'product of that process'. The outcomes will be assigned a numerical value.

Crooks (1988), McKeachie (1986), and Wergin (1988) report that students study in ways that reflect how they think they will be tested. If they expect an exam will focus on facts, they will memorize details; if they expect tests that will require problem solving or integrating knowledge, they will work towards an understanding and applying information. Based on the latter assumption, tests would validate the implementation of the ELE and determine if assessment can reinforce learning by providing students with indicators for understanding their own version of reality. The following suggestions were used to gauge the relationship between learning and assessment and to conclude whether assessment is effective in motivating, measuring, and reinforcing learning (assessment *for* learning).

Fuhrmann and Grasha (1983: 170) have adapted Bloom's taxonomy for test development. We have adapted Bloom's Taxonomy to our ELE framework and condensed the list further:

To measure understanding we pose these kinds of questions: Identify, Outline, Distinguish. Example: "List the different types of conflict and explain why there are problems."

To measure the depth of their inquiries, we pose these kinds of questions: Generalize, Associate, Link, Formulate, Give examples, Infer, Predict, and Summarize. Example: "Summarize the basic tenets of conflict."

To measure Investigation and application of hypotheses we pose these kinds of questions: Invent, Construct Compose, Describe, Present, Elaborate, Solve, and Use. Example: "Calculate the outcome of the USA finding WMD in Iraq."

To measure Interpretations analysis and validity of arguments we ask these kinds of questions: Differentiate Illustrate, Infer, Relate and Explain. Example: "In Colin Powell's address to the United Nations, which statements are based on facts and which are based on assumptions?"

To measure synthesis and communication (integrate learning from different areas or solve problems by creative thinking), we will call upon the following processes: Categorize, Combine, Compile, Devise, Design, Generate, Rearrange, Reconstruct, Revise, Tell. Example: "How would you resolve the conflict in Iraq?"

To measure evaluation (judging and assessing) we pose these kinds of questions: Appraise, Compare, Conclude, Contrast, Criticize, Describe, Discriminate, Justify, Interpret, and Support. Example: "Why is *To Kill a Mockingbird* acknowledged as a classic?"

Variations of these ideas were used to construct the Student Self-Assessment Rubric to be administered in the Evaluation and Reflection stage of the study. The scores from these rubrics are reported in chapter 4 as comparative quantitative data.

3.4.3 Implementation

Implementation Stages

- Obtain permission from the School Principals to conduct the research
- Design the ELE Methodology (Table 3:1)
- Design ELE Context Assessment Planner (*Appendix N*)
- Design the Assessment Rubrics (*Appendices C, D and I*)
- Design Questions to be used in interviews (*Appendix F/G*)
- Collect Pre data of Report Outcomes for Sample students
- Inform the students taking part in the research
- Explain how it will work and hand out outline (Table 3:4)
- Design Participant Observation Record (*Appendix L*)
- Design Observation Assessment Rubric (*Appendix M*)
- Conduct, gather and record data from Pre ELE Intervention Task (*Appendix E*)
- Design ELE feedback survey (*Appendix H*)
- Conduct and Record Informal Interviews (*Appendix J*)
- Make notes on Observations
- Compare Post Outcomes with Pre Outcomes
- Collate and Record Student Feedback Responses (*Appendix K)*

The study will be conducted within a normal program of instruction at two secondary schools. The researcher will introduce the subject of assessment and the Exploratory Learning Environment program and its capabilities to the classes. The researcher will explain the process for observing the relationship between assessment and learning and the belief that motivation to learn is dependent on learning environments. All students in the classes are to be assessed using the Rubric for Understanding (*Appendix C*) to complete activities over a period of 8 weeks; actual class time of 45 hours. It will be the students' responsibility to undertake tasks or activities within the context of 'Conflict' and to choose at least three (3) different types of presentations to demonstrate their understanding of the context. The major activities that form the basis for this study will be students completing self generated and self directed activities, informal interviews (*Appendix F*) and/or written questionnaire (*Appendix G*), feedback survey (*Appendix H*), receive feedback from Observation Assessment

Rubric (*Appendix M*) and Participant Observation Record (*Appendix L*), Student Self-Assessment Rubric (*Appendix I)* and participating in class discussions and collaborative work.

The development of individual meaning and the development of social meaning are to be taken as being reflexively related in that neither can exist independently of the other. Thus constructivists' view of learning is interactive as well as constructive activity (Cobb, 1988). Classroom discourse will play a significant role in this interactive activity. Vygotsky (1978) posited group interaction as one source in the development of mental operations. He suggested that students gradually internalize the talk that occurs in groups. They begin to challenge themselves, ask for reasons, and in general monitor their own understanding as others do their presentations.

Students and groups of students will work on the program, with their teacher (the researcher: participant-observer) for the entire eight (8) week period, and will provide assistance to the students as required. Observations will be recorded following recommendations typical of ethnographic fieldwork (Fetterman, 1989) and participant-observation research (Adler & Adler, 1994). Emerging themes are to be coded according to Strauss and Corbin (1998). During activities, the researcher makes general observations of the students' performances and records them in the field notes. Description of situations, events, and dialogues that occur during activities is to be documented also. Patton (1990) describes field notes as the most important task of an observer to preserve the details of an event.

The bulk of the research in the first three weeks will be observing students navigate the exploratory learning environment. In the fourth week, the researcher will invite the students to a 'meeting' to present their findings. During the fifth and sixth weeks, interviews (*Appendix F*) are to be randomly conducted and the researcher will take notes during these interviews and tape-record each interview. The tape is to be subsequently transcribed to enable more complex qualitative data analysis. Although laborious to ensure consistency the researcher will transcribe all the tapes. The Year 8 Experimental Group will complete a written questionnaire (*Appendix G*). During the seventh week, presentations are to be undertaken during class time, and these presentations will be assessed according to the Rubric Assessment for Learning, as

well as assessed by their peers, using the Peer Assessment Rubric using the criteria of: effectiveness of argument, how well the arguments were supported, conveys understanding and effective communication. The researcher collects the products at the conclusion of the class and will use observations from the process of learning as well as feedback offered throughout the program to assign outcomes for students' products. In week eight, students will complete the Student Feedback Survey (*Appendix K*) and conduct their on self-assessment of their learning process and their product using the Student Self-assessment Rubric (*Appendix I*).

In order to consolidate and expand on the information gained from observing the students using the ELE model, interviews are to be conducted individually with students. An interview schedule of over 10 questions was designed according to Patton's (1990) classification of interview questions. The majority of the questions were *opinion* and *feeling* questions. There were some *experiences* and *demographic* questions but no knowledge or sensory questions. No attempt was made to question students about their overt knowledge of assessment strategies during the interviews (as this data was to be collected by other means in another part of the research) nor was it felt necessary or appropriate to elicit any sensory information as students tend to be subjective about assessment. As the ELE model describes students' understandings as a combination of how they create knowledge by being helped to question the enabling power of the strategies (solutions) which they apply in the context of their learning activities, the questions were designed to incorporate multiple views about exploratory learning. The resulting questions were found to satisfy the basic principals of the ELE framework and to be compatible with research questions. Thus questions were designed to elicit students' perceptions of the exploratory learning environment model as a whole, with particular reference to exploring and understanding the process of assessment and the individual differences students have for evaluating learning demands. Table 3:7 gives examples of the types of questions used, together with a brief rationale. The students were interviewed separately for 20 minutes each, and at their conclusion the tapes were transcribed for analysis.

Table 3:7: Example of questions, classification and rationale of interview questions

Question	Type of Question				Rationale
	1 Exp	2 Opin	3 Feel	4 Dem	
What did you think of the Exploratory Learning Environment model of assessment? Did the model enable you to assess your progress in the context of their learning activities?		√◦ √◦			Open-ended question to encourage students to respond descriptively rather than short answer routine responses (Patton 1990). This question permits the respondent to reply in their own terms and language
Effectiveness of learning environment					
When you were working within the learning environment did you find it different from a classroom What did you do differently?	√	 √		√	Experience questions to encourage the respondent to review the environment before offering more detailed opinion
What were the strengths of the learning program? What were the weaknesses of the program		√ √			Presupposition questions (i.e. questions assume the program has strengths and weaknesses, and can thus elicit useful information) (Patton 1990)
Multiple perspectives					
The activities required you to consider your own questions from a number of different perspectives. How did you feel about these activities?			√		Feeling question to determine how the students responded to the expectation of assuming responsibility for their learning
How did you approach the task?	√				Experience question to seek means the students may have used to understand their own reality.

3.5 Data Analysis

Multiple data sources to be used are: interviews; direct observation; records (pre and post tests) physical artifacts, such as peer assessment and student self-assessment rubrics, and final 'product' of the process. In addition to observing the students, the researcher plans to interview them several times during the trial period and after the final presentation of their work. There will be regular meetings with the students which will include discussion of emerging hypotheses. The researcher role will be that of an active observer attempting to take part as authentically as possible in the activities of the students, reading the literature and facilitating some of the situations

for the students, whilst systematically making field notes about what is taking place in the learning situations. The study will be based on data from various sources: written material describing the course of study; the literature; the contexts that the students generate and work on. The major part of the data will be the students' stories about their learning to be recorded during the interviews and conversation.

The researcher will use a three stage coding process for data. First data from interviews and observations have to be coded to identify patterns in the students' descriptions of their learning, the learning situation, and the students' participation in the educational study. Then the data is 're-coded' into more specific categories. There will be descriptions of students' perceptions of various factors such as exploratory learning environments and types of assessment. The actions and utterances of individuals are to be analysed with respect to meaning expressed about the educational study. The analysis is to focus on patterns of participation and the interrelatedness between these patterns and contextual conditions for learning and assessment. Thus, it is not the participation of individual students that is to be the focus of interest, but modes of participation as social practice in a particular context. Individual actions, as recorded on the feedback, are to be analysed as a form of individualisation and particularisation of collective practice.

3.6 Displaying the Data

Data collection is to be done primarily through interviews with students of the focus groups and was recorded. In addition to observations in the classroom, observations are to be conducted around school, questionnaires and feedback surveys are to be administered, and there will be a review of students' previous outcomes against post outcomes of the trial. Spreadsheets will used to display statistics, tables and graphs.

Further, it is stated that students' perceptions of various factors of the Exploratory Learning Environment are to be inferred from the data taken from the interviews and feedback survey, for example one student commented: "I believe that we need to be pushed to work harder to go beyond these boundaries, to challenge your brain; I think some teachers put these limits on students by not allowing them to explore, allowing them to push themselves because assessment is not usually like this" and other student said that "many teachers want to know whether they can help you learn, but

they remain unclear on what we are really supposed to do in the classroom. So they just make us do tests". Hence, other factors are to be views of academic achievement and the burden of assessment. These descriptions cover several pages in chapter 4 and contain a number of 'direct quotes' and explanations from the students. Scores, responses from the feedback survey, peer assessment, self-assessment and outcomes of the 'product' of the processes are graphically and visually presented and comparisons of the results are detailed in chapter 4. The analysis of the data enabled some insight into how these students perceived the exploratory learning environment. These findings are discussed in more detail in chapter 4.

3.6 Summary of Chapter 3

The reliability of the research involves the extent to which these studies can be replicated. The validity involves interpretation with confidence and the generalizations made therefrom. Generally defined, reliability and validity refer, respectively, to the consistency and meaningfulness of research results (Sykes, 1990). Kirk and Miller (1986) differentiate between the two as follows: "Reliability is the degree to which the finding is independent of accidental circumstances of the research, and validity is the degree to which the finding is interpreted in a correct way" (Kirk and Miller, 1986: 20).

Thus this research will make use of qualitative and quantitative data to discuss aspects of learning environments, students' own assessment and experiences, and concerns about the function of assessment with the view to strengthening the relationship between learning and assessment by setting up a framework where curriculum functions as guidelines supporting expansive learning, rather than as constraints limiting students' exploratory opportunities.

Assessment, as illustrated within ELE model, does not determine relative contributions of curriculum structure, teaching styles, learning styles, or students' motivation. In other words, assessment is non-judgmental and does not assign fault or blame. Assessment makes learning transparent to dispel assumptions, illusions and specified realities. The ELE model and assessment in general, require conversation about students constructing and creating their own realities. Students' realities may

be identical to what are called goals (expectations) or learning objectives (the product as a process of learning).

Also the ethnographic study provides information about how students respond, to their levels of engagement, assessing (negotiating) the enabling power of the strategies which they apply in their learning context; what is difficult for students and how students use one another as resources. From this, the researcher is able to learn more about classrooms and what is needed to ensure that classrooms are learning environments that inspire learning whilst providing measurable data as valid assessment of learning and enhance the relationship between learning and assessment.

Chapter 4 – Results and Data Analysis

4.0 Introduction

In this study our specific objective is to identify principals facilitating a form of learning and assessment which support negotiation-based learning. So far we have identified principals forming a theoretical framework of such an environment. This chapter describes the results of the ethnographic study and assessment performances obtained directly from the ELE model. The data will enable a comparison of results from students' pre and post assessment results. The results will specifically address the second research question of this thesis. The question focuses on the practical aspects of the ELE model and examines how an exploratory learning model could help us to link assessment and learning in a way that would not threaten the negotiation basis of learning?

This chapter will use data obtained from interviews and students' self-assessment to elucidate how an exploratory learning environment engages students and offers a possible explanation for changes in their improved performance. Additionally, the chapter will demonstrate the aspects of the ELE model which enhance the relationship between learning and assessment.

Included in this section are description statements from observations, including statistics, tables and graphs. The ELE model facilitated an inquiry-based approach to learning activities. The activities allowed students to construct ideas about their learning and the product of that process. The campus sites of the study provided the opportunity to study exploratory learning environments while still resembling a classroom. Data analysis was a very time consuming and complex process, which included making sense of interview transcripts, observations and documents. All data sources required reading and re-reading in order to develop an explicit understanding of the functioning of exploratory learning environments (Lincoln & Guba, 1985). Interview transcripts, observations, and documents were analyzed using the comparative method as outlined by Glaser and Strauss (1967) and naturalistic inquiry as suggested by Lincoln and Guba (1985).

4.1 Review of Data

The data collected served two purposes: the first its relationship to the two research questions and the second to reject the null hypothesis to explain the positive relationship between assessment and assessment of learning an Exploratory Learning Environment. Using theoretical perspectives from humanist, constructivist and postmodern theories to set up a framework from which the observational field notes, classroom observations, informal interviews with students, student feedback survey, and participate-observer reflections were devised and assigned to research question 1, thus enabling learning by exploration of different ways of approaching problems; whilst the data from observation assessment rubric, student (peer) self-assessment rubric, and students' final products (post assessment tasks – assessed using the ELE assessing learning rubric) were allocated to answering question 2, to link assessment and learning in a way that would not threaten the negotiation basis of learning.

The significant patterns of the research were analysed and coded for learning environment concepts and facilitated by applying a simple valence analysis procedure described by Tashakkori and Teddlie (1998). The researcher chose to use an "a priori" approach to establishing the coding system; in this structure a small number of coding schemes or categories are developed to aid in search for patterns in the data, specifically in the projects, activity sheets and reflections. The concepts to code were based upon the six tenets in which the researcher categorized the principals of Personal Engagement for assessment of learning to assure activities developed understanding to reflect the process of learning as well as the product of that process. They included: structure and diversity characteristics Understanding/Explore; processes of Inquiry/Engaging, and engagement Investigation/Discover and Integrative reconciliations Interpretation/Validating, Communication/Internalising and Consideration/Evaluating which occurs when the students can identify the relationships between related concepts or propositions (Novak & Gowin, 1984). The stages of analysis are summarised in Table 4:1, together with an adaptation of Miles and Huberman's (1994) stages and the computer software used.

Table 4:1: Stages of Analysis of data

Description of process used to analyse the data relating to Research Questions 1 and 2	Stages (adapted from Miles & Huberman 1994)	Equipment Used
Collating: data from pre and post assessment tasks and compiling spreadsheets to record results **(Research Question 2)**	**Data simplifying:** assigning values to outcomes to rank, spread and obtain statistical information	Microsoft Excel Smith's Statistical Package
Transcribing: data collected as Participant Observer: observed incidents, concerning interactions between students in the ELE classroom. Data recorded included the date, time, place and students involved with as much detail as possible about what occurred**. (Research Question 1)**	**Data reduction:** selecting, editing, summarizing and transcribing in note form	Microsoft Word
Coding: Individual comments and actions coded according to a *priori* categories, such as *understanding/exploring, inquiry/engaging, investigating/discovery, interpretation/validating etc.,* and conditions, such as I, II, III and IV which emerged from constant comparison of these segments of the data **(Research Question 2)**	**Data reduction:** selection, focusing, simplifying, abstracting and transforming the data	Microsoft Word
Transcribing: Interview data transcribed for analysis. **(Research Question 1)**	**Data conversion:** Individual comments and statements were recorded and coded i.e. assigning codes and numbers for each participant interviewed	Microsoft Word
Collating: data from feedback and surveys **(Research Question 1)**	**Data simplification:** record data on spreadsheets, obtain , compare and draw conclusions from statistical information	Microsoft Excel
Ordering and displaying: Patterns and inferences were determined and statements made. Data is organised into displays for Appendices where appropriate. **(Research Question 2)**	**Data display:** creation of organised, compressed assembly of information that permits conclusions and recommendations.	Microsoft Word and Excel
Conclusions: Conclusions were made and written up for inclusion in the thesis **(Research Question 2)**	**Conclusion and verification:** Decisions about the meaning of the data and testing validity of findings	Microsoft Word
Verifying: Conclusions were verified by reference back to original data and review. **(Research Question 1 & 2)**		

The results are divided into 4 sections. **Section 4.2.1** considers the influence that the ELE model may have on students' assessment and links to Research Question 2. **Section 4.3** considers the influence of the ELE model on student motivation and assessment in response to Research Question 2. **Section 4.4** reports data from interviews: views on assessment, effectiveness of learning environment and multiple perspectives and the feedback provided by the ELE model based on a theoretical framework of an environment enable learning by exploration - Research Question 1. **Section 5** reports on the students' use of the self-assessment rubric for the ELE model to link the concept of learning as negotiation (exploration) and assessment - Research Question 2. Finally, the main interview questions and answers are

summarised and include illustrative quotes to highlight the need for an intellectual framework that strives to make assessment equally ethical by supports learning – Research Questions 1 and 2.

4.2 Results

4.2.1 Influence of ELE on students' assessment

This section reports ELE assessment results for Groups 1A, 1B, the Year 10 groups and the Experimental Group, a Year 8 class, in which the assessments covered the same context or topic of study: *conflict*. The research consists of assigning students to at least two groups, i.e. **experimental** and **control**, and administering an **independent variable** in the experimental group while holding conditions constant and equivalent for the control group. The groups will be compared on the **dependent variable** (performance) to determine the likelihood or probability that the independent variable caused these changes in the experiment group. The research was conducted across three groups and different year levels because the experiment was designed initially to be implemented in one school. However, the researcher moved interstate and had to take up the research in another school. To minimise the potential sources for variation the Experimental Group became the Year 8 class in which the independent variable became the participant-observer, whilst in the control groups the teacher was also the participant-observer. Participants in each group and different year levels were given the same pre assessment tasks (ELE intervention *Appendix E*) and post (ELE invention tasks - Table 3:4). The pre-intervention task was an outcome based assignment (Appendix E), as it was similar in design to the task in the ELE model (Table 3:4) in that students have a clear focus on learning outcomes and can monitor their own progress.

Statistics provide ways of measuring progress or lack of progress. In this study we use both qualitative analysis (holistic interpretations of social phenomena) and quantitative analysis (numbers and measures that describes the phenomena). The data are analysed to understand what the results mean in relation to an exploratory learning model (ELE) offering an environment which specifically enhances the relationship between learning and assessment? In addition how does an Exploratory

Learning Environment Framework, using theoretical perspectives from humanist, constructivist, and postmodern learning theories set up a framework where curriculum functions as guidelines supporting expansive learning rather than constraints limiting students' exploratory opportunities?

The experimental hypothesis, (looking for evidence that something has happened) we posit, is that the ELE method of assessment in an exploratory learning environment enhances assessment and learning in a way that does not threaten the negotiation basis of learning. The null hypothesis states essentially that there is no relationship or difference between the two conditions, i.e. traditional learning environments and exploratory learning environments. Our null hypothesis posited therefore, is 'that there is no significant relationship between the tasks assessed in an Exploratory Learning Environment (A) and the traditional learning environments (B)'. The 'products' or assessment results of the pre (invention of the ELE model) and post (invention of the ELE model) are analysed to determine differences, if any, in the students' understanding of their own reality. To verify the 'generalization of the results' in which it is reasonable to assume that differences were due to ELE quantitative analysis of the statistical results was conducted to explain the observable fact. In calculating the variance, to validate the spread of scores from the mean, the difference of 1.37 points in the variance supports our summation that exploratory learning environment interventions had an impact on students' ability to question the enabling power of the strategies (solutions) which they apply in the context of their learning activities. Table 4:2 reports the results for the pre ELE invention assessment tasks and post ELE intervention assessment tasks.

Table 4: 2: Relationship between Pre ELE Intervention and Post ELE Intervention

		Pre	Post		Pre	Post	Pre	Post		
Group 1A	18	65.61	76.27	10.63	11.78	10.37	0.16	0.17	1.49	0.77
Group 1B	28	69.55	80.10	9.76	11.07	15.53	0.32	0.22	1.23	0.83
Experimental Group	27	65.74	82.81	15.07	7.58	13.18	0.11	0.23	3.70	0.29
		200.90	239.18	35.46	30.43	39.08	0.59	0.62		
	Mean	66.96	79.72	11.82	10.14	13.23			1.10	0.63
Variance					3.34	4.71				
Difference					1.37					

The percentage means for the three groups showed that students increased their mean mark from 66.96 to 79.72, which is a statistically significant (dependent t=2.20, $p<.05$). Overall the Experimental Group performed better than those in Group 1A and Group 1B. Gain scores were calculated for each group with the following results. Group 1A indicated a mean gain of 10.63 points, whereas, Group 1B performance revealed a mean gain of 9.76 and the Experimental Group showed a mean gain of 16.03 points. The quantitative data of pre and post assessment results underwent further statistical analysis using descriptive and inferential statistics to further explain the positive relationship between assessment and learning in an Exploratory Learning Environment. Participants' responses on the pre-post assessments were calculated. In all cases, the Experimental Group performed better than Group 1A and Group 1B on the post assessment task. Thus in terms of the benefit resulting from the creation of an Exploratory Learning Environment, the evidence suggests that the majority of students who favour the new form of assessment differ significantly. The collective assessment results are reported in Table 4:3.

Table 4:3: Statistical Analysis of Groups' Pre and Post Assessment

Statistical Analysis of Groups' Pre and Post Assessments								
Sample Group 1A	Score on Pre Test	POST SCORE	Sample Group 1B	Score on Pre Test	POST SCORE	Trial Group	Score on Pre Test	POST SCORE
1	54	72	1	71	92	1	68	94
2	56	73	2	68	80	2	62	72
2	63	86	3	79	96	3	61	86
4	75	85	4	89	97	4	82	94
5	67	86	5	70	93	5	74	80
6	56	72	6	86	96	6	64	96
7	74	79	7	53	76	7	64	82
8	73	78	8	87	96	8	72	80
9	86	90	9	74	92	9	68	74
10	79	76	10	65	68	10	57	94
11	45	66	11	86	94	11	73	100
12	65	65	12	87	98	12	56	66
13	68	84	13	68	90	13	69	76
14	55	61	14	56	62	14	68	98
15	51	62	15	74	90	15	69	56
16	56	60	16	52	66	16	60	70
17	82	89	17	63	69	17	56	76
18	76	89	18	80	93	18	51	86
N=18	65.61	76.27	19	48	52	19	80	96
SD	11.78	10.37	20	59	54	20	58	96
Mean Gain	10.63		21	79	92	21	61	70
			22	52	53	22	64	56
			23	63	54	23	61	80
			24	66	69	24	64	70
			25	69	82	25	64	100
			26	74	70	26	73	92
			27	75	80	27	76	96
			28	67	89			
			N = 28	69.55	80.10	N = 27	65.74	82.81
			SD	11.00	15.53		7.58	13.18
			Mean Gain	9.76			15.07	

When comparing the quantitative scores of two or more groups, researchers suggest calculating the effect size. The effect size permits the comparative effect of the interventions to be compared, even when based on different samples and different

measuring instruments. In comparing the pre and post mean scores for the three groups, the mean effect size was determined to be 0.55. This reported effect size reflects the differences in mean scores between the pre assessment tasks and the post assessment tasks for the three groups.

This score is considered statistically significant in that most researchers consider that an effect of 0.50 means that the intervention is worth considering and to be an important finding of difference (Fraenkel and Wallen, 1996). The researcher therefore infers that the exploratory learning environment had an impact on the students' understanding of their own reality and the product of the process of learning. As there is significant statistical difference between A and B, the null hypothesis is rejected in favour of the experimental hypothesis.

Table 4:4 reports the group mean mark. Again it was found that students who participated in the ELE program increased their assessment results from pre to post assessment tasks. Further, in all cases the students performed better than the less motivated students. There was some variation in effect sizes, which averaged 0.55, for the difference between pre and post assessments results, representing how assessment can benefit from ELE intervention.

Table 4:4 – Effect size for groups covers the same context of conflict and assessment tasks.

Effect size for groups covers the same context of conflict and assessment tasks				
Group	*Mean Pre*	*Mean Post*	*Difference*	*Effect Size*
1A	65.61	76.27	10.66	0.51
1B	69.55	80.10	10.55	0.35
Experimental	65.75	82.81	17.06	0.79
Mean Effect Size				0.55

4.2.2. Summary of the Results

Results of the study reported in Section 1 are summarised in Table 4:5 and Figure 4. All students covered the same context of *conflict*. There was a statistically significant difference between pre assessment and post assessment for Group 1A. The group mean mark for these students increased from 65.61 to 76.27, which is a statistically

difference (dependent t = 1.49, p<0.05 with an effect size of 0.51 means intervention had some influence. There was a number of students in Group 1A who performed better than a group who did not. The percentage means for Group 1B showed that most students had increased their mean performance from 69.55 to 80.10, which is statistically different (dependent t = 1.23, p<0.05) with an effect size of 0.35. The Experimental Group percentage mean increased from 65.74 to 82.81, which is a statistically significant increase (dependent t = 2.7, p<0.01). The effect size of 0.79 is substantial. Using the ANOVA summary, the obtained F-ratios are in the critical region; we reject the null hypothesis, and conclude that the data did provide significant differences. The ELE assessment was significant, for Group 1A F (1, 34) = 8.30, p<*0.05*; for Group1B F (1, 54) = 7.57, p<*0.05;* and for the Experimental Group F (1, 52) = 34.01, p<*0.01*.

Table 4:5: Group Mean Scores for Pre and Post Assessments

Group Mean scores for Pre and Post Assessments								
	n	M	SD	M	SD	t	p	F-ratio
		Pre		Post				
Group 1A	18	65.61	11.78	76.27	10.37	1.49	0.77	8.30
Group 1B	28	69.55	11.07	80.10	15.53	1.23	0.83	7.57
Trial Group	27	65.74	7.58	82.81	13.18	3.70	0.29	34.01

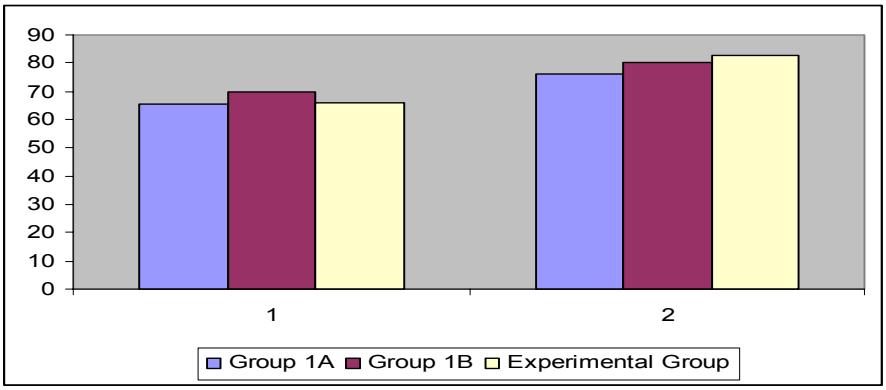


Figure 3: Group Mean Scores for Pre and Post Assessments

Figures 5 to10 are visual representations of group results and individual gains for each of the three groups. Figures 5 and 6 represent the data for Group 1A, Figures 7

and 8 show the data for Group 1B, whilst the data for the Experimental Group is shown in Figures 9 and 10.

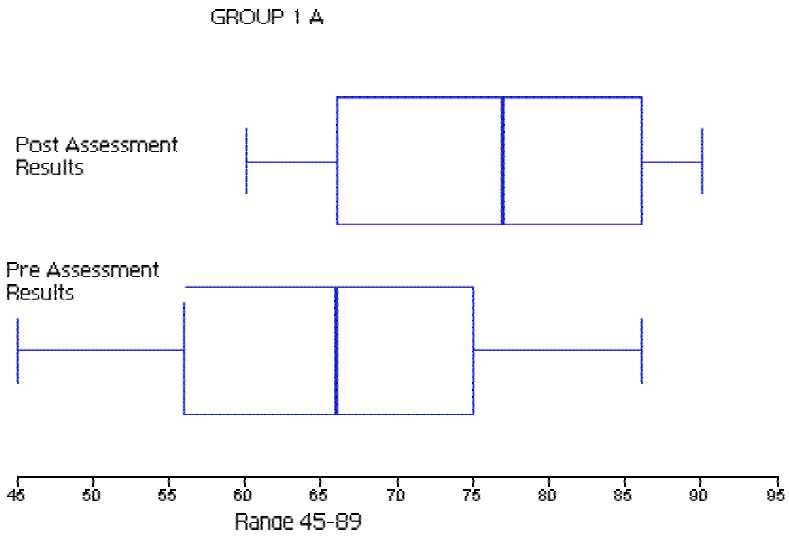


Figure 4: Group 1A Pre and Post Assessment Results

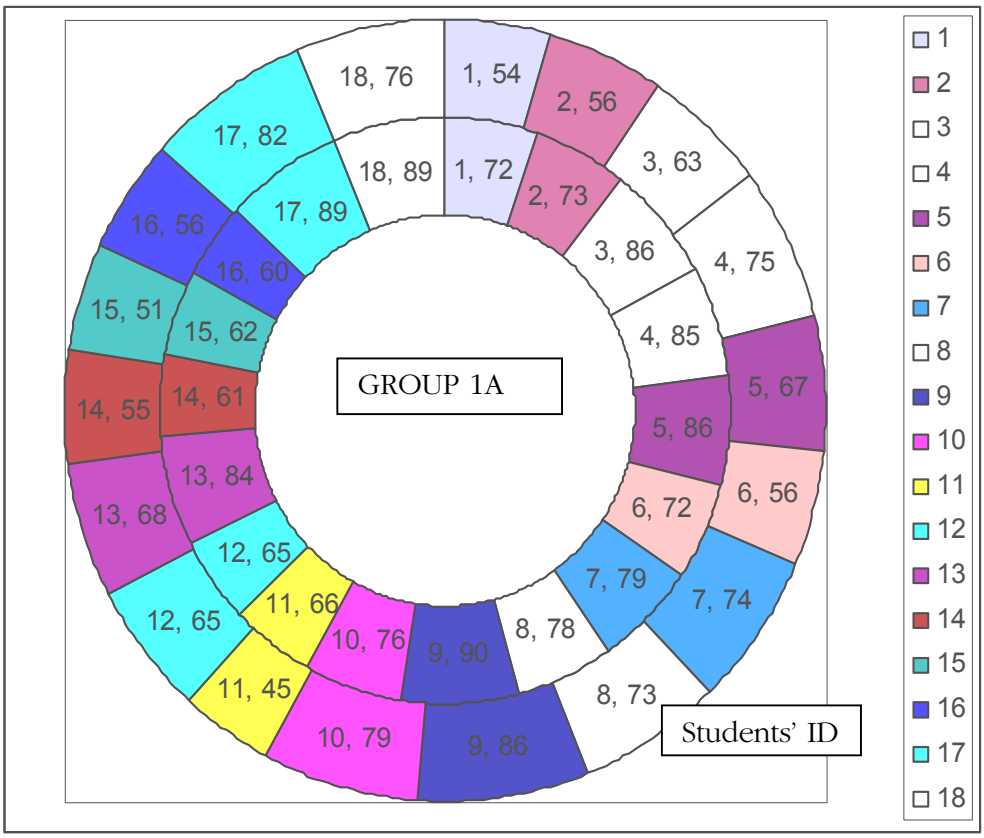


Figure 5: Group 1A -Individual gains

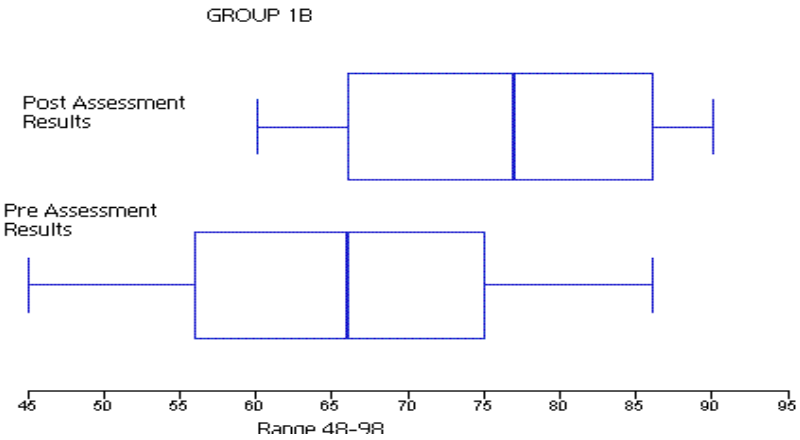


Figure 6: Group 1B Pre and Post Assessment Results

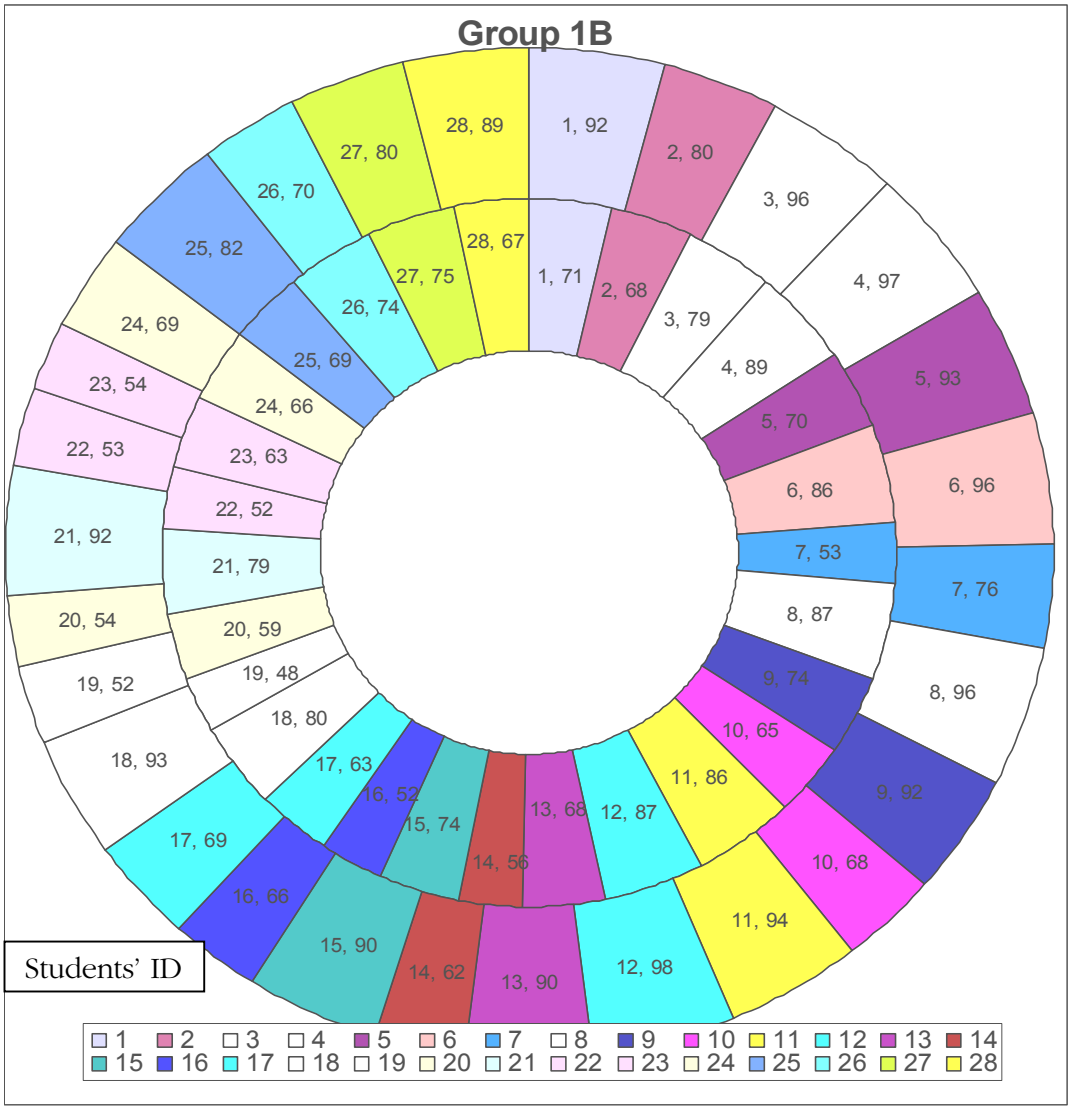


Figure 7: Group 1B – Individual gains

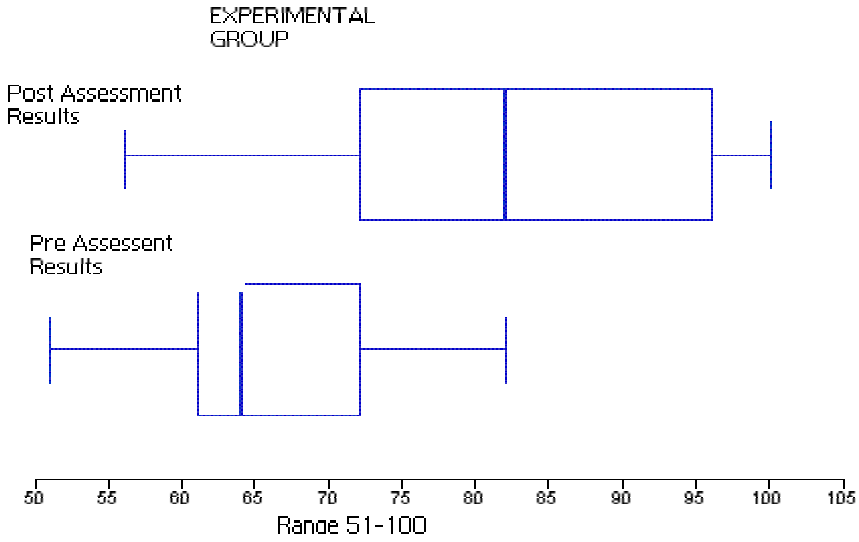


Figure 8: Experimental Group Pre and Post Assessment Results

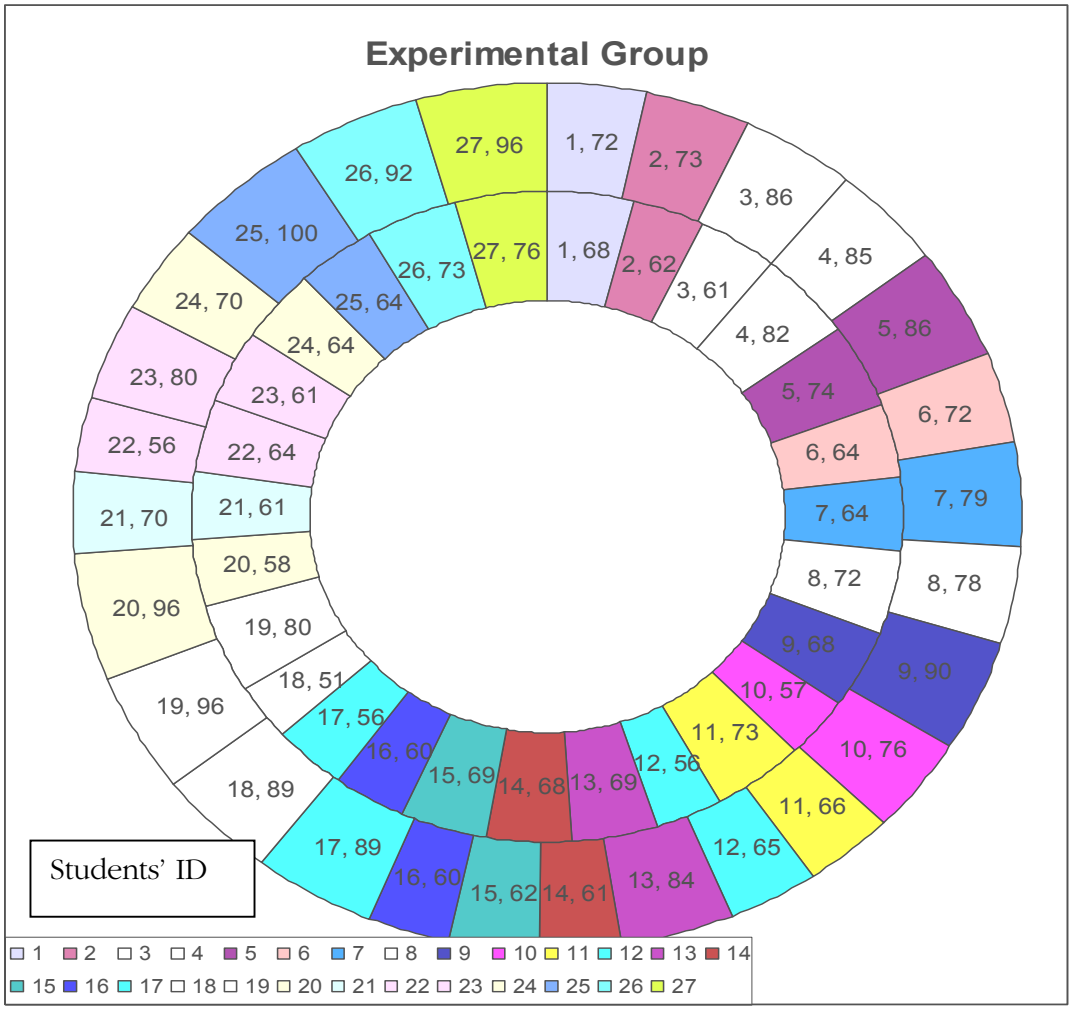


Figure 9: Experimental Group - Individual gains

4.2.3 Analysis of Post Assessments

As it was apparent from the data that most students performed better on the post assessments, an additional investigation examined the relationship between the pre and post assessments. Did an ELE offer an environment which enhances the relationship between learning and assessment? Pearson's product moment coefficient was calculated to determine whether the ELE related to later performance on the post assessment. For Group 1A, the correlations between pre and post performance ($r = 0.77$) were quite high (65.61 vs. 76.27, $t=1.49$, $p<0.05$), as were correlations between pre and post assessment performance for Group 1B ($r = 0.83$), the mean increased from 69.55 to 80.10, a statistical difference ($t=1.23$, $p<0.05$). The percentage means for the Experimental Group showed that those students increased their mean mark from 65.74 to 82.81, which is a statistically significant difference ($r = 0.29$, $t = 3.7$, $p<.001$). Figures 11 to 13 represent the performance data on scatter plots in order to show the possibility that the low to high Pearson product-moment correlation indicates a marked relationship between the ELE method of assessing learning and improved students' performance. All graphs indicate a positive relationship.

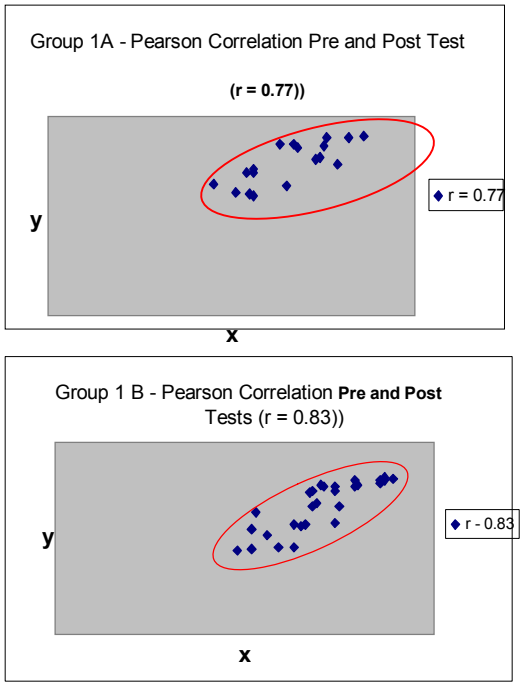


Figure 10: Scattergram indicating a positive Correlation Coefficient (Group 1A) Correlation Coefficient (Group 1B)

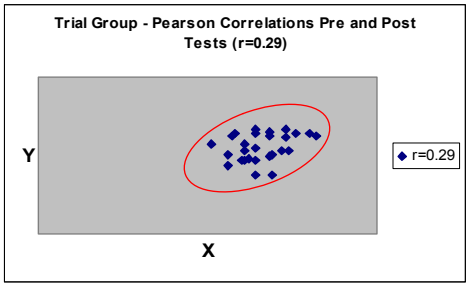


Figure 12: Scattergram indicating a positive Correlation Coefficient (Experimental Group)

The data were also analysed to calculate gain scores for each participant, in both the study and Experimental Groups. In most cases, students improved their assessment results, however it can be seen that some gains were greater at 15 points, especially by the male students in each of the three groups. The main reason given in the interviews by most of the male students was that the ELE was a better reflection of an assessment of their tasks (products). Further analyses were applied to determine the magnitude of difference between the study and Experimental Groups using effect size. Table 4:6 indicating the results of the statistical analysis of the Exploratory Learning Environment (ELE) is provided below.

Table 4:6: Relationship between Student's Increase >15 points on Post Assessments and by Gender

Relationship between Learner's increase in performance >15 points on Post Assessments and by Gender							
Group	M	F	Total	M> 15	Male%	F> 15	F%
1A	9	9	18	6	33	3	16
1B	11	17	28	7	25	5	17
Exp G	9	18	27	9	35	5	18
T test =0.035							
Pearson r =0.756							

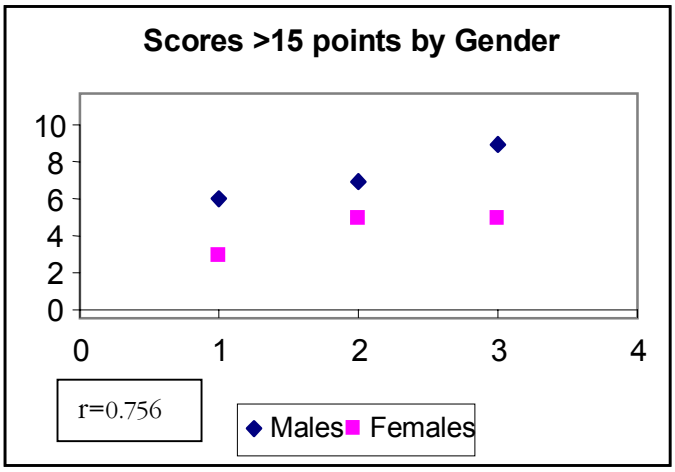


Figure 13: Scattergram indicating a positive correlation coefficient >15 points by gender

Again the scatter plot (see Figure 14) increases the possibility that the significant linear correlation might be due to direct relationship between the ELE and student performance.

4.2.4 Summary: Influence of the ELE on assessment results

The results reported show that students' performances increase from the pre assessment to the post assessment when feedback is offered and control shifts from teacher to student. A conclusion then can be drawn regarding the performance of students on pre and post assessment where the mean effect size of 0.55 was moderate. There was a statistically significant relationship between the performances of students on assessment tasks after the intervention of the ELE program. It is of interest that males in the three groups showed higher performances on all post assessment tasks. For the predominately female class (Experimental Group = 66% females), the difference in performance between the males and females was statistically significant (35% vs. 18%) and with an overall trend of males scoring higher in all groups (r = 0.756). This trend will be discussed in more detail in Chapter 5. Overall, it appears that those students who were influenced by the exploratory learning environment performed at a higher level on the assessment tasks than those who were not.

4.3 The influence of the ELE on student motivation and assessment

Use of the ELE model to motivate students was examined by using data taken directly from the performance results. The lower scores on the post assessment tasks are identified as possibly having an effect on motivation. These were investigated as possible alternative explanations for changes in student performance between pre and post assessment tasks. Students' motivation and prior use of the ELE are discussed together as a factor affecting students' performance to increase their results.

4.3.1Use of the ELE model on student motivation

A summary of the results which included all students and the percentage of students who did improve their results is provided in Table 4:7. The results show that, when given the choice to work independently and take responsibility for their own learning, an average of 21% increased their motivation after intervention had taken place. Students' responses to Question 6 of the ELE questions used in Interviews indicated that the majority of students in Group A and the Experimental Group were challenged by the ELE to expand their understanding and offer more informed decisions.

Table 4:7: Student motivation and performance

Group n=73	Learners motivated by ELE	Pre Test	Post Test	Learners ability similar on Pre and Post Assessment
1A	Yes	3 (17%)	15 (83%)	4 (22%)
1B	Most	6 (22%)	22 (78%)	7 (25%)
Exp. Group	Yes	2 (8%)	25 (92%)	5 (18%)
Mean		15%		21%

It is thought that students who simply lacked motivation may be contributing to the lower performance on post assessment tasks, but there is no clear trend. Student encouragement, due to the nature of the learning environment may also be contributing as shown by the results of the Experimental Group where the group dynamics strongly encouraged greater motivation.

4.3.2 Students' Ability

Pre Test performance measures which reflected student ability were investigated as possible factors influencing student motivation. It could be that more able students did better in both pre and post assessment tasks and this could explain their much improved performance on the post assessment tasks. Using the pre performance measure as a criterion, there is difference in the mean mark on the post assessment between those students with perceived ability and those who, according to the pre test appeared less able. Table 4:7 shows that the small percentage of students with perceived ability against those who did not demonstrate student ability as observed from their pre assessment performance (15% v 21%).

4.3.3 Summary of Results

The comparisons in this section suggest firstly that there is strong evidence that students are more likely to be motivated in a learning environment that encourages self directed learning and responsibility for one's learning. Secondly, if students have perceived higher ability they are just as likely to maintain their performance. Thirdly, on the basis of assessment performance for a small number of students, evidence would suggest that lack of motivation affects learning.

4.3.4 Overall Summary

All of the groups demonstrate that the learning environment affects assessment results. This effect is seen for students in the three groups. Final products presented for assessment ranged from PowerPoint presentations, songs, short stories, video clips, role-plays, letters, diaries, art work, interviews, essays, debates, political speeches, seminars and a dance interpretation. The majority of students however, favoured PowerPoint presentations, role-plays, speeches and seminars which had visual support. The feedback loop in the learning and assessment cycle provided suggestions for improving their learning outcomes. The Self-Assessment Rubric allowed the students to reflect on their understanding before submitting the 'final product' for assessment by the researcher. The examination and analysis of over one

hundred separate items took place to corroborate and augment evidence from other sources, such as pre assessment outcomes of both study groups and experimental group. From the evidence it can be acknowledged that learning environments enhance the relationship between learning and assessment. This evidence was statistically significant in all cases, with an average effect size of 0.55. On the data available it does seem that the learning environment has a measurable effect on assessment results and motivation. Students expressed a preference for the ELE method of learning and assessment as it was considered to be more reflective of the 'real world' rather than the classroom.

4.4 Data from interviews

This section reports results that considers students' general attitude to the ELE in an attempt to see how students use the ELE as well as gauge students' opinions and feelings of the strengths and weaknesses in the ELE model.

A total of 73 students from Group 1A, 1B and the Experimental Group were interviewed regarding their response to the ELE and use of the learning environment and assessment it applied (see *Appendix F/G*). The main questions asked for information relating to views on assessment, as well as effectiveness of learning environment and whether they approached assessment tasks differently. The students responded to questions usually asked of them when they were working within and outside the classroom. The best way to assess whether students can perform an activity is to observe them while they are actually performing the activity. Ask them probing questions. The use of anecdotal records and observation checklists, assisted in data collection when these observations took place.

Students were able to select any of the six options they believed were the best features of the ELE, and they were asked to add any additional information they wished. As Table 4:8 shows, most students selected the ELE assessment, followed by the freedom to choose their own activities as the most important features. About three quarters of students said they liked the ELE classroom while 71% of students found the learning environment different from a classroom in that it offered the opportunity to become motivated should they wish to improve their assessment mark.

Table 4:8: Which are the best features of the ELE program?

Which are the best features of the ELE program?			
Option		n	Percent
1	Did you prefer the ELE's assessment?	65	89
2	Did you like freedom to chose?	59	80
3	Did the environment help you learn and improve your performance?	63	86
4	Did the rubric help improve your results?	57	78
5	Did you prefer the activities	55	75
6	Did you find it different from a classrom?	52	71

The main questions of the interviews asked for information relating to the use of the ELE and students' perceptions of the optimal conditions for learning. The main questions addressed are listed in Chapter 3. Not all students responded specifically to each question and real names are not used in reporting student responses.

4.4.1 Student Responses to Interview Questions

The researcher conducted 120 classroom observations (105 hours) that included a series of 73 in-depth interviews over the ten month period. In order to gain a representative perspective on the classroom processes and interactions, the researcher observed at various times of the school day (during morning sessions, after recess, after lunch, and computer lab time). Field notes included observations of students' interaction with the environment and peers, and also included were accounts of the researcher's actions, thoughts, and conversations, as well as theoretical and methodological notes. More detailed responses from the interviews are found in Appendix J. A summary of the qualitative analysis is found in Table 4:7.

The open-ended interviews were usually conducted informally during lessons or outside the classroom, either in lunch areas or sub school areas. Questions were based on the researcher's classroom observations and were developed from Patton's classification of interview questions and often in response to students' comments. The students themselves frequently suggested issues and topics. Questions explored students' experiences when working in an environment: "when you were working within the learning environment did you find it different from a classroom?" "What did you do differently?"

The greatest consciously valued learning occurred in the Experimental Group whose members started out hesitant ('I did not think I would do well') but who gained a great amount of confidence during the process of the project (which even surprised the researcher by the motivation and engagement of the Experimental Group once the study began). This confidence was correlated with the students' opportunity to act independently - which in turn increased their self-confidence for future projects.

4.4.2 Students' opinions of the ELE model and Assessment

Graham (Experimental Group) at first was not keen to participate in the program as he had been off school sick but on his return he "thought the program was cool as it allowed me to do what I wanted to do and not what the teacher wants me to do". Ann (Experimental Group) "found it hard starting but then this assignment meant I could take my time and work at my own pace". Adam (Group 1A) commented "that this is the first time I could present my project how I wanted and not what the teacher wanted". Hannah (Group1A) said that the "ELE assessment seems as close to real life experiences as possible". She was referring to the usefulness of the learning environment in alerting her to the opportunities it presented in terms of flexibility in answering her questions. Alex (Group 1B) commented specifically that he liked the way the teacher "kept encouraging us to find out more information about our areas of interest and this made me find out more than I would have." Josh (Group 1B) said that it "did not matter what outcome I had to achieve, the ELE rubric made it easy to understand and work at doing your best".

4.4.3 Students' Responses - how the program was different

Dylan (Experimental Group) commented that "not being graded on your project was good"; while Hannah (Experimental Group) thought the program provided opportunities for us to learn more through our own experiences." Chris (Group 1A) thought that it was great "that the teacher let us do what we wanted….there was [sic] no boring lessons such as writing notes from the overhead;" whereas Rebecca (Group 1A) had similar views in that at first "I felt this was a dumb assignment, but by using this approach I found that I was able to produce the assignment to my way of

thinking and rather than somebody else's." Kris (Group 1B) said he "gained self confidence…and it taught me the power of learning" and Anne (Group1B) liked the way the teacher helped with ideas, "while also giving us freedom to create the activities we want to incorporate into our own projects".

4.4.4 Students' Responses on effectiveness of feedback

Steve (Experimental Group) recognised "that in sharing assessment with the teacher means they're giving it back to us." Kayla (Experimental Group) felt she had learned a lot "but don't know if it would stay with me." John (Group 1A) said that the rubric lets the teacher and our peers know how much effort you put in." Rachel (Group 1A) reflected that it was "good to compare myself with someone else and I think the environment helped me also". Emma (Group 1B) said it "helped develop an understanding of what we are doing by accepting feedback, and criticism from our friends." Rhiannon (Group 1B) prefers this type of assessment as the "ELE rubric gave every opportunity to receive a high grade that also reflects the level of contribution made by individual students."

4.4.5 Students' Responses - ELE rubric improving performance

Scott (Experimental Group) preferred the ELE rubric as "it helped me understand from the beginning of the task what I could do"; whereas Melissa (Experimental Group) believed that reading and working through the rubric "I can discover what I really understand and what I don't". Matthew (Group 1A) said that rubrics are "usually sketchy, although the main advantage is being fair. The ELE is more detailed than most.", however Matt (Group 1A) said the "best thing for him was that if you follow along the rubric you already know your assessment outcome and it is easy when you can choose any area of interest to study". Luke (Group1B) felt that "the ELE rubrics help teachers assess better than just thinking of an outcome in their heads." Rachel (Group1B) said she was "forced to think about my project – it is very easy to just remain lost in your own ideas rather than having some idea of where to start".

4.4.6 Students' Responses - Effectiveness of Learning Environment

Mitchell (Experimental Group) rated the learning environment highly as "we did not have to do what the teacher wants you to do…we could choose for ourselves what we wanted to find out. Sam (Experimental Group) said she "had not learned as much in any other class at school in the past three and half years." James (Group 1B)felt he had gained a great deal from the learning environment as "I have seen a remarkable change in attitude in myself…at times I find myself asking is this for real and thank you for the new found confidence I have acquired." Cassie (Group 1A) shared a common view "that the best way to describe our classroom as a fun place to be in…we couldn't wait for this class…it was cool." Anthony (Group 1B) expressed his views first at annoyance that he had to think for himself because in the past all his assignments only required him to consult textbooks and hand in specific answers to the teachers' questions. Lauren (Group 1B) said that the ELE classroom provided "an inclusive environment in which I was free to test and expand my creative and intellectual potential without feeling limited. I learned what I could now do."

4.4.7 Students' Responses to Strengths and Weakness of the model

Laura (Experimental Group) said one of the best things about the program was "being able to do what you wanted to do…and knowing that you were being assessed on something you knew something about". Ellie (Group 1A) "I understand the importance of doing my own work and learning from my mistakes as well as building on my strengths." Sam (Group 1B) said "I put in hours on my project and received an Expert outcome. This made me very happy, because I had done so much work and the mark reflected my efforts". Luke (Group 1A) said that "by putting what we learnt in writing or a project makes you think about it and we remember it for longer".

Some of the weaknesses were expressed by Alanah (Group1B) in that "I did not have enough class time to finish all we wanted to do". Bianca (Group 1A) said "I found it hard to start without being told what to do…usually I just have a question and then find the answers on the net." Kim felt one of the main weaknesses was more to do with access to computers and media equipment, rather than the program because

there is only a limited number of computers in the school: a ratio of 1:6 computers: students makes it difficult to do your work, although his group came up with a roster system for the classroom.

4.4.8 Students' Reponses to ownership of their own learning

Brian (Experimental Group) commented that one of the things he loved about the ELE program "is that we're trying to learn how to ask questions – not just get the right answer. That's really good. Naomi (Experimental Group) really wanted to do this "because it is not just useless data or memorization, it is something that I can apply to everyday life." You want to get the right answer, but you still want to learn. You do better because learning is more important than getting the right answer. Nadia (Group 1B) felt the "idea of thinking has created no end of problems for me…all through school; I am constantly asked for the right answers…now I know that there are no right answers."

Laura (Group 1B) liked the idea of being "able to control when, where and what we learnt…as well as how often and how quickly…and this level of control is what made us enjoy doing this course." James (Group 1A) hates being "put on the spot…and being told just tell us the answer, don't keep asking more questions and if I ask you a question in class, you are told I don't want another question in return, I just want the answer…in the ELE I can ask all the questions I want. Steph (Group 1A) said she learned "a lot about how to be an effective member of a group…and I learned that I will be able to step up in a team situation when I enter the real world. John (Group 1A) felt that "this is the best work I have done. My parents were pleased with the project that I produced. I think this is because it was what I wanted to do".

4.4.9 Summary of Interview Data

The interview data (see Appendix J) are in general agreement with the responses to students' self-assessment reported later. Students found the ELE encouraged them to take responsibility for their own learning and if motivation was a contributing factor. When given the opportunity to take ownership the students' approach varies. In this

study most students did more work than others in the study groups, some took it seriously and a few just treated it as a trial and there was no reason to improve their performance or take ownership of their own learning. One interesting issue here was the change in motivation for a couple of students. After the initial response to the program, they re-evaluated their position, as their attitude changed. This re-evaluation may show the effectiveness of the ELE on motivating students to take responsibility. The fact that they are re-evaluating their position means they are looking for conditions that will alert them to probabilities for assessment of their learning but they are going one step further and revising in order to improve their assessment results.

4.4.10 Students' Use of Feedback

The main reason for the survey about the ELE was to find out how students use it and because it provides feedback which can be of use for understanding the effectiveness of an Exploratory Learning Environment and how it enhances the relationship between assessment and learning. In the study, students were asked questions specific to changes in the learning environment. Students responded to the *ELE Feedback Survey* (see Appendix H). A summary of responses is reported in Table 4:9. Question numbers used are those of *Feedback Survey Responses* (see *Appendix K*).

Table 4:9: Summary of Student Responses to Feedback Survey

Learners' Responses to Feedback Survey			
Question	**Response**	**n**	**Percent**
Q1 Were there significant changes in your learning during the program	Yes	58	79%
	No	5	6%
Q2. Do you have questions that are uppermost in your mind?	Yes	33	45%
	No	28	38%
Q3. Did the ELE improve your understanding of how to learn	Yes	48	65%
	No	15	20%
Q4. Would you like to make changes in your current study program	Yes	38	52%
	No	21	28%
Note: Some learners omitted some questions			

Study Groups 1A, 1B and Experimental Group

Surveys were returned by 15 (83%) of students from Group 1A, 21 (75%) of students from Group 1B and 19 (70%) of the Experimental Group students. For Question 1, the percentage of students who reported significant changes in their learning was high. For Question 1 the percentage was 79% and for Question 3 regarding the usefulness of the program in improving understanding of how to learn, the percentage was 65%. Overall the students in total said they favoured the ELE program.

Use of response information

Table 4:9 also reports the students' comments to open-ended questions on the student feedback surveys. Multiple responses were allowed so the percentages do not total 100%. Percentages are based on total responses not on number of students responding. The most common response again was that the ELE acted as a motivator for improving assessment performance.

Summary of Survey Data

There is agreement across the interviews and feedback survey that students are in favour of the ELE program. Students are positive about the ELE assessment program and many commented so even when not specifically requested to do so.

4.5 Students' use of Self-assessment Rubric

Students were asked to complete a Student Self-Assessment Rubric (Appendix I) after the post assessment tasks. The Self-Assessment Rubric provided an opportunity for students to observe, analyse and judge their performance on the basis of criteria and determine how they can improve it. Self-assessment promotes motivation and critical thinking and assists with the development of ownership and responsibility of learning. The results suggest that self-assessment demonstrated levels of improvement in an understanding of their own reality.

Table 4:10 reports the comparison mean of Students' Self-assessment with the Researcher's pre and post assessment. It can be seen that students produced similar

results to assessment by the teacher. Table 4:11 summarises self-assessment and pre and post assessment for all three groups. Further, in all cases the students scored similar results on their self-assessment compared to the researcher's assessment. The results of the relationships between these scores are reported in Table 4:12.

Table 4:10: Comparison Mean of Students' Self-assessment with Researcher's Pre and Post Assessment

Group	PRE	SELF	POST
1A	65.61	70.84	76.27
1B	69.55	71.90	80.10
Experimental	65.74	72.50	82.81

Table 4:11: The relationship between Students' Self-assessment Scores and Researcher's Pre and Post Assessment

The relationship between Learner Assessment Scores, compared against Researcher's Pre and Post Assessment Scores																	
Results of Self Assesment for the three groups									Group 1A			Group 1B			Experimental Group		
1A	Assessment Score	%	1B	Assessment Score	%	EG	Assessment - Scor	%	1A Self Ass	Score on Pre Test	POST SCO	1B Self Ass	Score on Pre Test	POST SCO	EG Self As	Score on Pre Test	POST SCO
1	15	62	1	17	70	1	20	83	62	54	72	70	71	92	83	68	94
2	20	83	2	19	78	2	15	62	83	56	73	78	68	80	62	62	72
3	20	83	3	20	83	3	20	83	83	63	86	83	79	96	83	61	86
4	19	78	4	22	91	4	20	83	78	75	85	91	89	97	83	82	94
5	16	67	5	19	78	5	20	83	67	67	86	78	70	93	83	74	80
6	14	58	6	22	91	6	22	91	58	56	72	91	86	96	91	64	96
7	21	87	7	15	62	7	15	62	87	74	79	62	53	76	62	64	82
8	22	91	8	22	91	8	16	67	91	73	78	91	87	96	67	72	80
9	15	62	9	20	83	9	16	67	62	86	90	83	74	92	67	68	74
#	19	78	10	12	50	10	22	91	78	79	76	50	65	68	91	57	94
11	17	70	11	16	67	11	23	95	70	45	66	67	86	94	95	73	100
#	14	58	12	23	95	12	13	54	58	65	65	95	87	98	54	56	66
#	16	67	13	22	91	13	16	67	67	68	84	91	68	90	67	69	76
#	19	78	14	16	67	14	22	91	78	55	61	67	56	62	91	68	98
15	18	75	15	18	75	15	20	83	75	51	62	75	74	90	83	69	56
#	15	62	16	12	50	16	14	58	62	56	60	50	52	66	58	60	70
17	22	91	17	13	54	17	12	50	91	82	89	54	63	69	50	56	76
#	19	78	18	19	78	18	15	62	78	76	89	78	80	93	62	51	86
			19	16	67	19	20	83				67	48	52	83	80	96
			20	12	50	20	23	95				50	59	54	95	58	96
			21	22	91	21	16	67				91	79	92	67	61	70
			22	12	50	22	12	50				50	52	53	50	64	56
			23	13	54	23	12	50				54	63	54	50	61	80
			24	14	58	24	16	67				58	66	69	67	64	70
			25	18	75	25	20	83				75	69	82	83	64	100
			26	18	75	26	18	75				75	74	70	75	73	92
			27	20	83	27	20	83				83	75	80	83	76	96
			28	18	75							75	67	89			
N = 18		70.84	N = 28		71.90	N = 27		72.50		65.61	76.27		69.55	80.10		65.74	82.81

Table 4:12: Relationship between Students' Self-assessment and Researcher's Assessment (Post Test)

Relationship between Learners' Assessment and Researcher's Assessment									
		Self Assess			Post Test -				
Group	n	Mean	SD	z score	Mean	SD	z Score	Pearson	t test
Group 1A	18	70.84	16.18	0.22	76.27	16.84	0.19	r 0.31	0.01
Group 1B	28	72.50	16.59	0.30	80.10	18.06	0.26	r = 0.81	0.002
Experimental Group	27	71.90	16.71	0.30	82.81	16.69	0.28	r = 0.70	0.001

Again the scatter plots (see Figure 14 to 16) show the strength of the relationship between an Exploratory Learning Environment that engages students and the significant linear correlation which might be due to direct relationship between the ELE method of assessing learning and student results.

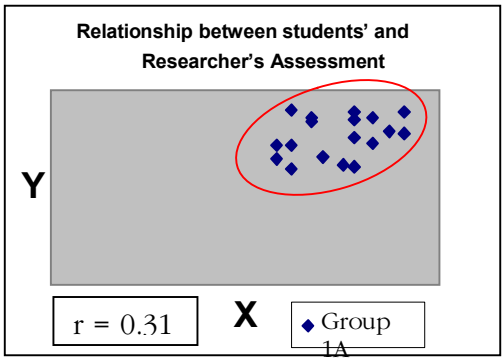


Figure 14: Scattergram indicating a positive relationship between Students' and Researcher's assessment (Group 1A)

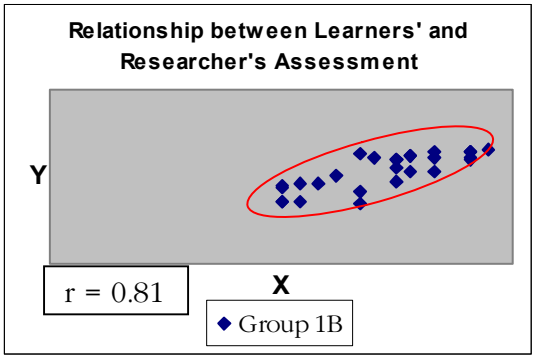


Figure 15: Scattergram indicating a positive relationship between Students' and Researcher's assessment (Group 1B)

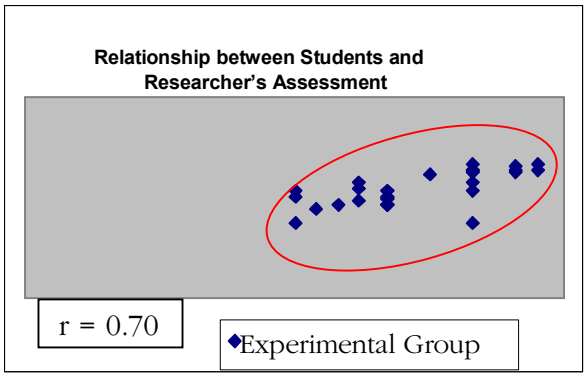


Figure 16: Scattergram indication a positive relationship between Students' and Researcher's Assessment (Experimental Group)

4.6 Overall Results

Overall, the pre and post interview data, observations of the learning process and statistical analysis of the assessment of the 'products' of the students' understanding indicate that all the students improved their assessment scores as well as an

understanding of their own product and outcome of the process of learning (see Table 4:11 for summary of data).

The combined effect of variables in this model explained 80 per cent of the variance of engagement by the students. The large amount of variance explained and the stability of the outcomes measure reflected by the high V (0.8) indicates a well defined and stable model.

Constant attempts were made to review and search for alternative explanations to any data analysis. Because observations, statements or similar pieces of data may be interpreted in different ways, it was the responsibility of the researcher to provide the most plausible explanation for any analyzed data (Marshall & Rossman, 1989; McGee-Brown, 1994). Triangulation was achieved by using all the various sources of data, checks, and the expertise of the researcher as an instrument model (Merriam, 1988).

Students were a little apprehensive at the beginning of the study when and during the 'defining the problem' stage some had the tendency to seek assistance to determine if their conclusions were correct. However, as their involvement expanded so did their sense of confidence to probe and seek answers to their questions independently. The students in all the groups eagerly participated in activities and showed camaraderie; however, this was more evident in Group 1A. A contributing factor in the differences in class climate could have been that this group had more informal opportunities to interact and develop relationships than the comparison groups. This observation supports the claim that students perform more effectively when they are in an environment that allows for social interaction (Huitt & Hummel, 2003; Vygotsky, 1978).

This social interaction becomes evident when the students as a class decide that they want to synthesize the data and formulate an answer to their guiding question. Their observations and explanations continually expanded; they found they had to consider factors they did not originally think were important, such as the physical environment, politics, religion and the activities of indigenous people.

As they compiled data they began the difficult task of answering their questions. They realized that they must first address the question: "What counts as conflict?" For the final assessment task a new problem was presented and students were asked to prepare a report describing how he or she would investigate the problem. This extension activity was implemented due to the eagerness of the students in all groups to take ownership for their learning and wanting to simply find out more in their own time.

It was found that the emotional involvement of the students in the project was an important correlate of perceived success. Lack of involvement resulted in failure to gain valuable learning outcomes, or, alternatively, to fail to value the outcomes of learning in the ELE. Students who were uninterested by the project did not identify significant learning outcomes from their products. It is worth noting that the valuing of outcomes did not necessarily correspond to doing well or the process of learning for the project. Group 1A and the Experimental Group did everything that was required of them in this study, and when asked what the most important thing they learnt was, most of them answered 'being able to answer our own questions'. On the other hand, a couple of students in Group 1B who failed to complete the project commented that they needed to work on time management and organisation, as well as some ownership for their own learning.

4.7 Data Analysis

The constant comparative method of data analysis (Bogdan & Biklen, 1982; Glaser & Strauss, 1967) provided a feedback loop to shape both the methodological and analytical facets of the study. To illustrate, before the Students' Self-assessment, the researcher analysed the content of the interviews and prepared questions for clarification, correction, and elaboration of the students' ideas to find out "if I got it right" (Geertz, 1973). The researcher also conducted theoretical sampling (Bogdan & Biklen, 1982; Strauss & Corbin, 1990) during those interviews, checking the perceptions of each student about categories that were emerging from the study. For example, early in the data collection, a few students described their experiences of being able to take charge of their learning that is, to "choose an area for study and write their own questions" and therefore overcome their lack of incentive about a

particular task. Subsequently, specific questions about this issue of motivation were posed by other students and conditions emerged. Given the range of internal and external degrees of motivation in relation to the classroom environment it was decided to establish a basis for comparison (LeCompte & Preissle, 1993) to be used by researchers and practitioners in studying other contexts and other students. Some students who may have alternate motivational learning might be assessed differently in other learning environments in which rewards (grades) were emphasized more and meaning construction and understanding was emphasized less. The researcher knew many of the students, having taught a number of them before the intervention. Thus, it was important to establish conditions and organise a theoretical framework for presenting the results to explain the relationship between the ELE model and students' responses to the intervention. Further, the researcher's ongoing analysis of the interviews helped shape an understanding of student motivation to be explored more fully in subsequent interviews.

Categories and conditions were inductively generated (Bogdan & Biklen, 1982; Erickson, 1986). The field notes were cut into segments according to identified units of meaning based on relationships to particular categories and conditions. The units of meaning and understanding ranged in length from a single phrase to a couple of paragraphs; for example, Graham's comment "We could ask the kind of questions that good scientists do" was sorted into the category of Exploring.

These segments were placed on index cards and sorted into groups by categories. These final six categories were analysed to identify ways in which they related to each other. Frequencies of responses were counted and patterns for individual student profiles were analysed in relation to particular categories and properties. Table 4:10 summarises the different categories and conditions. There was much diversity in the experiences described by the students in this research, but a few findings were representative of all students. For example, all students preferred exploring; being able to come up with their own research questions.

Validity checks on the coding processes were conducted by a colleague, who worked at one of the secondary schools, and was an experienced qualitative researcher. He

coded randomly selected sections of the field notes and compared these with the researcher's coding. A high degree of initial consensus was found and provided verification, clarification, and elaboration during subsequent individual interviews, through focus groups and through whole class discussions.

In order to conduct further theoretical sampling of the categories and properties, the researcher held a series of small group sessions in which all students in the study participated. In focus groups of about eight members (Patton, 1990), students expressed their ideas on questions central to the study. Data analysis processes and tentative findings were shared in a whole-class meeting that was followed by discussion in which essentially no new ideas emerged, thus providing strong indication that the categories were covered. Students were asked to respond to their perceptions of the above through a four point scale on the Student Self-assessment Rubric ranging from 4 = high to 1 = low. The statistical data summary for all students, n = 292, is shown in Table 4:10.

Table 4:10 indicates the result summary of those analyses

Categories	**N = 292**	**%**	**Mean of students responses**	**Conditions of Students' Responses**
Exploring /Questioning	249	84	3.8	*Condition 1-* were students who scored high overall on all categories/properties
Engaging/Planning	251	85	3.5	
Discover/Gathering	227	77	3	*Condition 2* – students scored on an average of 3.5 on the first four categories/properties
Validating/Sorting	210	71	3	
Internalising/Synthesizing	176	60	2.3	*Condition 3* – students who scores an average of 2 on the last four categories
Evaluating/Self-Assessment	167	57	2.3	

As indicated, in Table 4:10 three different patterns emerged from students' responses:

Condition I: Students were motivated to complete the project and ultimately engaged in the tasks due to the nature of the exploratory learning environment.

Condition II: Students lacked initial motivation to complete the project, but eventually engaged in the tasks and completed them, due to the nature of the learning environment.

Condition III: Students lacked initial motivation, and engagement, and felt unable to complete tasks despite the nature of the learning environment.

There were undoubtedly cases in which students lacked motivation and either did not engage or complete tasks (potentially a *Condition IV*). However, this study focuses on ways in which students managed the exploratory learning environment when they were motivated, lacked initial motivation and when they lacked motivation and felt unable to complete tasks. As there were only 2 students who lacked motivation, did not become engaged and either felt unable to engage or to complete tasks, Condition IV was not explored.

In this section, students' experiences in these three situations will be described, as well as their motivation and engagement responses when lacking motivation.

There was unanimity among students in relation to two findings: First, all of the students occasionally experienced lack of motivation even in this class that they generally found interesting and engaging. Second, all the students preferred to be interested and involved, rather than bored or disengaged, in their projects. Although certain students felt stalled in their work occasionally, most found ways to work through the anxiety they experienced when they lacked motivation.

***Condition I*: Students were motivated to complete the project and ultimately engage in the tasks due to the nature of the exploratory learning environment.**

Motivation for the program and a positive attitude towards what was expected and valued and student self-evaluation or assessment were the main approaches which motivated this group of students.

Motivation/Enthusiasm for the program. Adam explained that he and his classmates found this assessment task to be great as they could do what they wanted and with all their efforts, they could be experts in their area of research. Similarly, Anthony

commented, “this assessment task sounded like fun…it takes time to find things, yet it is easy to find stuff, making it effortless to present the information to be assessed”. Anne reported that this “assessment task was an interesting one which required quite a lot of research and thinking about. I believe that the assignment went well and if I were to do it again I may spend more time asking questions and researching information. Gabby’s concerns went beyond the program in that she commented “my learning has been meaningful and important doing this project. I don’t want to lose that motivation because my other classes do not have the same passion for learning.

Positive attitude towards what was expected and valued. From the onset several students demonstrated attempts to take charge of their attitudes in a positive way. Manning (1990) describes these as part of a person’s inner language. Several students demonstrated this metacognitive awareness, for example James’ comment “to have successfully completed this assessment process that I was afraid of, offers me hope to challenge and work toward completion of other more difficult tasks. I felt valued for my work.” James became more positive in his approach to learning and completing tasks for assessment. Similarly, Scott shares this view “I think this program also provides times for us students to help other students, and motivates each of us to be active participants in our own learning.” Priscilla also indicated that “by reflecting on the problems we encounter together, we analyse them and synthesize them to the point of categorizing them in order to solve them. By doing this we compare them to problems that we know how to solve in order to solve them”. Stevie described her feelings “it’s the greatest idea ever. Really. I thought for a long time – how teachers could make lessons useful and interesting at the same time? And this is the best solution really! It’s so easy – to teach you to ask questions, and it’s much more productive. Well, that’s what I think.”

Self-evaluation or self-assessment: Self-assessment is particularly appropriate for students. With the development of metacognitive abilities students' abilities for self-reflection and self-regulation of learning are enhanced. Self-assessment promotes natural motivation, and sets out to achieve on-going self-assessment. Brian sums up this view “the things that help your feelings of self learning…that little voice that

gives you feedback can either be a friend or your worst enemy. The ELE helped me better understand myself and gave me motivation to learn more." This view was also shared by Maddie: "for me, I learned the difference between learning and learning for assessment. However, what is more valuable than learning for me, is how to appreciate understanding, rather than learning stuff for exams…because when you assess your work you tend to be able to understand what you are doing." Yasmin indicated that the "best part was that I started to analyse the task. There are self-assessment and critically thinking components, etc, and I can observe these in myself."

***Condition 1I*: Students lacked initial motivation to complete the project, but eventually engaged in the tasks and completed them due to the nature of the learning environment.**

As described in the previous section, students found ways to engage in the program after lacking initial motivation. When asked why they lacked motivation they frequently referred to the classroom as being non-responsive; i.e. unable to have discussions, and the boring nature of assignments and that they could not do what they want.

Learning Environment. Some students sought engagement in activities as the rest of the class was perceived as having fun. Troy recognized that creative activities make life [learning] more interesting "my favourite part of making the project was the ability to experiment with the different media equipment as I found it challenging at first."

Discussions. A responsive classroom is one that respects student voices and, according to Noddings (1994), develops a community of students that promotes the maintenance and enhancement of caring. This view is shared by several of the students in each of the groups. For instance, Ashley states that "if only I could convince teachers to include this approach into their teaching style. Many just don't believe that it can actually work. They hate having discussions because no one listens…but we do if the teachers set up the right environment for us to learn in." Melissa indicated that "discussions need to be built into the environment so the role

of the teacher can be there to encourage us to ask questions rather than just the right answer to their questions". Ellie said that they "liked asking questions and applying more questions at a higher level and even my friends who are struggling are having success with it. They might need some more support through it but they certainly seem keen to do the work. I know in our other classes they would not do the same amount of work."

Nature of assignments. Dylan, who was struggling with motivation and then influenced by his peers said "that the missing thing in our classes is that teachers do not understand what makes us work…why can't they make the assignments and lessons more interesting like in the ELE program." Similarly, Samantha said "she hated it when you cannot research what you want, but this project allowed me to do anything I wanted." Initially Kayla felt jaded by another project that involved group work because "if you work with friends, you feel reluctant to give a group member a poor assessment, unless they did nothing", however observing her peers being motivated helped her "work with my classmates and do exciting things…and share our ideas."

Could not do what they wanted. Students, who did not become motivated but nonetheless completed the project, were supported by the dynamics of the classroom as it made the transition to being motivated less difficult. As Luke explains, -- "the type of surroundings that I work best in, is like being able to do what I wanted and not what the teacher wanted." Unlike other classrooms, "the ELE classroom helped me understand" commented Peter. For Aaron it was a "better place to work in and helped me think for myself." Steve indicated that "we need to be pushed to work harder to go beyond these boundaries, to challenge your brain and all; I think some teachers put these limits on the students by not allowing them to do the same type of work." He reflected again later, by saying "if we were encouraged to do the work but approach it differently, we would actually do more work." Helen also comments "if students are exposed to areas that already interest us, then they may get more involved than if the focus is on learning for the end of semester exams."

***Condition III*: Students lacked initial motivation, and engagement, but felt unable to complete tasks; despite the nature of the learning environment**

Students, who lacked initial motivation, however became more positive but were unable to complete the tasks and their responses on the Self-assessment Rubric focused more on management and past learning experiences. Some students in *Condition 111*, who lacked motivation, responded to the supportive nature of the exploratory learning environment. A supportive learning environment has the potential to nurture and care about the process of learning. Conditions such as time management and past learning experiences made it difficult for some students to experience a sense of empowerment. This is exemplified by Graham's case.

Management. Graham seemed overwhelmed initially by the demands of the project; however intervention by the researcher, who explained that the entire assessment project was for them to decide and make decisions, did alleviate some of the stress in terms of work avoidance. During the fourth week Graham commented "I can't help wishing that we could have done this much sooner. Hard to do what I have to do in such a short time." Graham felt much better about handing in what he was able to complete rather than stress over what he had not done in the given time. Alison felt her management problem was more to do with not understanding what she actually had to do, and usually she was reluctant to ask. She eventually felt much better about working on the task, rather than rushing to complete it, and as Alison indicated "many teachers want to know whether they can help you learn – be it English, Art, History or Maths. But they remain unclear on what we are really supposed to do in the classroom".

Past Learning Experiences. Some students; John, Luke, Rachel, Rhiannon, Mitchell and James were prompted to engage in the process of learning and attempt the activities said they felt this was the first time they had been encouraged to work rather than ordered to complete the activities. This is articulated by John. "Teachers do not understand that when we are inattentive and sometime disruptive in class is because we are bored with what we are doing…so the teachers should change what happens in the classroom so we can learn." Even though a couple of students did not complete their projects, the fact that they connected with the context and became engaged because of the nature of the supportive learning environment, is supported

by their comments, "I wish all our teachers put a lot of effort and time into making the classes interesting, and enjoyable for us to learn…this is our everyday life and future" and finally "I had fun learning and remembering things. It will help with thinking skills and English skill. If only all my classes could be like the ELE."

4.8 Conclusion

This chapter has discussed various ways the data which was collected can be grouped in order that it can be meaningfully examined. The frequency distribution tables and diagrams of this chapter form the basis for understanding the relationship between learning and assessment.

Chapter 4 presented the results of an ethnographic study. The purpose of the study was to investigate in what ways can assessment benefit as a result of the creation of an Exploratory Environment and would this approach represent an approach that would engage students and at the same time enhance the relationship between learning and assessment. The interviews identified the following three dimensions of a supportive learning environment: students were enthusiastic to complete the project and ultimately engaged in the tasks due to the nature of the exploratory learning environment; other students lacked initial enthusiasm to complete the project, but eventually engaged in the tasks and completed them, due to the nature of the learning environment; whilst a couple of students lacked initial enthusiasm and engagement, and felt unable to complete tasks, despite the nature of the learning environment. The purpose of the interpretive analysis of interviews and feedback responses was to richly describe the dimensions identified in the study.

In the next chapter, the overall trend of improved performance will be summarized and the implications this has for learning environments that support the objective of negotiation which help students to create their own interpretations of learning demands by evaluating (negotiating) the enabling power of the strategies which they apply in their learning context. Everyone in the exploratory learning environment learns (including the facilitator/teacher). The results of our study suggest that students' engagement in challenging work was more likely when it was within a supportive classroom as this enabled them to connect and construct their own

meaning. This tendency is "constructivist" because it coincided with a view of students as actively constructing meaning through problem-solving activities (Jonassen, 1991).

4.9 Overview of the Next Chapter

Chapter 5 discusses how these results elaborate and refine the conceptualised dimensions, resulting in the systematisation of a theoretical framework of an environment enabling learning by exploration using a model that enhances the relationship between learning and assessment.

Implications for the direction of education point towards exploratory learning environments that enhance the relationship between learning and assessment by encouraging students to reflect not only on the process of learning but the product of that process, in addition to supporting students, who lack motivation. It is important to see assessment of learning from the students' point of view: one particular comment in the feedback on ELE assessment was from one student who said "You expect more from us than any other teacher."

Chapter 5 – Summary and Conclusions

5.0 Introduction

This research reports the results of a study set up to investigate the relationship between learning and assessment in the context of the Exploratory Learning Environment. The study sought to identify theoretical and practical features of a learning environment which would link assessment and learning in a way that would not threaten the negotiation basis of students' learning. The research took place in two large secondary schools which use summative and formative classroom assessment. Data collection occurred using the field notes from observations, interviews, participating-observer reflections, students' peer and self-assessment, and quantitative analysis of the 'products' of the process of learning. We also looked into factors potentially able to affect students' performance such as supportive classroom, motivation, students' gender, past learning experiences and their response to ELE. The last factor includes the students' attitude to the ELE generally and their engagement in the activities.

The study focused on Year 8 and Year 10 students because many students in both these years were more at risk of lowering their performance on summative and formative assessment tasks. Three groups of students participated, with two groups in Year 10 (in which the researcher was the teacher and participant- observer) whereas in the one Experimental Group in Year 8 the researcher was participant-observer. In total there were pre (ELE intervention) and post (ELE intervention) data, questionnaires, self-evaluations and self-assessment, surveys and assessment of students' 'final product'. All students were also asked to participate by way of interview. Data were obtained from these various sources and the findings pooled in an attempt to provide answers to the research questions.

5.1 Findings

In this research, all studies have shown an improvement in the mean student mark on post (ELE invention) assessment tasks. That is, across the three groups, there has

been an improvement in the mean student mark from the pre ELE intervention to post assessment in the ELE. Further, those students in the Experimental Group did better than Group 1A and Group 1B.

Results of the three groups showed improved student performance on the post assessment tasks with effect sizes ranging from 0.51 to 0.79. The average effect size was 0.55 (see Table 4:4). In all cases, the difference between the pre and post assessment tasks was statistically significant, for Group 1A F (1, 34) = 8.30, $p< 0.05$; for Group 1B F (1, 54) = 7.57, $p<0.05$, and for the Experimental Group F (1, 52) = 34.01, $p<0.01$ do (Table 4:5)

The analysis of the quantitative data indicates that students showed an improvement in their performance and achievement on the post assessment tasks. Students preferred the ELE assessment process because it offered constructive feedback on their performance. In their responses both on the feedback survey and in the interviews, students indicated this method as a preferred approach to assessment of their learning, because the criticism provided by the ELE model allowed them to identify areas for improvement. The main reasons given were that the researcher offered strengths and weaknesses for the different types of responses. This had a flow on effect, which enabled students to evaluate the effectiveness of their efforts. So, providing regular feedback and self-evaluation during the ELE process appears to be to students' advantage in that it served as reflection opportunities, empowering the students to improve their efforts. The teacher's assessment rubric, given at the commencement of study made the student aware of the agreed criteria for assessing the overall quality of their final product. The peer and self-assessment rubrics enabled the student to reflect on the learning process and independently create a response (product), often requiring multiple perspectives when problem solving and decision making, and which demonstrated their understandings of their own realities. The process for working on continuous assessment is outlined in Figure 18. The following points highlight the findings of that process.

Students began the process after they had been given the task and the ELE assessment rubric. After several lessons, the students received feedback from the researcher. They then used this constructive criticism to evaluate what they had

found useful and not so useful in their exploration and investigations. These cycles of feedback and evaluation repeated themselves as students continued their self-directed learning. From each cycle students began working on their exploration with a new level of understanding and the feedback and evaluation assisted students in applying and using this new understanding to re-examine their problem. Assessment at the end of the process was in terms of teacher, peer and self-assessment. The assessment of the product included three areas: the process of learning, responsibility for meeting the agreed criteria of the assessment task and the quality of the product.

Figure 17: The ELE process cycle used in this study

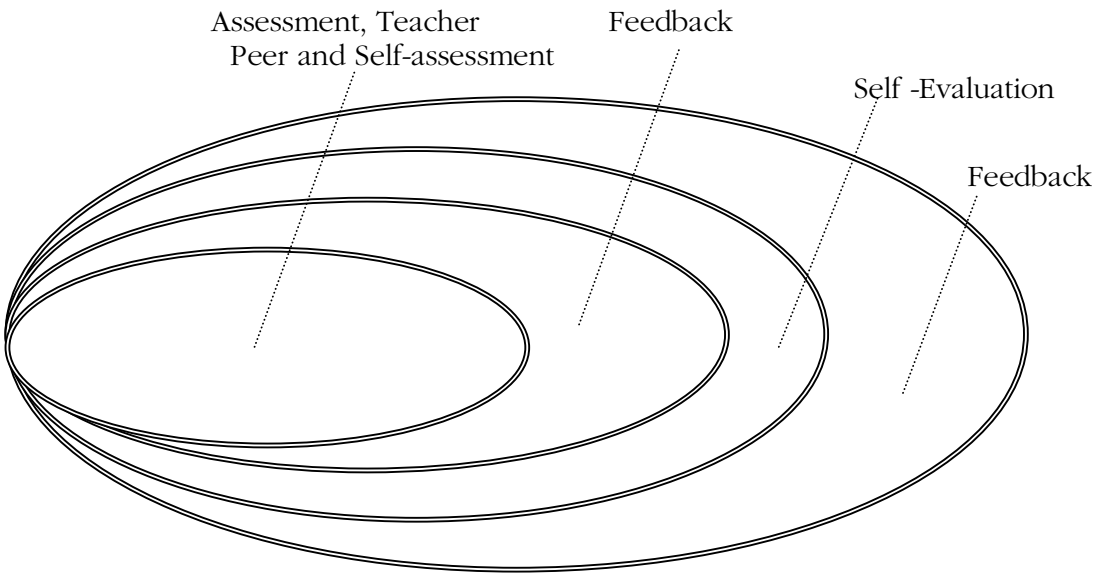
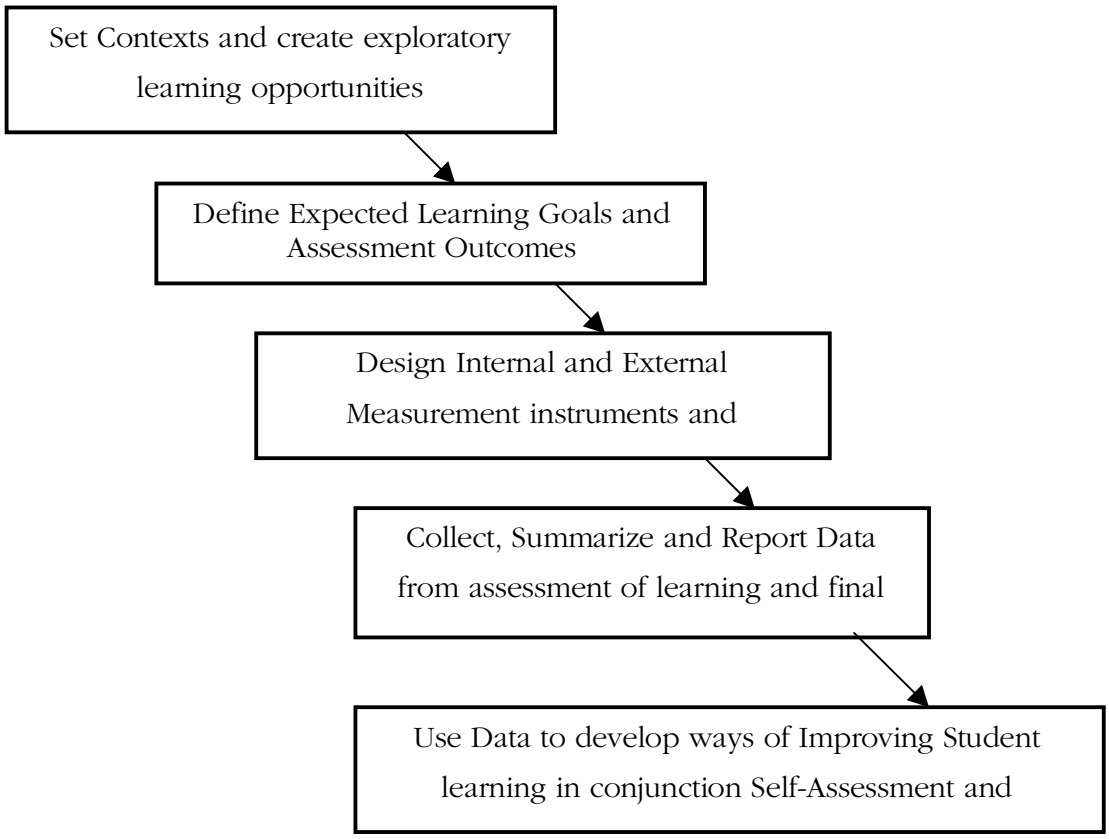


Figure 18 is an overview of the process. In practice, the feedback loop checked on students' assumptions with open-ended questions to elicit follow up lines of investigation. Next the evaluation loop enabled the students to monitor their own progress against the ELE teacher assessment rubric and evidence from their own work, which helped to improve learning and to develop social and cooperative actions. Within the context of a supportive learning environment the feedback focused on the task with specific and substantial information linked to the teacher, peer and self-assessment rubric given prior to the study. When asked in the *Feedback Survey (*see *Appendix H),* students indicated that there had been significant changes in their learning due to the cyclic process of assessment. The issue of

feedback was addressed in two ways. The three groups of students received a feedback survey and self-assessment scoring rubric. Students from the three groups completed surveys which were used to gauge student opinion about the ELE program. The self-assessment scoring rubric provided an opportunity for students to observe, analyse, monitor and judge their own performance. Hence, the ELE learning and assessment cycle (Figure 19) has 5 steps.

Figure 18: The 5 steps in the ELE learning and assessment cycle used in this study



When students were asked by survey or interview for their preference, they were adamant that they wanted the ELE model. The uses the students stated that they made from the feedback provided by the ELE model can be divided into three categories: motivation, nature of learning and past learning experiences. While students indicated that they used the feedback to improve performance, there was a stronger indication from the findings in this study that the feedback was used to identify important areas of personal weakness. Although students were strongly in

favour of receiving constructive criticism, it appears that they were using the feedback to alert themselves to the nature of learning rather than motivation. The feedback may have been used as a tool to facilitate learning by providing necessary incentive for students to take control of their own learning.

Throughout the study, the researcher summarised students' achievement at any given point in time and this was often more structured and formal than the final assessment of the product. It provided the researcher and students with information on their progress and level of achievement. The final assessment was a culmination of students having ownership of the task. Thus assessment is not content driven; it was focused on metacognitive processes.

Furthermore, the study showed that the responses associated with the students' preference for this model of assessment was that it offered more information by way of decoding the agreed criteria, learning goals (outcomes) and standards for the assessment task. However, the most frequent reason given was that the ELE model enabled them to take responsibility for their own learning as the process was cyclic rather than singular. Other reasons for wanting the ELE model was an understanding that questions were more important than answers and that conjecture is more important than certainty. In addition, students referred to new ways of doing things, which allowed them to relate better to their groups, develop lasting relationships and 'learn by doing'. The last reason adds support to the ELE model being an effective tool for assessing learning because students had a better understanding of learning and how to construct and make meaning based on their own understanding of reality.

5.2 Additional factors with the potential to influence results

In addition to information obtained from the feedback survey and self-assessment scoring rubric, other factors were investigated. Supportive classroom, motivation, self-evaluation, students' gender, past learning experiences, and their response to ELE were investigated as factors having the potential to influence students' performance. The students' attitude to the ELE model generally and their engagement in the activities were also investigated.

5.2.1 Supportive classroom

Students' control or empowerment is a distinguishing feature of exploratory learning environments. The concept of supportive and interactive learning environments may have become more complex since Socrates' time; however the notion of the centrality of students has remained an essential and distinguishing feature. As the research progressed it became clear that those students who were fully engaged were performing better than those who were not. Thus it was asserted that interactive classrooms may have contributed to improved assessment results. Classrooms, which are exploratory and supportive learning environments, can influence students' performance and this has been stated by Hattie (1987) who showed that 20% of students in desirable climates are better off than students in average classrooms. This is supported by Jonassen (1994:31) who states, where students are immersed in the tasks with as few barriers as possible, the supportive environment encourages students to become involved in the learning process and ultimately the construction of knowledge" (Jonassen, 1994:31).

5.2.2. Motivation

One factor which seemed to influence performance was motivation. A positive impact, in terms of improved assessment outcomes, was evident across all groups where most students engaged in the tasks. Where the student perceived lack of internal control (ability) then little could be done to help the student complete the tasks. However, for the couple of students, who were influenced by the motivation of their peers within the exploratory learning environment, their perception of control and motivation altered. The main difference is that there were students who were influenced first by their peers and then immediate actions in the environment, whereas there were other students who were self motivated and influenced more by their own constructions of their learning and understanding (self-regulation, reflection and redirection) rather than the environment. One possibility for the advantage of motivation seen initially for the majority of students was the benefit gained from using the ELE model and seeing how the intrinsic suggestions functioned. The three groups had exposure to why learning was important; the creation and maintenance of curiosity, self-setting goals for learning, self-evaluation

and self-assessment. In the context of school learning that involves operating in a relatively structured environment, students who seek mastery of goals focus on gaining competence or mastering a new set of knowledge of skills and often outperform students with performance goals, who focus on self attainment and improving performance. However, in the ELE model, students are motivated towards performance and achievement goals, which provide an interesting challenge, but still keep the high expectations for learning goals and expectations.

The strength of motivation is the force in which students retrieve or discover meaningful understanding and experiences in supportive situations. Exploratory learning requires students to take more responsibility in the learning processes. According to the view of Lave (1988) learning as it occurs is a function of the activity, context and culture in which it is situated. Thus, as students move from the periphery of the environment to the centre, they will become more motivated, active and engaged within the culture, and hence assume the role of 'expert'.

5.2.3 Self-evaluation

Students were surveyed on their attitude to assessment, as this was considered to have the potential to influence their assessment performance in the ELE model. When students used self-evaluation it was possible to see a change in students' attitude towards improving their performance. The outcomes of the student self-evaluation process include, students more actively engaged in their learning. With supportive conditions, it is also possible for students to develop increased motivation, confidence and control over their learning.

Despite the rhetoric of educational aims which seeks to provide opportunities for students to achieve their potential as independent students capable of participating successfully in society, the reality of assessment is such that assessment of mastery of content is being fostered. However, it has been shown in this study that understanding rather than mastery of content entails the integration of what was learned and how it was learned into the students' view of the world and his or her place in it. The implications of this research are critical, particularly as educators are increasingly dissatisfied with assessment tasks, which measure mastery of content,

rather than assessments which seek responses to open-ended questions when solving real world scenarios.

There is an increasing demand for students to develop higher order thinking skills, for them to learn how to learn so that they have an understanding of the real world. By using self-evaluation and self-assessment, students can explore the effects of their efforts. Thus the benefit, in terms of assessment, is the opportunity to modify or refine their assessment performance with their expectations. As noted by Gipps (1994):

> [...] our understanding of cognition and learning is telling us that we need assessment to map more directly on the processes [of learning] including higher order thinking skills.
>
> (Gipps, *op. cit.*: 12)

The findings of this study support the contention that assessment is more than an exercise in measuring what is easy; it is a process of improving and supporting students in their efforts to become critical and independent thinkers. Yet at the same time these findings indicate the impact of student self-evaluation processes on assessment and learning and the potential as a stage in the assessment process. Used as a base in relation to feedback, student self-evaluation is a cognitive strategy which provides an avenue for the paradigmatic shift in assessment, where the focus is on learning rather than simply measurement of that learning. This process also provides a window for educators to determine the learning process of the individual students within the learning environment. When students are engaged in evaluating and assessing their own performance, they are thinking about what they have learnt and how they learn. They are consequently more aware of their thinking and learning processes which encourage a deep, as opposed to a surface, approach to learning (Entwistle, 1993). When students evaluate and assess their work and that of their peers, they are analysing, judging and interpreting. Students convey, clarify, and then reiterate to each other how they constructed and made meaning.

> The things that help your feelings of self-learning. That little voice that gives you feedback can either be a friend or your worst enemy
>
> (Student interviewed 2004).

The link between assessment and learning has becomes apparent when tasks are valued learning experiences. Thus student self-evaluation is one such learning experience. The emergence of new forms of assessment has mirrored the demand for students to develop thinking skills, working in teams and interpersonal skills. The advocacy of such processes has relevance for this research because student self-evaluation fosters what is being demanded and subsequently assists student self-assessment. This process requires the student to make judgment of 'the worth' of the 'product' and identification of their strengths and weaknesses with a view to improving their learning outcomes and goals. The term student self-evaluation is used to emphasise that it is the students themselves who are an important part of the assessment cycle.

5.2.4 Gender of Student

Studies of the three groups in this research investigated the possibility that gender may be a factor influencing either student performance or motivation. There was a statistically significant relationship found for Group 1A and the Experimental Group but less significant for Group 1B. Gender as a factor affecting student performance on the post assessments tasks was examined in two ways. Firstly, males' and females' performances on the post assessments tasks were investigated using the results of the post assessments and secondly, the results of the self-assessment scoring rubric. A statistically significant relation was found in the predominately female Experimental Group. Males outperformed their female peers on the post assessment tasks. So, for students in exploratory learning environments, gender as a factor affecting performance has conclusive results.

The results from the ELE model suggest that gender differences may be attributable to the design of the task and the nature of asking questions, rather than problem-solving abilities. It is important to distinguish between the assessment of problem-solving skills and the assessment of communication styles. Observations from the study suggest that females are less likely to produce answers to all their questions, but in contrast, almost all males answered most of their questions. In this study, then, the open-ended questions were a factor. Open-ended questions seek to measure the students' understanding, whereas many assessments tasks attempt to measure

processes. Results of the 2004 ACT AST indicated that the boys outperformed the girls in the quantitative tasks (problem solving), whilst the girls performed better in the communicative tasks.

In addition, observations of student engagement in the ELE environment were consistent with prevailing gender-role stereotypes; women are more likely to think of themselves as being submissive and harmonious with the environment, whereas men are more likely to think of themselves as dominant and in control of the environment. A further factor which could have influenced these findings is the fact that girls rather than boys admitted to lack of confidence and motivation during informal interviews thus perpetuating this gender stereotyping in classrooms. Whilst some of the data showed that girls benefited from the ELE model girls still show less confidence in their problem solving ability than boys.

Based on the results of this research (see Figure 14), boys at both year levels indicated more enjoyment in developing problem solving questions, whereas the girls in the three groups were slower to respond to the tasks. A final major difference was the students' perception of whether their traditional classroom or ELE was a more successful learning environment. At Year 10 level (Group 1A and Group 1B), the numbers indicate a dramatic difference where 80% of students preferred the ELE classroom and 92% of students in the Experimental Group preferred the ELE classroom (see Table 4:7). Whilst these figures indicate positive feelings for their own situation in the ELE environment, they are speculative as the vast majority of the students involved in the study have only experienced traditional classrooms.

Changing the students' role and bringing them to higher levels of thinking are some ways in which ELE is described as affecting the process of learning in general. The ELE provides students, irrespective of gender with an opportunity for learning and the exploratory learning environment is enhancing their learning by enabling them to find their own answers as it is keeps them on task for the whole lesson, something that rarely occurs in a regular classroom setting.

5.2.5 Past Learning Experiences

Past learning experiences of students were not specifically measured, but when interviewed they were given the option of commenting on any differences between past learning experiences and the ELE learning experience. One student commented that teachers need to change what happens in classrooms so we can learn, because he felt that learning was not taking place, only transfer of 'useless' information. Several students felt that traditional classrooms failed to nurture independence and to feed enthusiasm for learning and personal creativity. Another student, in his interview commented:

> If I didn't understand why I needed to know something, I didn't want to learn it. I am impatient with teachers as they explained everything in agonizing detail. I wanted to be actively engaged in what was being taught, instead of just passively listening. Teachers would go on and on about anything, and my mind wandered elsewhere.
>
> (Student interviewed, 2004)

Another student commented after participating in the ELE that he did not realise learning was not being defined by the teacher as the knowledge drilled into our skulls, but encompassed everything in which we engage. The ELE program encouraged this new appreciation of what learning is and how learning processes affect our understanding.

Over twenty-five years ago, Kolb (1974: 29) highlighted these counterproductive features of classroom learning: "as a result of our hereditary equipment, our particular past life experiences and the demands of our present environment, most people develop learning styles that emphasise some learning abilities over others." Some students did report how after initial hesitation they grew confident in communicating their understanding and learning to the class. Thus, to summarise traditional learning models start with the data and often presume only one method of transmission, stereotypically the transference of information as if it were merchandise. But the ELE model starts from the student, their needs and their learning styles, and encourages discovery, synthesis and creativity. Past learning experiences, some students felt, did

not encourage student input, the sharing of resources and a systematic approach for better learning-for-life which are self developed, reinforced and applied by the student with supervision.

For many of the participants in the study, their past learning experiences have been insular and restrictive. While admitting to doing little study or preparation before assessment tasks, the majority of students found that assessment had a uniform tangible outcome. Facts and testing were of greater importance than the learning processes. The ELE model has highlighted the need for the use of more effective specific techniques and strategies to help students facilitate their learning in more appropriate and relevant ways. Learning is a complex process. It entails not only what students know but what they can do with what they know; it involves not only understanding but the construction of meaning based on an understanding of the students' own reality. Assessment should reflect these understandings by employing a process which includes monitoring performance over time so as to reveal change, growth and increasing degrees of awareness of their realities. Such an approach aims for a more complete measure of learning, and therefore a substantiated basis for improving the students' educational experience. To learn effectively, one must be active in controlling one's learning, or in other words, one must have some autonomy. In short, students were in favour of the assessment offered by the ELE model, as well as the convenience of exercising their autonomy in satisfying their need to connect and construct their own version of reality.

5.2.6 Response to the ELE Model

Students were surveyed on their response to the ELE model as this was considered to have potential to influence students' assessment performances. Students were positive in their comments about how the ELE method assessed their learning. They rated highly the immediate feedback offered by the ELE rubrics, as well as the self-assessment grading rubric, as being important features of this model. As a group, they did not find the model difficult to use, and they felt that assessment measured their understanding of the tasks and 'final product' effectively.

Another factor which seemed to influence performance was the positive attitude towards the ELE model. Students from a class of the researcher in the previous semester had a greater participation rate than the other students. These students were already familiar with a supportive learning environment. Interview data confirmed the findings that students interacted positively with their exploratory environments rather than more traditional classrooms. It was noted that the more passive you ask students to be the less they will learn. When asked to be more actively involved students found they had learned a lot more than they had in other areas - whatever the graded performance might be.

5.3 Discussion

Learning and assessment of learning have been interpreted as including all tasks and activities that provide data and information which can be used as feedback to modify both teaching and learning activities (Black & William, 1998a). Assessment occurs when educators feed information back to students in ways that enable students to understand, or when students can engage in a similar, self-reflective process. Thus these learning experiences should enable students to observe and practise the actual processes and products which demonstrate their understanding of their own reality. In addition, students should not be seen as mere recorders of information but as creators of their own knowledge and understanding structures. Rather, what is important is how and whether students use that understanding in context to solve their own problems. It has been posited that students gain understanding when they construct their own cognitive maps of interconnections among concepts and facts (Shepard, 1989:5-6) and students in this study have shown that assessment in the ELE model places the students in a more active role by engaging their capacities to produce ideas and solve problems. Feedback on performance is specifically intended to improve and guide learning, (Sadler, 1989). Assessment of learning in the ELE model used constructive feedback which appeared to facilitate students' understanding as shown by better performance on the post assessment tasks compared with the pre assessment tasks.

Stiggins, 1994; Wiggins, 1998; Torrance and Pryor 1998; Shepard, 2000 and in a recently published article by Black and Wiliams (1998) state that assessment, when

properly implemented, is a powerful means to improve student learning. Black and Wiliams described results from their studies which indicated that assessment of learning can be particularly effective and the effect size on tests of between 0.4 and 0.7, larger than most known educational interventions. What their research also indicated was that assessment for learning is relatively rare in classrooms. They also found that most classroom assessment encourages rote and superficial learning.

In sum, assessment in its present form is incongruous. The emphasis on external, standardised assessment has intensified the domination of what gets assessed is what gets taught; to gather data and return results. This process has excluded students from assessment practices and fails to recognize the value of the process of learning in attempting to achieve learning goals. For assessment to be legitimate it must be connected to issues or questions that students really care about and this is the process of learning and assessment, the capacity to improve the whole of the students' understanding. The ELE model of assessment values the merit and worth of the students' product. It involves what Shepard (2000) has described as the systematic analysis of evidence that involves students and teachers in the gathering and interpreting of data, and that informs and helps guide continuous improvement. Unlike other assessments, the differences in the approach used for this study and compared with those reported by Black and Wiliams (1998b), is that the students' results demonstrate the benefits of student self-assessment skills, learned and applied as part of the assessment cycle which enhances student achievement, but more specifically their understanding of their reality.

5.3.1 Other factors that may influence Students' Assessment

While it is apparent that the ELE Model is contributing to better assessment performance, there appears no single factor to which this can be attributed. The supportive learning environment, the positive response to the ELE, feedback and self-assessment were all investigated as factors that may influence student assessment results.

5.3.2 Supportive Learning Environment

In this environment, students have full control over the learning process. It is possible that the beneficial effect seen with these students was due to the exploratory learning environment (ELE) scaffolding the students with real world contexts to help them induce meaning. The students were given opportunities to explain their reasoning by considering the interactions among a variety of factors. The domain of understanding is represented as a two-level response abstraction. In the first level response, students draw on their prior understanding and experiences. This understanding level is a type of declarative understanding, and students have understood it by prior experiences. The second level of understanding is a deeper, causal understanding that involves making meaning and with a connectedness to the real world. Thus students are able to justify as their own version of reality. In this way, any gain in students' assessment performance is available from the evidence of learning when students construct their own understanding and create their meaning. Thus, the ELE assessment process cycle (see Figure 18) offers depictions of the interactions occurring in the exploratory learning environment as students and the researcher monitor progress towards intended goals.

5.3.3 Positive Response to the ELE Model

It is possible that the positive response to the framework made it easier for students to perform better. Students chose to do better because they believed the benefit of this model was in their interests. The ELE model provided interactive opportunities for students to modify their attitude towards learning. This interactivity is intended to engage and motivate students to explore and engage which will lead to meaningful understanding. The features proposed in this thesis for designing an exploratory learning were for the purpose of enhancing the relationship between assessment and learning and meeting students' needs in constructing understanding.

5.3.4 Feedback

Students' use of feedback in this study appears to depend on individual students. Some students use the feedback to predict their final outcomes while others use it to

familiarise themselves with the expectations of the tasks and the amount of work needed to do well. The fact that students highly regarded the feedback was an important consideration in the findings. Feedback must be used in assessment if it is to be effective (Sadler, 1989). Thus for students, teachers' comments serve as insight into their progress. To be effective, feedback needs to recognise positive aspects of the students' progress and not only their shortcomings. It is also an opportunity to justify the outcome or grade awarded. However, this study also found that assigning outcomes on students' work does not help them to comprehend what it takes on their part to understand something more accurately or deeply. Feedback that indicates specific actions to improve their progress is crucial to student performance. Research shows that students generally look only at the grades or outcomes and take little notice of the comments if provided (Butler, 1987).

Students taking part in the ELE model had the opportunity to design their self-assessment rubrics and this gave them a chance to make good use of feedback loop to improve their 'products'. Consequently, a comparison of feedback in these studies showed that it was the feedback about assessment goals that resulted in students improving their performance and attaining their learning goals. The literature also refers to motivational effects that feedback can provide (Butler & Winne, 1995) as well as the information it can offer about the learning process and improved assessment performance.

In his recent article, Cole et al. (1999) notes that if assessments and assessment-related tasks are made apparent to students then their progress and connections between performances provide a scaffold for ongoing students' self-assessment. This study provides some evidence for this assertion. It was reported both in the students' surveys and interview data how students made use of the feedback. Furthermore, students commented on how the ELE assessment process acted both as a motivating influence to help them identify individual misunderstandings of the task or the context and to work in collaboration with other students.

In a review of similar research in this area, Fuchs and Fuchs (1986) reported that students' achievement gains were significantly larger (twice the effect size) when teachers used a consistent and methodical process for recording and interpreting

assessment data and providing feedback as compared to when they simply allocated a grade or outcome. So while the student and motivation varied across this research, the ELE feedback provided these students with the option to take whatever action was needed to close at least some of the gap between their pre assessment performance and their post assessment performance. As students improved their performance on the pre and post assessment tasks it seems that the ELE model changed the way they viewed learning.

5.3.5 Self-assessment

The central idea behind self-assessment is to provide opportunities to help students to evaluate themselves and their progress more critically. Reich (1991) advocates the development of this process. He suggests that students need "to get behind the data - to ask why certain facts have been selected, why they are assumed to be important, how they were deduced, and how they might be contradicted" (Reich, 1991: 230). Thus an ability to assess one's own strengths and weaknesses is an essential life-skill that facilitates personal development whether in school or in the real world. Brown and Dove (1991) state four main points when explaining the importance of self-assessment in the assessment process. Students have to (a) take ownership of their personal learning, (b) take active participation in the learning process, (c) make assessment a shared activity by challenging the proposition that the teacher is the best person to assess their inputs and outputs, and (d) acquire a more autonomous approach which leads to aligning assessment with learning. Asking themselves questions and submitting extensive written answers requires students to supply a more honest appraisal that should feedback into modifying and improving their work. The self-assessment is not of great value in itself – it is the process that it induces that is important. Black and Wiliam (1998a) assert, "...self-evaluation and self-assessment by the students is not an interesting option or luxury; it has to be seen as essential" (Black and Wiliam, 1998: 55). Students prefer to have both the teachers' assessment and the rubric as the evidence suggests that they are using both to gauge and monitor their performance against the standards of the assessment task. Again this positive trend signifies that the ELE model is beneficial as a tool for enhancing the relationship between assessment and learning.

5.4 Summary and Implications

The majority of students reported experiencing benefits from using the ELE model. A sense of self-efficacy, which has been linked to understanding and achievement (Bandura, 1982, Nelson et al. 1973), was reported by many students. Three key challenges emerged from this study. The first was that of challenging the students. There is evidence to suggest that students engaged more in the learning process as a result of doing self directed activities. Consequently, assessment of their product which includes the process of learning can benefit as a result of both the Exploratory Learning Environment and active involvement in the assessment cycle. The second challenge was the learning environment where it became clear that instead of using the traditional classroom as the information transfer model, educators needed to provide opportunities for students to access information in new and innovative ways. The final challenge was to the educational institutions. Although a number of individual benefits would help in areas such as understanding and achievement, the use of the ELE model for a whole group of students suggested in this study has a number of institutional benefits.

1. It gives insight and understanding of differences in how students make meaning.
2. It can be used as an effective tool for enhancing the relationship between learning and assessment.
3. It is not resource intensive and achieves the aim of developing more aware and critical thinking students; students who create their own versions of reality

In the wider context, powerful arguments have been made for the process of assessment and learning as multidimensional, integrated, and evident in performance over time and taking place as an activity within a supportive learning environment. In this scenario learning and assessment have, as has been mentioned, no independent ontological status, but are embedded within the activities of a supportive learning environment. In other words, assessment helps us understand how students learn best and under what conditions.

The ELE model has common features with the natural system of learning, where children understand and make meaning by working with their parents and other adults, and learned other aspects of their culture by listening to oral historians and story-tellers and by participating in religious and social/cultural events. What they all share in common is participation in activities to varying degrees by all, and where a separate activity called 'assessment' is notably absent. Students learn by experience and become 'experts' through exchange of information which is essentially social, interactive and personal. An overview for the ELE theoretical framework may be stated thus:

> Understanding evolves. Students make meaning from external and explicit information belonging to society [community], being controlled by tacit intrinsic insights which originate with students who then may act alone or cooperatively in order to integrate with their own environment when constructing their own realities.

Thus a developmental framework is crucial for understanding students' learning and the ELE model therefore, offers cooperation and collaboration undertaken by students and educators with a continuing involvement by all. Students' concerns are evident and they are helped to overcome these during ongoing engagement with the tasks. The tasks are shared by all with everyone having a stake in their success. Educators actively model what they want students to understand and students are able to more easily grasp what is required with frequent opportunities for effective feedback. The supportive environment engages students in meaningful activities and supports them in their own learning and suggests assessment measures by which to gauge student progress.

The ELE model has been shown to deliver many of the functions of assessment identified as important within the literature. Specifically, improved performance on post assessment tasks has followed the intervention of the framework. One group of students showed this improved performance when aware of the nature and function of the framework suggesting that familiarity with the ELE model may also be a contributing factor. Thus, the more compelling set of results is the consistently higher performance of this Experimental Group compared to the results of Group 1A and Group 1B.

A clear conclusion from this research is that the ELE model should be used for all assessment so that students can make best use of feedback, evaluation and self-assessment opportunities that the framework provides, as well as the motivation it encourages. The emergence of new forms of constructive feedback and evaluation for student performance has mirrored the demand for students to develop thinking skills, collaborative and interpersonal skills. The advocacy of such skills and qualities has relevance for this study because student self-evaluation fosters what is being expected by the community and workplace (the real world). In addition, feedback on students' progress provides an overview of class performance which may influence the way in which they interact within the environment. Thus, feedback provides information that can be used to examine the quality and performance of contexts, as well as the performance of students on various aspects of the supportive environment. Hence, assessment of learning is a purpose oriented process that entails feedback, evaluation and monitoring performance against learning outcomes and expectations.

The Exploratory Learning Environment (ELE) is more flexible and students spend more time defining their problems and generating and evaluating alternatives rather than sitting at a desk generating answers to teachers' questions. Despite some resource problems, the ELE model offers a number of advantages including enhanced feedback opportunities and better access to information. It seems likely that the benefits of the supportive environment in this study would also be demonstrated in an Online learning environment, but this would need to be tested in new research.

McNabb (2001a) points out that, historically, research shows positive cultural experiences, based on mediated interactions with others, are a vital part of children's personal and interpersonal development that fosters their overall ability to learn (Boyer, 1995; Dewey, 1990; Feuerstein & Feuerstein, 1991; Vygotsky, 1978). In developing learning environments which support and promote life long learning, educational institutions have to change the way they structure students' experiences. One way to develop supportive learning environments is to move to a more student centred flexible environment that enhances the relationship between assessment and learning. The evidence has shown that the ELE model appears to have the potential

to facilitate students' progress by the provision of feedback, evaluation, self-assessment and framework flexibility. This flexibility is both in the contexts and the freedom for the student to control their learning.

This study has provided a framework which inculcates learning. While we would be among the first to concede that assessment is not without problems and certainly requires careful implementation to avoid the 'teach to the test' label, we do feel that the arguments in favour of changing the way we assess more than outweigh the potential problems. The case we have made for a more enlightened approach to assessment has been primarily on the grounds of improving the relationship between assessment and learning. Although assessment is by no means the only method by which learning can he enhanced, it is often viewed as something quite separate and distinct from the learning process; rather it is something that has to be done to students at the end of their courses, a way of testing what they know or do not know before issuing them with certificates.

This study has shown that assessment should be viewed as an integral part of the teaching and learning process. Moreover, we need to ensure that learning is not simply assessment-driven. It can be argued that presently we have far too much assessment, but that neither the quality nor the diversity of this assessment is valid or reliable. If we confront students with a diet of assessment that is rigid and monotonous, they will learn to produce our version of reality. To improve their learning, we need to provide opportunities for them to create their version of reality. Learning rather than assessment should be the end product of education. Thus, students should learn through assessment not learn to be assessed.

5.5 Overview of the Next Chapter

The final chapter offers recommendations for changing the present state of assessment. The conclusion and implications of this study suggest that classrooms be environments where students co-create criteria for learning within the realm of their experience and obtain useful feedback from multiple sources regarding their performance toward advancing their progress and understanding. When students are engaged in evaluating their own work, they are thinking about what they have learnt and how they learn. Educators must engage with significant characteristics of any

learning environment, and seek to understand how these characteristics interact. Knowing that is different to knowing why, and to knowing how, and classrooms must remain open to change, i.e., learning. As educators, we are creators of communities of students. But seldom do educators consciously create their own learning communities. The idea of using the community as a place for learning builds on the philosophy of natural learning; 'hands on experiences' as posited by Rousseau and Dewey.

The world outside the classroom has changed significantly, so classrooms must reflect that change. Despite the advances in education by Dewey et al. assessment needs to mirror the learning process as well as reflect the real world by enabling classrooms to be natural learning environments. Students will be far more actively engaged with the natural and human world around them, not just in the context of subject disciplines. Students will need to be familiar with examples in real life and then demonstrate through assessment of their progress a holistic understanding of the real world. Assessment rather than being defined in narrow terms, will need to encourage life long learning. It will need to move from illusions of reality to interpretative realities of the students. Only then will it connect the personal and the real world that students care about.

Chapter 6 - Recommendations

6.1 Introduction

This study sought to determine whether a supportive learning environment of the kind described in this thesis enhances the relationship between learning and assessment, and to identify factors that would engage students in the process. We argued that assessment by itself has no real value. Instead, we showed learning gains value when learning and assessment hinge upon one another, thus making the two components depend on one another in an intellectually coherent fashion. Effectively, our aim was to establish harmony between learning and assessment, with teachers and students critically approaching the expectations which they bring with them in the context of learning, teaching or assessment. It is this questioning of the qualities of the learning environment which teachers create that enables them to derive a better understanding of their students' achievements. Thus it is no longer teachers' expectations that guide their assessment, but their capacity to challenge those expectations and, as a result, to negotiate them against conflicting assumptions. This negotiation process allows teachers to develop a fuller understanding of students' learning outcomes. Further, the same process assists the students whose learning is enhanced as teachers provide them with continuously more sophisticated and critically informed support structures. Thus, we concluded, learning is enhanced when assessment does not serve itself, but to improve students' learning conditions.

Having proposed principals (a conceptual framework) of the ELE, we next devised an experiment which helped us to investigate the educational potential of the ELE in practice. The experiment involved translating the theoretical principals of the ELE into a learning context for secondary students of English in Australia. The environment that we designed represents our interpretation of the principals and can be challenged. Nevertheless, our findings suggest that the ELE model offers a powerful pedagogic and assessment tool.

In particular, the results of the experiment show that conditions facilitating feedback, self-evaluation and self-assessment reflect their importance as the means for supporting and improving learning when constructing responses that demonstrate their understanding and sense of the real world. Regular feedback, formative assessment such as discussion, observation and self-assessment appear to be key features of the process of learning and assessment in the ELE model, because it enables students to monitor their progress and identify areas for further improvement. The improved performance on the post (summative) assessment tasks by students in the study has been persuasive in promoting this model as an effective tool for assessing students' understanding of their own reality as well as enhancing the relationship between assessment and learning.

In all three groups, students showed some improved performance on post assessment tasks. Overall, the increase in performance across the three groups ranges from about 11% to 17% (Table 4:4). Of particular interest is the 17% increase in the Year 8 Experimental Group, which is greater than that of the other two groups. Also, there is a number of other positive factors in the findings of the study. For example, there were many students, about 45% in each group who, in generating their own questions, developed highly creative and innovative responses to the various scenarios they constructed. Further, the majority of students in each study group showed positive attitudes toward the ELE model and the supportive nature of the classroom environment.

By examining the way in which assessment controls and facilitates learning, particularly through the institutional and regulatory constraints of accountability and reporting, the evidence suggests that assessment reform has reinforced the importance of content as the predominant criterion through the widespread practice of aligning learning to assessment. The evidence from the research literature suggested that there have been a great number of changes, both in educational policy (including curriculum) and pedagogy which are inclusive of the diversity of students' abilities, their interests and backgrounds. Therefore, this study has made a case that irrespective of the types of assessment, students are better prepared to attain learning and assessment goals, if the learning process is part of the assessment process.

This study indicated that assessment is content driven and this is often cited by educators as the most difficult aspect of teaching. According to Pascoe (2001) Australia defines itself as a nation of knowledge and service workers, and while foundation knowledge continues to be an important skill, problem solving, intercultural understanding, teamwork and self-aware metacognition are of secondary importance for citizens engaged on a life long learning path. Dewey et al. support the latter notions that it is more important for students to know how to find and utilize information than it is to memorize a collection of random facts. Moreover, there is evidence of a trend in assessment of only marginal understanding of content by students. The longer-term consequence of this trend could well be an increasingly alienated student who is less confident and more inclined to socially dysfunctional behaviour in the classroom.

Another compelling finding of this study has direct implications for schools seeking to reduce performance/achievement gaps in gender and cultural groups (see Table 4:6). Assessment needs to be inclusive and apply to all students equally, ensuring they are not disconnected from their reality. The emphasis is not on learning to be assessed but rather learning through assessment. In this way, the process is continuous, considering each student as an individual with a different style of learning. Thus, it offers a more balanced approach to assessment and limits gender and socio-economic biases as students are constructing their own versions of reality not the educators' reality. In other words, the social system of the educator or curriculum is not assessing the student. It is students, with their own social system, who are measuring their success against the agreed criteria and expectations of the assessment task. The importance of this model is noted in many student responses where they acknowledge the usefulness and importance of the ELE and as many respondents stated it was "hard work, but you were rewarded by a sense of achievement and the determination to succeed".

A conclusion drawn from the research literature published on assessment procedures used in the states and territories of Australia is that educators and system authorities are expected to account for public expenditure via data to prove learning. Educators then grapple with how to fill this accountability requirement and

simultaneously assess for the purpose of monitoring individual student progress. Our conclusion supports the findings of the above mentioned literature and refers to recommending the need for assessment that is inclusive of the learning process and which satisfies the needs of students in attaining national agreed curricula and standards. Furthermore, the evidence suggested that present classroom assessment practices cause students to believe they cannot learn, rather than enabling them to be responsible, informed, inquiring and participatory students. New learning environments need to be created to provide opportunities for assessment to be part of the learning process. This means that students must be active participants in the process and be given increasing responsibility for using the feedback, self-evaluation and assessment data to monitor and improve their own learning in a positive and meaningful manner. The affirmations in the feedback and evaluation loops which, whilst not entirely constructivist, did however, provide forms of scaffolding to support the construction of meaning and understanding that enabled more valid assessment. The observation of students in this study confirmed Kemmis' (1985) belief that reflection is a social process, as one student commented:

> I really liked sharing problems and answers. I never really shared before. I enjoy working in groups because you can bring up your grade.
>
> (Interview with Ellie)

Boud, Keough and Walker (1985) define this reflective process, particularly through feedback and evaluation, as "activities in which students engage to explore their experiences in order to lead to new understandings and appreciations" (Boud et al. 1985:19). Another substantive finding was the effectiveness of the assessment in substantiating the scoring achievement of the student. The study indicated that students perceived a discrepancy between what they did in the ELE as opposed to assessment they did in other classes. On one hand assessment was seen as relatively unimportant and unfair, on the other hand the ELE assessment encouraged students to take responsibility for meeting the agreed criteria and standards by allowing them to generate their questions for greater understanding and appreciation of their own reality. As Kroll, Masingila, and Mau (1992) have pointed out, assessment should 'present new situations for which the students neither know an answer, nor have a previously established procedure for finding an answer" (Kroll, Masingila & Mau (1992: 621).

This problem is not new; however, it becomes more serious when assessment tasks require any depth of thinking, ownership for learning and self-evaluations. The thesis indicated that assessment has become marginalized to such an extent that it is no longer fulfilling the major goals, agreed criteria and standards of education (Adelaide Declaration, 1999) for all students i.e. to improve learning. Assessment is continuous. It should give students the information they need in order to improve their learning over time. As assessment is a ubiquitous part of classroom life what is needed then is a careful look at exploratory learning environments as a means for making the connection between learning and assessment, where the learning process is part of the assessment process. It is difficult to separate the two. Learning informs, improves and proves assessment; assessment informs, improves and proves learning.

The findings, presented in chapters 4 and 5, outline the need to improve assessment practices. These findings recommend the use of the ELE as a system for enhancing the relationship between learning and assessment. Rousseau, Piaget, Dewey and Vygotsky each developed their theories about learning and they still dominate education today. But assessment fails to reflect their ideals. The assessment evidence extracted from this thesis is that the students' understanding and quality of their 'product' is in their curiosity, exploration and experiences which support constructivist learning processes, and when embedded in supportive learning environments, promote a sense of personal, cultural and community identity. This study suggested that when learning methods are in harmony with compatible learning environments, a love to learn develops. Natural or constructivist learning environments can be designed to encourage student-centred investigations, interpretation and understandings. This research showed that when students were situated in such environments, they engaged in their investigations, they interacted with peers, and became motivated and committed to the tasks at hand. While it is acknowledged that individual construction of meaning is important in learning, (Resnick, 1996) the role of the collaborative partnership appeared to provide a multitude of advantages for students working in supportive learning environments. The corporate world has abandoned individual assessment in favour of teamwork assessment (Wineburg, 1997).

The thesis has also found that observations of students' interactions and performance when completing the final work products were a rich source of data from which the researcher (and teacher) could make inferences about the students' understanding of the contexts and their nature of inquiry. For instance, in the context of planning the inquiry, students posed questions for investigation. Their ability to explain and justify their course of action demonstrated their understanding of the real world, as well as their capacity to reason systematically when defending their own version of reality.

Thus the sources of information from observations, evaluations and feedback served to corroborate the results from the assessment cycle and consequently enhanced the relationship between learning and assessment. This was because the evidence was in the quality of students' ability to generate hypotheses, speculate, reason logically and progress from initial investigations to conclusions. In the first instance, students generated research questions from an understanding of issues associated with some conflict or phenomenon. In the second instance, students made inferences from information they had found. In either case, the quality of the reasoning can be inferred from how well connected the chain of reasoning was, how explicit students were about the assumptions made, and the extent to which speculations could be validated and justified when interpreting their findings. The communicative requirements of final product provided ample evidence for assessing the ability of students to elaborate and explain their own version of the real world.

In light of these findings, the researcher recommends a re-conceptualisation of assessment, which would move away from its current content-bound orientation to assessment practices that take into consideration the process of learning. The framework proposed for enhancing the relationship between learning and assessment is the ELE model, a process orientation, to understand that learning is continuous and reflective and assessment is continuous and collaborative reflection. While these elements have always been part of assessment, they however appear to have lost focus within the more factual orientation which is now encouraged by the accountability elements in assessment itself.

The ELE model which sets out to engage students and enhance the relationship between learning and assessment includes the following dimensions:

- Facilitation and support of learning
- Engagement of students in higher level cognitive activities
- Provision of opportunities for students to find relevance, connectedness and create and construct their own understanding of the real word
- Provision of feedback to improve learning
- Provision of a point of reference, to understand that learning, personal development and assessment are continuous

6.2 Recommendations

The study has highlighted the benefits of using an exploratory learning environment to assess learning in conjunction with a participative approach to learning. Student feedback, self-evaluation and self-assessment have indicated the value of this approach and highlighted the potential empowerment, especially in terms of providing specific 'how to learn' guidelines for students.

This study has also found, however, that the effectiveness of self directed learning, self-efficacy and the educator's role in facilitating environments is contingent upon the relationship between learning and assessment. The classroom is still a real challenge to widening participation, especially for the gender of students and providing a natural learning environment. Therefore, opportunities for students to explore, investigate and express their understanding should be designed into assessment tasks, for this will initiate the interaction whereby assessment promotes learning. Furthermore, this study found that discussions emanating from exploratory learning environments, in which students are encouraged to share their understanding in their own ways, are important indicators for assessing the quality of their 'product'. Dialogue with the educator provided the opportunity for them to respond and assess students' thinking, whilst the feedback and evaluation offered guidance on how to improve. Students must be given opportunities to work at improving their achievement of the agreed curricula and standards.

The shift from content testing to assessment which includes the learning process has brought with it a subtle but important shift in assessment philosophy. The selection of assessment tasks on the basis of their inherent value complicates inferences from test scores to non-test situations, especially if students and teachers participate in that selection of the final products for assessment. As constructed interpretations become less salient and assessment tasks come to be viewed as demonstrations valued in their own right, the traditional warrants for interpreting and generalizing from test scores are weakened. The use of rubrics as an effective tool for assessment is well documented in this study and enabled a broader form of assessment and meets various individual learning styles. However, if rubrics become too task-specific and do not offer constructive feedback, then substantive generalizations about the meaning of scores or outcomes, as well as statistical generalizations to other tasks, are threatened.

Over the past hundred years and particularly in response to demands for accountability in schools since the 1960s, stakeholders have advanced the belief about mastery of content being valid and reliable measures of learning and important decisions about students are made on the basis of scores of these assessments. Yet assessment instruments, whether used to help students want to learn and to feel able to learn have not been part of the informed decisions usually made by committees responsible for writing these documents. Because students differ according to ability, interests and motivation, it is impossible to assess them in the same way. The ELE offers an environment that enables students to be inquirers, thereby understanding what it means to be in charge of their own learning, monitor their success and make decisions. Assessment in the ELE model focused on identifying the process of learning and the product of that process, which met students' needs for understandability and motivation. Educators are then better positioned to document learning, and make informed decisions, thus all the stakeholders benefit from the reality of meeting accountability and outcomes when exploratory learning environments optimise the relationship between learning and assessment.

It may be difficult to see the benefits of the ELE model for assessing learning. Indeed it may be impossible to separate the positive influence of the model from other school activities which are designed to support students. However, in order to

motivate and retain students, and raise their performance, it is essential to provide learning environments that meet their particular needs, hopes and aspirations. Assessment is a process that forms part of a continuum of learning.

There is much to applaud in the shift from nearly exclusive reliance on selected-response tests toward assessment of the process of learning. There is no guarantee, however, that the potential benefits of students to learn through assessment will be realized. Regardless of the value of assessment in the classroom, a measurement-driven reform strategy that relies on assessment to drive curriculum and teaching seems bound to fail. As this study has shown, via student comments and assessment data prior to intervention, that there was increasing and disturbing evidence that when completing assessment tasks, students do not engage in the deep learning process that promotes these kinds of skills, but rather engage in surface learning and regurgitation of memorised material in a disorderly way (Entwistle, 1981; Gibbs, 1992; Boud, 1992). A major downfall of this type of assessment (traditional) is that it does not take into consideration the learning process as well as how students can function as part of a team or apply analytical or creative approaches in solving problems, characteristics of life long learning.

Whilst the research literature suggests that students are encouraged to be self-reliant and self-motivating, assessment nonetheless relies primarily on appreciation of core material available in key textbooks and resources. However, there are inadequate incentives for initiatives in identifying critical and analytical thinkers in assessment. These, whilst very difficult to promote in classrooms, are not addressed in assessment. These incentives require students to have much greater control over their learning than is usually the case, and a greater flexibility in the method of assessment. Assessment therefore, needs to promote learning through a process of discovery and learning, which is created by the students' insights and suggestions.

In an era of increased emphasis on students' scores on standardized assessment tests, this study makes the recommendation that educational reform transforms assessment practice so that it reflects a greater appreciation of learning; a shift away from assessing what has been learned to a focus on students' meaningful understandings. The next challenge is to develop ways in which educators can gain an appreciation of

the students' understandings and experiences within classroom activities and interactions and from this understanding bridge the gap between assessment and learning. Moreover, classrooms need to relate to the world students live in and serve the needs of all students not just serving perceived needs which sustain traditional concepts of hierarchy and control by the nature of the environment. All students have a natural talent for constructing their own understanding but that natural talent has been repressed by the present forms of assessment. What is needed is assessment that supports learning and encourages involvement in the assessment process.

This study has demonstrated the power of exploratory and supportive learning environments in providing opportunities for students to meet difficult challenges, to sustain creative endeavours, and to attempt something new, all important aspects of sustaining life-long learning. Vygotsky's Zone of Proximal Development described in chapter two derived in part from his understanding of the relationship between effect and reason, hence the importance for assessment to reflect the process of learning. Learning and assessment are flexible in terms of achievement (attainment of learning goals and outcomes) and dependent on the sociocultural learning environment.

To summarise, what is most essential about assessment is understanding how assessment can influence learning. Dewey urged that educators provide conditions that enable the student to engage in inquiry, and to guide inquiry so that it leads to a broader understanding of the culture to which the student is to enter. In other words, students should learn through assessment. This will be achieved if educators and administrators appreciate the value of supportive learning environments which facilitate inquiry, investigations, interpretations, and understanding and apply these fundamentals when evaluating and assessing learning. The ELE model of assessment reflects real-life situations and is a multi-faceted view of the students' progress or to the analogy like a video tape of a students' understanding, whereas content driven assessment is more a snapshot of the students' understanding.

6.3 Enlightened Change

Table 6: 1 Enlightened Assessment encompasses the following changes in emphases:

LESS EMPHASIS ON	MORE EMPHASIS ON
Assessing what is easily measured	Assessing what is valued by the students
Assessing mastery of content	Assessing understanding and reasoning
Assessing to learn what students do not know	Assessing to learn how students construct and make meaning
Assessing only attainment	Assessing performance and opportunity to improve from feedback
End of term, semester assessment by teachers	Students engaged in continuous assessment of their work and that of others
Development of external assessment by educational systems and schools	Teachers involved in the development of external assessments, which are innovative and model good assessment practice

The study has introduced a conceptual framework that enhances learning when embedded in natural learning classrooms; more specifically, an exploratory learning environment. In this regard the framework proves useful in providing a conceptualisation of the interrelationship between learning and assessment. Figure 6:1 advances the concept. In addition, our study serves to advance the understanding that assessment is an essential feature of any learning environment, an environment, which can produce improved learning gains in performance by the students. Black and Wiliam (1998b) offer recommendations for changing assessment by beginning with students, the 'ultimate user' of that assessment information which is geared towards improving their learning. To be truly beneficial to students, assessment information should focus on the task, not the student, and students need to understand that feedback and evaluation assists them improve their assessment of their product by understanding the process of learning. The ELE model encourages students to self assess, "so that they can understand the main purposes of their learning and thereby grasp what they need to achieve" (Black & Wiliams, *ibid.*).

Finally, while it is considered that the findings of the study have wider application than the use of enhancing the relationship between learning and assessment, similar research would serve to verify this contention. The education system has been subjected to many far-reaching initiatives which are about improving learning, yet are based on little evidence about their potential to meet those concerns when seeking to assess students. In this study on the relationship between learning and assessment,

it can be seen that firm evidence indicates clearly a direction for change which could improve assessment for learning. Further research into this aspect of the curricula would contribute to an understanding of the relative benefits of active assessment as against passive assessment.

6.4 Conclusion

In this thesis we attempted to gain a better understanding of the relationship between learning and assessment. Through an approach based on humanist-constructivist-postmodern notions we developed an exploratory learning environment (ELE) model to enhance the link between learning and assessment. We then investigated the effectiveness of the ELE model with 73 students in two secondary schools.

In the ELE, we created a context of 'conflict' with the development of assessment tasks which encouraged students to be become actively engaged in defining their own problems, generating and evaluating alternatives and defending their course of action. The focus was on students as constructors of their own knowledge and understanding. Their performances would be monitored, evaluated and judged on how they applied and communicated their own versions of reality. In the ELE model, students were encouraged to think both critically and creatively and to monitor, self-evaluate and self assess their own understanding, for example, function at a metacognitive level. According to Flavell (1976), metacognition describes how students reason not about 'the world as it is', but about the relation of their understanding of the real world and the learning goals they pursue. As students deal with learning tasks in different ways, the ELE encourages students to become a "critic" of their thinking and the exploratory nature of the learning environment helped them to 'discover', 'explore' their thinking and to understand that they can make radical changes in their thinking. As collaboration and social negotiation were important features of the ELE, assessment of progress included observations of how students worked in a problem-solving team structure and in group decision making. The use of feedback was another important feature of the ELE. The fact that students consistently referred to the use of feedback provided by the researcher was important in alerting them to ways they could monitor and improve their

efforts. Assessment in the ELE was considered legitimate as it encompassed the learning processes in that the 'product' was evidence of all the learning arising out of exploring the problem, investigating many issues, explaining and elaborating discoveries and justifying and defending courses of action which synergized the entire learning process. In other words, the students had ownership, not only of the learning process but also the assessment process.

There are significant efforts being made to develop and implement frameworks for learning and assessment and this study is an ideal based on a set of ideas and theories referred to as humanism, constructivism and postmodernism. Essentially, the paradigmatic shift in the ELE framework is a shift from traditional classrooms to learning environments in which the teacher is a learning resource (rather than a controller of learning), with the integration of constructivism, which asserts that we learn through a continual process of constructing and interpreting, while postmodernism accepts modifying our own versions of reality based on our experiences with reality.

Finally, in looking at assessment in the real world, students like employees need to perform tasks, demonstrate skills or produce a product that will demonstrate what they know and can do rather than take a test which does not include the process which bore the fruits. We hope that this modest study provides another step in the quest to enhance the relationship between learning and assessment.

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Appendices

Appendix A - Rationale for ELE

EXPLORATORY LEARNING ENVIRONMENT (ELE) ENHANCING THE RELATIONSHIP BETWEEN ASSESSMENT AND LEARNING

ASSESSING FOR LEARNING

Exploratory Learning Environments encourage students to reflect on the process of learning as well as the product of that process

RATIONALE

LEARNING

John Dewey theorized that learning should not only prepare one for life, but should also be an integral part of life itself. Simulating contextual real problems and real world problem-solving is one function of Exploratory Learning Environment.

Our society values individuals who can solve problems creatively, using imagination, so why shouldn't we encourage students to do the same?

Assisting students to explore, engage, explain and elaborate will make learning a part of living, not just a preparation for it, thereby enhancing the relationship between learning and assessment.

ASSESSMENT

What is a Rubric?

For most educators, a rubric is a printed set of scoring guidelines (criteria) for evaluating work (a performance or a product) and for giving feedback. Thus, rubrics are a critical and vital link between assessment and learning.

For the ELE suggested criteria for rubric design.

1. A rubric is a set of criteria or expectations to assess students' performance.

2. Criteria are established to help distinguish between expert and novice responses.

3. A rubric becomes a learning tool when it presents guidelines for students to track. Thus rubrics bridge assessment and learning.

4. Application of rubrics to specific contexts help students identify personal strengths and weaknesses.

5. Students feel the freedom to be imaginative, creative and constructive within an exploratory learning environment.

6. Rubrics enable teachers to make valid and reliable inferences about the students' version of reality.

7. Rubrics encourage students' ownership of the 'product' of learning'

The word "rubric" derives from the Latin word for "red."

It was once used to signify the highlights of a legal decision
As well as the directions for conducting religious services,
Found in the margins of liturgical books— Both written in red.

Why do we use rubrics in ELE?

The aim of the criteria is to be engaging and effective to:

- Motivate students to construct their own version of reality.
- Enable valid evaluations of students' 'product'.
- Provide consistent and reliable assessment of learning over time.

Appendix B is a matrix for assessing learning and *Appendix C* is a rubric for assessing understanding in the ELE. The latter is offered as a model; ideally rubrics are constructed for specific populations and assessment tasks in mind. *Appendix D* is the Peer Assessment Rubric.

For the research, *Understanding* has been developed to assess learning (understanding) for both the trial and study groups.

Appendix B - ELE Assessing Learning Matrix

ELE ASSESSING LEARNING - MATRIX

Exploratory Learning Environments encourage students to reflect on the process of learning as well as the product of that process

COMMUNICATING *IN A* *RANGE OF SITUATIONS*

Assumptions	Initiatives, Proposal, Enterprise	Contemplation, Thinking, Ideas, Deliberation,	Insightfulness, Perception, Complexity, Depth of	Justification, Deduce, Clarify, Reason, Explain, Validate
Understanding of situations through exploratory activities and develop learner's increasing competence in creating own reality	***Exploring, Engaging, Experimenting, Construct Hypotheses***	Speculates about, and experiments with a variety of ideas to formulate premises. Aptly takes steps to refocus or redirect questions and offers feedback and guidance to	Demonstrates understanding of, and thinks critically about situations. Confidently offers insightful interpretations and evaluations of situations.	Intelligibly justifies own version of reality through researching and testing solutions, and validates understanding through testing reactions and generating new
Inquiry of situations helps learners to clarify their ideas through speculation and critical dialogue	***Confront, Challenge, Context, Question, Draw Inferences, Critical Dialogue***	Critically examines how, why and which, in order to develop arguments with increasing sensitivity and perceptiveness.	Demonstrates ability to advance inquiry and make succinct and prescise conclusions based on inferences. Insights into problems, discerning and	Welcomes challenges and hypotheses or research questions are strongly supported in the responses. Confidently contests make assertions and draws
Investigation of situations enables learners to experience problem solving, modify perspectives and develop arguments	***Discouver, Imagine, Invent, Explain and Elaborate, Abstract Thinking, Logic and Reasoning***	Questioning reveals a transparent understanding of how the "ideal" may or may not be the most apt when problem solving: the real-world variables and implicit premises have been carefully	Demonstrates ability to imagine generalize and hypothesise. Solutions to problems are effective and inventive. Evidence of depth of analysis through elaboration and generating more questions.	Explains assumptions and reasons. Arguments are logical and substantiated with decisive details of problems and the real-world situations are fully addressed.
Interpretation of situations enables learners to interpret, share solutions, ideas and questions	***Compare and Contrast, Connect Evaluate various interpretations, perspectives and relationships***	Logical thinking, analysis and development of ideas through personal investigations and where appropriate draws comparisons offering multi-dimensional experiences.	Solutions are creative in many possible ways: an unorthodox approach, the thoughtful juggling of conflicting variables; bringing in ways not likely seen as apt by most	Justifies all claims with compelling evidence and argument: Counter-arguments, questionable data, and implicit premises are explored and validated.
Communication of situations demonstrates learners new experiences through conveyed feelings and making meaning	***Appreciates understands and makes meaning through using prior knowledge. Independently makes connections between prior and existing understanding***	Identifies, explains and connects personal experience to real world situations and transfers concepts to new situations.	Responses demonstrate ability to clarify complex ideas through interplay of collaborative and personal inquiry. Effectively contributes to deepen and broaden shared	Draws on personal observations and experiences to support thesis. Criticisms made are never as ad hominem (invalid argument).
Consideration of the process contributes to learners' understanding and the 'product' provides a detailed evaluation of their own version of reality.	***Review progress, evaluate understanding and meaning***	Reflects a deep awareness which is thoroughly and logically developed, and meaning is unambiguous. The intention of the response is achieved through own	Thoughtfully and purposefully transfers knowledge from context and/or previous experiences to new or different situations.	Compose, responds to and shapes meaning through situations for understanding, analysis and pleasure.

Appendix C - ELE Assessing Learning Rubric

ELE - ASSESSING LEARNING - RUBRIC

Exploratory Learning Environments encourage students to reflect on the process of learning as well as the product of that process

Rubric for Understanding

Scope	Initiatives	Expert	Practitioner	Apprentice	Novice
Contemplation	Explore	Speculates about and experiments with a variety of ideas to invent theories. Aptly takes steps to refocus or redirect questions and offers feedback and guidance to others.	Confidently thinks about and experiments with ideas to devise theories Takes steps to refocus questions and working with others	Competently experiments with ideas to plan theories. Makes effort to include others when advancing questioning.	Manages, with reasonable success to experiment with ideas to develop a theory. Appreciates collaborative learning.
Insightfulness	Engaging	Demonstrates understanding of, and thinks critically about situations. Shows originality of thought, independence and offers insightful interpretations and reviews	Identifies and is decisive about situations. Shows originality of thought and offers considered interpretations and reviews.	Appreciates and identifies with situations. Organises and develops logical interpretations and reviews.	Recognises contextual connections and expresses own interpretations and paraphrases ideas.
Justification	Experimenting	Comprehensibly justifies own arguments through familiarity with situations and validates reasoning by generating opened questions (Socratic method)*	Clearly justifies own arguments and validates reasoning using opened questioning and reasoning.	Explains own arguments and attempts to validate reasoning though some questioning.	Displays some ability to create own arguments and with support can generate some questioning.
Consideration	Construct hypotheses	Confidently draws on personal and impersonal experiences to support thesis. Criticisms made are never as ad hominem. ±	Draws on personal and impersonal experiences to support thesis. Some constructive criticisms.	Draws on personal and impersonal experiences to support thesis.	With support can use personal experiences to make meaning.
Communcation		Composes, responds and shapes meaning through evaluation of situations for meaning, understanding, and pleasure.	Responds and shapes meaning through evaluation of situations for meaning, understanding and pleasure.	At times composes and responses are consist within the context of demonstrating connectedness and meaning.	With support communicates an appreciation and understanding on the situations.

***Socratic Method** enables students to experience the excitement of discovering (often complex) ideas on their own. And it gives teachers a chance to learn how much more inventive and imaginative students are than they usually appear to be when they are primarily passive**.**

± ***ad hominem*** Translated from Latin to English, "Ad Hominem" means "against the man" or "against the person." An Ad Hominem is a general category of fallacies in which a claim or argument is rejected on the basis of some irrelevant fact about the author of or the person presenting the claim or argument.

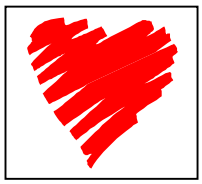
Appendix D - ELE Student (Peer) Assessment Rubric

ELE – STUDENT (PEER) ASSESSMENT FOR LEARNING - RUBRIC

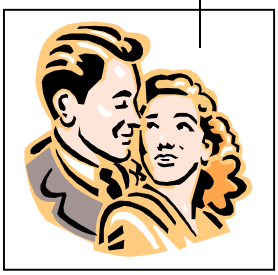
Exploratory Learning Environments encourage students to reflect on the process of learning as well as the product of that process

Scope	Quality		
Effectiveness of argument	Able to state an argument and explain the nature of conflict why it is controversial	Made an argument but limited explanation the nature of conflict and why it is controversial	Made an argument but it is buried, confused, or unclear
How well the arguments were supported	Able to offer convincing reasons in support of the claim showing the presenters understanding of the issues. Explains why the argument is valid	Offered reasons in support of the argument but overlooked important reasons for issues. Explained in a limited way why th argument stands.	Didn't support the claim well, and/or irrelevant or confusing reasons. Acknowledges that there are reasons against the argument but unable to explain them.
Conveys understanding	Utilized resources to develop hypotheses which was reasonable and well substantiated with research Identified questions which were interesting and qualified	Utilized resources to develop hypotheses which were reasonable. Identified questions which interesting and testable.	Hypotheses not complete nor did they flow logically from research. Questions were interesting
Effective Communicato	Spoke clearly, did not read from notes. Demonstrates skilful control of language and an ability to use language to bring about a thoughtful response in the audience	Spoke clearly, referred to notes, language somewhat inexact: pauses, repetition of some words, etc.	Unclear speech, read directly from notes, distracting speech patterns using "like," "you know," etc. several times to the point of distraction
	The intended message is conveyed clearly and word choice is precise and vivid.	Demonstrates some control of language.	Demonstrates limited control of language and a limited sense of audience and purpose.
		The intended message is conveyed clearly and vividly	

Appendix E - Pre (ELE Intervention) Assessment Task



LOVE IN CONFLICT



Romeo and Juliet

The story

The action of this play happens against a background of two feuding families – the Capulets and the Montagues.

The two young lovers belong to opposing families and therefore are committing a crime against their respective families by falling in love and secretly marrying.

Activity 1- Students to describe the type of conflict in this play. (internal) What kinds of feelings this type of conflict give rise to. (stress, tension, indecision, confusion)

Love is the main focus of Romeo and Juliet. However it is important to remember that it is set against a background of violence and feuding.

Today we see conflicts are essentially feuds between two differing points of view.

Acitivity2 - List other types of conflicts you have experienced. (between friends, between themselves and teachers, parents, etc.)

Label these external conflicts and discuss what kinds of feelings these conflicts provoke. (anger, frustration, hurt, jealousy, fear, etc.) Compare and contrast these with feelings provoked by internal conflicts

Global types of conflicts:

- Humanity vs. Nature -- the challenges people face in regards to extremities of weather, environment, time, geography, etc.

- Humanity vs. Society -- the anger that people feel when faced with injustice, oppression, unfairness, etc.

Activity 3 - Journal Entries – write your views on each of the following questions – try to be honest in your opinion.

1. Why do you think conflict happens?

2. Why is it that human beings cannot live in harmony with other human beings who hold different views, different beliefs, different values or different faiths?

3. Why do you that Jews and Arabs, Muslims and Christians, Catholics and Protestants, different races are not able to live in peace and harmony?

4. Discuss how each of these types of conflicts may call for a different process of problem-solving.

Conflict:

Part of the appeal of Romeo and Juliet is the sense of waste of two young people as a result of a conflict. We, the audience, emphasise with the sense of loss and more importantly the waste of this love.

Many stories describe such human tragedies brought about by some kind of conflict.

Your turn:

Write a short story (about 600 words) about a conflict. Make up two endings. In one ending the conflict is resolved, and in the other it is not.

Appendix F - ELE Questions used in Interviews

Legend	
Exp	Experience
Opin	Opinion
Feel	Feeling
Dem	Demographic

Question	Type of Question				Rationale
Views on Assessment in ELE	1 Exp	2 Opin	3 Feel	4 Dem	
1. What did you think of the ELE model of assessment? And did the model enable you to assess your progress in the context of your learning activities?		√◦ √			Open-ended questions to encourage students to respond descriptively rather than short answer routine responses (Patton 1990). These question permits the respondent to reply in their own terms and language. Students encouraged to share their views about the assessment program.
2. How was the program different from your everyday programs?			√		
3. How helpful was the program? Why or why not?			√		
4. Do you think using the rubric helped you improve your work		√			
Effectiveness of learning environment					
5. When you were working within the learning environment did you find it different from a classroom?	√				Experience questions to encourage the respondent to review the environment before offering more detailed opinion. Students encouraged to share their views on the conditions of the environment
6. Did the environment help you learn and improve your outcomes or performance? How?	√			√	
7. What were the strengths of the learning program?		√			Presupposition questions (i.e. questions assume the program has strengths and weaknesses, and can thus elicit useful information) (Patton 1990)
8. What were the weaknesses of the program		√			
Multiple perspectives					
9. The activities required you to consider your own questions from a number of different perspectives. How did you feel about these activities?			√		Feeling question to determine how the students responded to the expectation of assuming responsibility for their learning
10. How did you approach the task?	√				Experience question to seek means the students may have used to understand their own reality.

Appendix G - ELE Student Interview Questions

1. What did you think of the ELE program on assessment?

_____
_____
_____
_____
_____

2. How was the program different from your everyday programs?

_____
_____
_____
_____
_____

3. How helpful did the ELE rubric assist in giving feedback to your fellow students about their work?

_____
_____
_____
_____
_____

4. Do you think using the ELE rubric helped you improve your work? Why or why not?

_____
_____
_____
_____
_____
_____

5. When you were working within the learning environment did you find it different from a classroom?

_____
_____
_____
_____
_____
_____

6. Did the environment help you learn and improve your outcomes or performance? How?

7. What were the strengths of the learning program?

8. What were the weaknesses of the program?

9. The activities required you to consider your own questions from a number of different perspectives. How did you feel about these activities?

10. How did you approach the task?

Appendix H - ELE Feedback Survey

ELE – FEEDBACK SURVEY

Briefly respond to the four questions below:

1. What are the two [three, four, five] most significant [challenging, useful, meaningful, surprising, disturbing] things you have learned during this program?

_____
_____
_____
_____
_____

2. What question(s) remain uppermost in your mind?

_____
_____
_____

3. Did the ELE improve your understanding of how you learn and with a view to improving one's learning outcomes?

_____
_____
_____
_____

4. If you could make changes to your study program, what would they be?

_____
_____
_____
_____

Appendix I - Student Self-assessment Rubric

Student Self-Assessment Rubric

for ELE program

Ranking: 4 = High 1 = Low

EXPLORING/QUESTIONING

☐	**4**	My questions are clear, well-focused and require high level thinking skills in order to research.
☐	**3**	My questions are clear and well focused. My question requires moderately high level thinking skills.
☐	**2**	My questions are incomplete and unclear. My teacher needed to help me form a question.
☐	**1**	I was unable to come up with a research question.

ENGAGING/PLANNING

☐	**4**	I wanted to find out more, brainstorming possible areas of interest. I was able to remain focused on the tasks and make changes when I needed to. I was able to develop clear methods to organize my information. I was able to make revisions in my plan when needed.
☐	**3**	I could brainstorm some areas of interest. I was able to work within the time frame specified. I was able to develop a system to organize my information. I was able to make revisions with minimal assistance.
☐	**2**	Able to specify only one or two areas of interest. I needed assistance to help to list and organize what I needed to do. There are some steps missing in my planning. I made revisions with assistance.
☐	**1**	Unable to find any specific areas of interest. I was unable to come up with an organized plan and work within the time limits.

DISCOVER/GATHERING

☐	**4**	I used a variety of resources to discover and investigate several areas of interest. I carefully selected only the information that answered my questions. I was able to continually revise my questions and evaluate my investigations based on information I found.
☐	**3**	I used many resources to investigate find information that answered my questions. I attempted more questions and revised my investigations to explain fully my findings, but had some problems doing so.
☐	**2**	I used 1 or more sources to discover some information. Original question or focus guided my investigations, although I should have generated more questions and made revisions. I made errors in selection of references.
☐	**1**	I lost focus during the gathering process and therefore my information was incomplete.

Student Self-Assessment Rubric – Page 2

VALIDATING/SORTING

☐ **4**	I thoroughly selected and organized information that answered my questions in an organized way. I selected information that could validate and support my arguments.
☐ **3**	I sorted information and organized information that answered my questions without too many errors. Some information could validate and support my argument.
☐ **2**	I tried to organize the information I found, but it was mostly incomplete. I was unable to find sufficient information that would support my claims.
☐ **1**	I was unable to sort and organize the information I found to answer my question and no supporting evidence.

INTERNALISING/SYNTHESIZING

☐ **4**	I merged the present experiences and findings with past experiences to construct and understanding of the issues and how they relate to everyday situations.
☐ **3**	I was able to merge the present experiences to construct and understanding of how these issues relate to everyday situations.
☐ **2**	I had some understanding of how my findings relate to everyday situations
☐ **1**	I was unable to understand how my original question related to my everyday situations.

EVALUATING

☐ **4**	I used the information I found in a meaningful way to create an original product that clearly answers my questions with and an understanding of my own reality.
☐ **3**	My product answers my question in a way that reflects my understanding of reality.
☐ **2**	My product is not complete and only demonstrates some understanding of my own reality.
☐ **1**	My product is incomplete and does not demonstrate my understanding of my own reality.

TOTAL POINTS ☐

COMMENTS

_____
_____
_____
_____

Name: _____
Teacher _____

Appendix J - Summary of Interviews with the 3 groups

THE FOLLOWING SUMMARISE STUDENT RESPONSES USING THE INTERVIEW QUESTIONS

1. What did you think of the ELE program on assessment?

-- "I thought the program was cool as it allowed me to do what I wanted to do and not what the teacher wanted me to do."

--"The [assessment] encourages student participation, concentration and motivation to learn.

--"The assessment methods were excellent."

--"[The assessment] actually makes us think."

-- "I hate it when you cannot research what you, but this project allowed me to do anything I wanted."

-- "I find it hard starting any project but this assignment meant I could take my time and work at my own pace."

-- "I found it did not matter what outcome I had to achieve, the ELE rubric make it easy to understand and work at doing your best."

-- "My classmates and I found this assessment task great as we could pretty much do what we wanted and we could with all our efforts be an expert in our area of research."

-- "I found the spoken feedback provided during and immediately following the assessment helpful. And the written feedback was positive and meaningful."

-- "Our assessments was fair and an honest appraisal of what I have learned. I have understood more of what I have researched."

-- "ELE assessments seem as close to real life experiences as possible. It made sense."

-- "To have successfully completed this assessment process that I was initially afraid of, offers me hope to challenge and work toward completion of other more difficult tasks. I felt valued for my work."

-- "This is the first time I could present my project how I wanted and not what the teacher wanted."

--"This assessment task was a fun task. It took time to find things, yet it was easy to find things, making it effortless to present the information be assess.

2. How was the program different from your everyday programs?

-- "Being able to choose anything we wanted". I choose to explore the nature of sibling conflict and it was really cool interviewing my classmates and finding out about their lives."

-- "Not being graded on your project."

-- "Being able to work with my classmates and do some exciting things".

-- "I did not have to read a novel if I didn't want to. I could get my information from the internet."

-- "I hate having to do essays all the time. It was great to be able to show the teacher what I had found out by writing a song and the lyrics and even performing in front of the class."

-- "The teacher let us do what we wanted…and there was not boring lessons such as writing notes of the overhead or reading a textbook."

-- "When we hear other people's work read out it helps you with ideas."

-- "The teacher kept encouraging us to find out more information about our areas of interest and this made me find out more that I would have."

-- "The program provided opportunities for us to learn through our own experiences."

-- "The teacher gave us plenty of ideas, while also giving us freedom to create the activities we wanted to incorporate in our projects."

--"I felt very comfortable with presenting questions, problems, and suggestions with others in my group. I feel that we built off of each other's ideas well and used each other to get suggestions, as well as confidence."

-- "During the lessons, we posed many questions for each other to answer. By asking general questions and then constructing more questions from our responses. I really felt like I gained a good understanding of the nature of conflict."

-- "The teacher tells us what the activities we can choose from. At the end of the lesson we give a summary. I like that because it tells me what we have learned."

-- "The assessment task was an interesting one which required quite a lot of research and thinking about. I believe that this assignment went quite well and if I were to do it again I may spend more time asking questions and researching information."

-- "At first I felt this was a dumb assignment, but feel that by using this approach I was able to produce the assignment to my way of thinking rather than somebody else's."

-- “I gained self confidence…and it taught me the power of learning.”

3. How helpful did the ELE peer assessment rubric assist in giving feedback to your fellow students about their work?

-- “Yes, I used rubrics to assess my classmates work in this study. They helped me determined if my work is good or not.”

-- “I recognised that in sharing assessment with the teacher 'they're giving it back to us.”

-- “Yes, the rubrics help everybody and they help us explain to the other people what they need to learn. But I don't like to assess other people's work. Sometimes it is fun and sometimes it is not.”

-- “I have used rubrics to assess my classes' work. In this study and when we finish a task, we partnered up and used a rubric to discuss each other’s work.”

-- "Yes. When using a rubric you tend to be able to understand better when you have outcomes for the task there in front of you."

-- “We used them in this project and just recently we used them to evaluate a project in English.”

-- “Our teacher lets us assess other people's work with these rubrics, so we get an idea how we can improve and know where we messed up. Then she lets us try to improve it.”

-- “The rubric lets the teacher how much effort you put in.”

-- “While we worked on the project, we all communicated well through discussion inside and outside the classroom and through e-mail. Our group’s performance was a big factor in the project’s success as the rubric helped us stay on task.”

-- “The rubrics provide feedback to our friends to ensure an understanding of the problem as well as helping us evaluate our own strengths and weaknesses.”

-- ‘They help develop an understanding of what we are doing by and accepting feedback, criticism from our classmates.”

-- “Learned a lot, but I don't know if it would stay with me. I like marking my friend’s presentation.”

--“It was good to compare my work with someone else and I think the environment helped.”

--“I benefited from learning in groups as long as the groups are well managed and there are clear and fair assessment requirements.”

-- “The ELE rubric gave every opportunity to receive a high grade that also reflects the level of contribution made by individual students.”

-- “I used it to help my friend do his project by telling her what her task requires, based on what the rubric said.”

-- “The student self-assessment idea, were far more valuable than I thought they would be. I hope I get to use those again.”

-- “It's fun looking at our classmates’ progress. Assessing them is also fun because then you get ideas from each other to make your paper better.”

4. Do you think using the ELE rubric helped you improve your work? Why or why not?

-- “I would strongly suggest these rubrics for any task, because they help you to know what you left out and what was I doing wrong?”

-- “The ELE rubric I found better as it helped me understand from the beginning of the task what I could do.”

-- “I think the ELE rubrics really help me improve my work because since I've been using them, I've improved in my studies.”

-- “I like the way they word the outcomes and also how they show you to get that level. The guidelines are right down to the point and are precise to what you need to get that level.”

-- “I think they do for me because it is like a list you go down to check off what you've done.”

-- “The rubrics help us discuss with our friends so we can make the project easier to understand.”

-- “I think ELE rubrics can help teachers assess better than just thinking of an outcome in their heads.”

-- “Having rubrics where no marks are counted. Having many discussions in class.”

-- “Rubrics are usually very sketchy, although the main advantage is it being fair." The ELE rubric is a little more detailed.”

-- “Through the reading and working through the rubric, I can discover what I really understand and don’t.”

-- “The ELE rubrics are an easier way of showing what you have been able to produce. There is less guilt, favourites or decisions. This is a more 'fair' way of assessing. Also you can see why you got that outcome.”

-- “Yes, because before I knew about a rubric I found it hard to know what to do. Know I kind of understand what I can do.”

-- “You can go back and make your work better if you haven't completely followed the rubric. It lets you know exactly what you need to do to get an Expert assessment.”

-- “Rubrics help you improve your work because you are told right away what is expected of you.’

-- “Very useful in providing some idea by which to compare your work with your teacher and other classmates.”

-- “When you are given a task or project you need to look at its requirements. Sometimes there are things on the rubric that I have overlooked. But on the ELE I can change, and know what to change, by the rubric guidelines.”

-- “The best thing about rubrics to me is that if you follow along the rubric you already know your assessment outcome and it is easy when you can choose any area of interest to study.”

-- “The ELE rubric gives me a chance to see how I can improve and I like being able to do want I want.”

-- “Yes, it has made me a better student and a better communicator, because it helped me understand my strengths.”

-- “Good for discussion and clarifying ideas so I have some idea of where to start and what I need to do.”

-- “Helpful for me was the rubric to start my thinking in terms of a coming up with a hypothesis and clearer understanding of what my project was about.”

-- “When I use a rubric, I don't always get a (perfect score). True, but with the ELE its right there, but you really think you got it all and the way the ELE works you can be the best (Expert) when you do you best.”

-- “According to the ELE rubric, my understanding is higher than I expected."

-- “Most of the time it's the language with rubrics. It can be hard to understand, especially the test ones, but the ELE is a little easier to understand how you performed.”

--“This was good as it made me sit down and actually understand what I had to research that I usually would not do.”

-- “I was forced to think about my project – it is very easy to just remain lost in own ideas rather than having some idea of where to start.”

-- "Yes, I think the ELE rubrics improve my work because it gives me guidelines on what I had to do and I could choose to investigate my area of interest. If I was supposed to do a project without a rubric, my assessment would definitely be lower. I've noticed that my classmates felt the same. If rubrics didn't improve work, what is the point of using them?"

5. When you were working within the learning environment did you find it different from a classroom?

-- "We did not have to do what the teacher usually wants you to do. We could choose for ourselves what we wanted to find out."

-- "We were able to work together not only as a class but in our own groups."

-- "The discussions were the best part."

-- "I liked the way we could all share our opinion and everyone listened."

-- "Being interactive, think of questions, lots of chances to practise and discuss what you find out."

--"The brainstorming activities were the best. The teacher helped with ideas for our projects."

-- "We like these practical classes; and we have put it on our feedback forms to ask for more practical classes like this one."

-- "Yes, I did as it is a good idea, because it's useful to develop thinking skills in all fields. Besides, I like working with problems, asking questions and so on."

-- "I liked it best when we could just do what we wanted to too. The teacher would not tell us what to do."

-- "We had access to more flexible learning."

-- "We are not used to thinking for ourselves. Last year we had assignments that required us to look the answers up in a book. We had assignments that required specific answers. In this program there is no one textbook."

-- "Got me thinking about why and how – this helps to clarify things in my own mind."

-- "I gained a great deal from the classroom environment. I have seen a remarkable change in attitude in myself. At times I find myself thinking "is this for real?" I thank you for the new-found confidence that I have acquired."

-- "Thought the brainstorming and discussions were interesting, useful, interesting and challenging. I think I got it now."

-- “I haven't got used to the freedom of being able to discover and to put things in my own words. I am sure I will do better next time.”

-- “By reflecting on the problems we encounter, we analyse them and synthesize them, to the point of categorizing them in order to solve them. By doing this we compare them to problems that we know how to solve in order to solve them.”

-- “When we discover solutions to our problems on our own, by relating them to other problems we know how to solve, it makes more sense to us.”

-- “It encourages us to be creative and thoughtful as opposed to the usual method in which we regurgitate information.”

-- “Often our classes can be rather dull. But I've never seen a student fall asleep in these classes, and they definitely ask far more questions.”

-- “The classroom was fun…everyone doing their own thing…and my classmates really liked just finding out stuff.”

-- “Our class was so much better than our other classes…we could talk, discuss and work on our projects at our own pace.”

-- “I think it's good, because if I don't understand something, I try to do all to understand what I need to do.”

--“It's the greatest idea I've ever had. Really. I thought for a long time – how teachers try make lessons useful and interesting at the same time? And this is the best solution, really! It's so easy - to teach you to ask questions, and it's much more productive. Well, that's my own point of view.”

-- “I was exposed to critical thought on issues that interested me and provided with the means to make links between them. The ELE taught me to ask questions--not just attempt to give answers. I became more equipped to examine my own learning and understanding.”

-- "I think if teachers used rubrics like the ELE instead of oral directions students would get better outcomes because they could just look at the rubric instead of keeping asking the teacher.

-- “I think it would be better with teachers if they had a rubric because if they liked you they could give you a better assessment and if the teacher didn't like you they could give you a bad assessment and the student couldn't do anything. But if they had a rubric they couldn't because they would have to point out what you did wrong.”

6. Did the environment help you learn and improve your outcomes or performance? How?

-- "I think this is the best work I have done. My parents were pleased with the project that I produced. I think this is because it was what I wanted to do."

-- "Being able to work entirely on my own and finding out more about my area of interest."

-- "I've not learned as much in any other class at school the past three and one half years."

-- "Discussing the nature of conflict with your friends, can make the concept easier to understand."

-- "The type of surroundings that I work best in, like being able to do what I wanted and not what the teacher wanted."

-- "The ELE classroom helped me understand."

-- "Better place to work in and helped me think for myself."

-- "Yes, I think it is a good idea. All these opportunities for searching for problems really develop our thinking. We don't just do the task, we also think about it."

-- "Knowing that you were not going to fail…because the rubric helped you know what and how you needed to do in advance."

-- "I now know the environment and how I can get motivated."

-- "I wish all my classrooms were like the one in the study…because we could all take part in each other's projects and share ideas around…we just didn't have to copy done notes from the overhead or just listen to the teach talk."

-- "We didn't know what we could do until we were in an environment where we could work with any resources and materials."

-- "Having some extra resources in the classroom like the TV/Video, Library books, Newspapers, Computers and being able to use the teacher's overhead so that we could prepare for our presentations."

-- "The best way to describe our classroom in the study was that it was alive…everyone felt they could contribute and it was fun."

--"The teacher made our classroom a fun place to be in…we couldn't wait for this class…it was cool."

-- "We felt we did best when we worked in groups, and could do projects, be active in class, and experienced less teacher talk."

-- “I felt I could really understand what I was doing.”

-- “The best use of it was that I started to analyse the task. There are self-assessment and critical thinking components, etc. and I can observe these in myself.”

-- “I believe it was a good way to allow students become more deeply involved in a class. I mean not just the teacher telling us what to do. We were able to have a say. I like being able to do that.”

-- “We can talk to people about stuff and they’ll understand it. Our group had so much fun with that! It was the best project that we had in an English class.”

--“I liked being able to investigate as much or as little as I wanted…I wanted to do more because the teacher would ask me other questions which made me want to find out more.”

--“This is the first time I actually wanted to learn something because it interested me.”

-- “It made me reflect on my own life’s experiences and this helped me better understand what I could do with my work.”

-- “I have learnt things about myself and I know how to use them in order to improve my learning and how to study.”

-- “When I used the rubric I got ideas I have to use…it is like feedback.”

-- “I hate school, but coming to this class change my ideas, as it wanted to learn. The teacher just let me do anything.”

-- “I think ELE learning is effective in any class....I appreciate this method in my English class and wish it were more common in my other classes.”

-- “The ELE offers some interesting solutions to research problems, problems which cannot be solved by reading from reference books or looking up the net.”

-- “The ELE classroom provided an inclusive environment in which I was free to test and expand my creative and intellectual potential without feeling limited. I learned what I could now do.”

7. What were the strengths of the program?

-- “Being able to do what you wanted to do…and knowing that you were being assess on something you knew something about.”

-- “Knowing I would not fail not matter what I did.”

-- “Being able to be creative with my presentation, rather than having to write a boring essay.”

-- “I understand the importance of doing my own work and learning from my mistakes as well as building on my strengths.”

--“This program enhances my understanding of working through problems and helps me to express my feelings and ideas in alternative way. The assessment helped rather than made you feel like you were not valued.”

-- “I put in hours of hours on my project and receive an Expert outcome. This made me very happy, because I had done so much work and an assessment mark which reflected my efforts.”

-- “I hate doing assessment tasks, but the teacher made this activity so interesting that it helped me do better than I normally do.”

-- “I always do badly on assessment tasks, but on this project I did much better because it was doing what I wanted. I felt the assessment was fair.”

-- “I got to do an individual project as well as working with my classmates on their project…this was fun just sharing.”

-- “It has improved my performance. This is the first time assessment has helped me learn. And it helped me when I did projects in English. It bothers me that most of them require a lot of work.”

-- “I think the worst thing about rubrics is that maybe you're at a level 5 and maybe it makes you feel bad because you feel you have to push yourself harder to get to a 6 or 7. With the ELE assessment it does not matter what level you are at, as you are working to be an Expert in your area of research.”

-- “In the end they help make things fair so that a student can't complain about their outcome, and it also gives the teacher back up for the outcome they gave. A student can also use it for them if they feel they have been unfairly assessed.”

-- “It made me think more about assessing myself in what I wanted to do and why and what I wanted to study. It became clear to me that thinking about these things is understanding that learning and assessment is one learning skill. Now I can observe my learning skills; the ELE brought forward different skills.”

--“Before using the ELE program, I did not see learning and assessment as a whole... but now I, as a student understand what learning is…doing things for myself.”

-- “The ELE program is particularly important because it requires recognition of one's own strengths and also recognition of difference. It's an important life skill to be able to work with others, engaged in our differences and share our ideas and beliefs.”

-- “Being honest, I didn't like very much this idea of thinking skills, but now I like this idea, and these skills will help me not only in English, but in my 'out-of-school' life too.”

-- “By putting what we learnt in writing or a project it makes you think about it and we may remember it for longer”

-- “It forces me to review and do a self-assessment of things I’ve learnt”.

-- “It's really a good thing to spend time thinking about things, and to discuss topics and issues that don't have an "answer" (unlike maths, for example). Discussions without answers ("discussions that don't resolve anything") seemed to bother some of my classmates”.

-- “Making up questions to think about for my assignment that I wouldn’t have acquired, let alone thought about without doing this program.”

-- “THANKS A LOT FOR EVERYTHING YOU'VE DONE FOR US! You know, actually I already started thinking that all teachers don't care about students when they are assessing us all the time. I never see the point. Most of the work is boring and not interesting. But I wanted to change my point of view and I did it. Because of the ELE program. Well, you can't imagine how far this has changed me. I myself can't imagine it.”

8. What were the weaknesses of the program?

-- “Not having enough time to prepare as much as I wanted to present to the class as my final presentation. I was writing a song and needed more time to work on the lyrics.”

--“If you work with friends, you feel reluctant to give a group member a poor assessment, unless they did nothing.”

-- “We did not have enough computers for everyone in the class to share, although we made up a roster system which seemed to work.”

-- “Not enough time to research…as we could have done better if we had more time to use the Library and Computer labs at school.”

--“Not being able to book the AV Equipment to do our presentations.”

-- “Not having enough class time to finish all we had to do.”

-- “There were not enough resources in the school for us to borrow, such as video cameras and TVs.”

-- "We did not have enough resources for all of us to do the experiments that we would like to."

-- “Can’t help wishing that we could have done this much sooner. Hard to do what I had to do in such a short time.”

-- "Some rubrics don't fully cover all the situations and the ELE can be a little like most.”

-- "The worst thing about the ELE rubrics is it is hard to translate them into a letter grade."

-- “I found it hard to assess people I knew, and also I gave everyone fairly good marks, out of fellow feeling, even if the presentation was not good.”

-- “I think the worst thing is that it is kind of confusing because there are not enough directions or rules.”

-- “Having to follow by the directions closely until you find what you need.”

-- “I didn’t like the assignment as it was hard to explain to the group what my questions meant and what information I needed to be assessed for the assignment. I didn't like this task as I have to work out my own questions.”

-- “I found it hard to start without being told what I had to do…usually I just have a question and then find the answers on the net.”

-- “You expect more from us than any other teacher.”

9. The activities required you to consider your own questions from a number of different perspectives. How did you feel about these activities?

-- “I thought they gave me the chance to learn more about a country than I would have done if I had just done a research assignment.”

-- “One of the things I loved about the ELE program is that we're trying to learn- ask questions - not just get the right answer. That's really good. You want to get the right answer, but you still learn rather than produce the ‘right’ answer to get a good assessment. You do better because learning is more important than getting the right answer.”

-- “I never really realized what I liked to do. I realized what I didn't like, but I didn't realize what I liked. And when I sat down and thought about it and talked about it, I realized what I like. Answering your own questions - it's kind of fun and knowing that you will still be assessed fairly.”

-- “I find myself in class sometimes now, saying, "This is what I was talking about. This is what we should be doing better – asking our own questions, not just finding answers to make sure we get a good grade. I feel we've talked about it so much, that I've used the information to understand better the world.”

-- "I like being in this class. You know what you need to learn, and you can get used to doing your own thing. Not just what the teacher wants for assessment at the end of the term."

-- "At least I know that I am not alone in some minor disagreements with my teacher and other classmates. There are several ways of answering questions. Not just one answer. I like that."

-- "The idea of thinking has created no end of problems for me. All through school, I am constantly asked for the right answers, especially when we are assessed all the time. I know now that there are no right answers, just more questions. So assessment means less to me now."

--"Last week we did our conflict project....I learned some things from students about animation and publisher. I really enjoyed this project because of the fact that I learned a lot and it really gave the students a chance to show their creativity....We had planned two days for presentations and it took four days but the quality of the presentations were unbelievable. The presentations together taught the class about the nature of conflict."

-- "I have mastered the art of memorization, but I am finding this thinking thing absolutely agonizing! Why didn't I have thinking in other classes to get me used to this new way of learning?"

-- "I have disliked being "put on the spot" and told just tell us the answer, don't keep asking us more questions and if I ask you a question in class, you are told I don't want another question in return, I just want the answer." In this class I can ask all the questions I want…sweet."

-- "You start questioning everything you have done in the past and wonder how you can adapt it to this project and how will it affect my grade. Then, you start questioning the whole concept of what you originally did and forget about assessment."

-- "I got into the network and lost lots of information because I didn't know what I was doing....but the teacher and my friends help me get it back – that is what I like about this program you get help for others."

10. How did you approach the task?

--"I wanted to do it because it is not just useless data or memorization to be assessed; it is something that I can apply to everyday life."

-- "It made me realize my instincts weren't always true. Things that seem so apparent, such as the reasons for the conflict, turn out to be a little more complex than expected."

-- “My parents asked me if something was wrong, because I was starting to talk about schoolwork at home, something I never did [before].”

-- “We could ask the kind of questions that good scientists ask.”

-- “I learned to objectively criticize myself using the self-assessment rubric, which is important.”

--“I learned a lot with my group and on my own without a teacher telling me, and it enabled me to draw on the knowledge of more than one person – other classmates and you have to depend on others when working in groups.”

-- “I learned about how to be an effective member of a group.” “I learned that I will be able to step up in a team situation when I enter the real world.”

-- “I thought being able to work on 'real life' situations was an excellent way to learn new stuff.”

-- “This course (ELE assessment) gave me with the opportunity to develop my creativity. I have lots of freedom that encourage me to do what I imagine and constructed from my findings without any constraints of being unfairly marked.”

-- The teacher in discussions posed problems from more than one angle and give variety of perspectives. In turn this gives students like myself a starting point to analyse and also confidence to give our own opinion.”

- The teacher encourages us to discuss problems amongst ourselves and will often provide an alternative point of view that makes us "sit up" and think again. These sessions are very stimulating and exciting.”

--“We could control when, how, where, and what we learnt, as well as how often and how quickly — and this level of control is what made us enjoy do this course.”

-- “The ELE program is fantastic. It really encourages me to think about what we are learning in class and apply it to an unfamiliar situation.”

-- “The whole ELE concept really provided the opportunity for exploration and innovative thought.”

“The ELE exercise ... involved thinking ... you are faced with challenges, you ask your questions which are very good to try to solve.”

-- “I choose to do a project like the rest of my classmates because this is the one way we can tie in all our knowledge and relate it all to further thinking.”

-- “Helped me to re-focus my ideas on questions and generate a few new ones.”

-- “Gave me a good idea to give presentations for both positive and negative feedback. Usually assessment is only negative feedback.”

-- “Looking towards presenting my project and getting first hand experience with the processes involved.”

-- “Helped me to think about my project that I wouldn’t have thought about without doing the program.”

-- “Before I took part in the ELE program I had had neither the freedom nor the opportunity to question or even develop any ideas about issues which interested me. By working in this program with my friends was the main way questioning and development took place.”

Appendix K - Student Feedback Responses

1. **What are the two [three, four, five] most significant [challenging, useful, meaningful, surprising, disturbing] things you have learned during this program**?

-- "How to sit down and listen and then take part in the great discussions. It was the sharing."

-- "I would say the most useful thing I learned is to be in control of my own learning…not just doing what the teacher wanted but what I wanted to learn."

-- "For me, I learned the difference between learning and learning. However, what is more valuable for me than learning how to appreciate understanding, rather than learn stuff for exams."

-- "I believe that questions are more important than answers, that wonder is more important than certainty."

-- "I learned that the quality of education depends more on the desire of the student rather the wants of the teacher. To a motivated student, a poor teacher is not to blame, as the best teacher in the world cannot open the mind of someone who refuses to learn."

-- "The things that help your feelings of self-learning. That little voice that gives you feedback can either be a friend or your worst enemy. The ELE helped me, better understand myself and gave me enthusiasm to learn more."

-- "I benefited watching and helping my classmates and friends experience the presentation that they had made and feeling the satisfaction of a job well done."

-- "I think using this program also provides time for us students to help other students, and motivates each of us to be active participants in own learning."

-- "My favorite part of making the projects was the ability to experiment with the different media equipment as I found it challenging at first."

-- "The thing I enjoyed most was learning new ways of doing things. It allowed me to relate to better to my group and develop lasting relationships. Before the program I hated group work, especially assessment as it was not always fair."

-- "The discussions in class were most interesting in that we discussed current social and cultural aspects of conflicts around the world today. Now I have a better understanding."

2. What question(s) remain uppermost in your mind?

-- "the missing thing in our classes is that teachers do not understand what makes us work…why they can't make the lessons more interesting like the ELE."

--"There is a lack of understanding by teachers in thinking why he doesn't want to learn. We do want to learn not just copy from the overhead or read boring old textbooks."

-- "My teacher should have known I couldn't read, but, because I couldn't read, I had to miss my recess and playing with my friends. I was punished because I couldn't read so it made me not want to. I hate reading. It's boring! I just keep thinking I can't read. I'm stupid. Yet when I did this program it changed my mind. Sure I still find it hard to read, but when I read what I want to read it is different. Why can't all teachers see that?"

-- "Why testing where tests become the main part of assessment…rather than using our portfolios or our teachers assessment of our work."

-- "If only I could convince teachers to include this approach into their teaching style. Many just don't believe that it can actually work. They hate having discussions because now one listens…but we do if the teacher sets up the right environment for us to learn in."

-- "Discussion needs to be built into the environment so the role of the teacher can be to encourage us to ask questions rather than the right answer."

-- "My learning was meaningful and important. I don't want to lose that enthusiasm because my other classes do not have the same passion for learning."

--"I see an excitement in my friends as they do their projects. I see an excitement for learning rather than a memorization of what either we had to read or what our teacher has taught us so they could assessed us sometime later."

-- "We like asking questions applying it at a higher level and even my friends that are struggling are having success with it. They might need some more support through it but they certainly seem keen to doing the work. I know in our other classes they would not do the same amount of work."

-- " I believe that we need to be pushed to work harder to go beyond these boundaries, to challenge your little brains at all, I think some teacher put these limits on the students not allowing them to explore, allowing them to push themselves because assessment is usually not like this."

3. **Did the ELE improve your understanding of how you learn and with a view to improving one's learning outcomes?**

-- "I was positively surprised about the whole program and how it helped me learn more not just the outcomes being assessed."

-- "I really like sharing answers. I never shared answers before. I really like working in groups because you can bring your grade up."

-- "While working in groups there are no arguments. If you disagree with someone you find a way to solve the problem."

-- "I learned not to argue and always help out and share ideas that you think of and do not start fights. Working with groups is fun because you get to share your facts with someone else."

-- "When I look at what I have learned in the past eight weeks, I think I learned more than if the teacher was obsessed with the time restrictions and testing us for our report."

-- "I now feel more comfortable in my class have gained better communication skills, both in speaking and written work according to the ELE rubric."

-- "This course has given me confidence and opportunity to develop. A great experience well worth the work and effort."

-- "An eye opening and life changing experience - thanks for showing me the way to think for myself. Here's to new beginnings."

"An extremely good teaching method combining imparting knowledge with making the lessons fun and interesting. The teacher is very patient and encouraging and do a great deal to build the student's confidence."

--"I've learnt so much and my results in this project have improved thanks."

-- "All the learning is so much fun, lessons are go so quickly, because we enjoy it so much."

-- "The course is great fun as you work with lots of different people in the class. It can be quite challenging learning to cooperate as a group but I find that motivates me to get along and it helps me improve."

-- "One of the best things about these classes for me is that they give me something to develop between classes and I find that I am learning all the time."

-- "It was great fun and hard work, rewarded by a sense of achievement and the determination to succeed. That is why the ELE rubric is good. We need feedback to help us improve."

4. If you could make changes to your study program, what would they be?

-- “Make sure the teachers understand that being inattentive and sometimes disruptive in class is because we are bored with what we are doing…so try to change what happens in the classroom so we can learn rather than just do tests.”

-“Make sure all teachers teach all students at the same high level.”

-- “Many teachers want to know whether they can help you learn--be it English, Art, History, or Maths. But they remain unclear on what we are really supposed to do in the classroom. So they just make us do tests.”

-- “A shift to more toward discussion and less emphasis on the content would be important, to have computers more than just in the computer labs.”

-- “If students are exposed to areas that already interest them, they may get more involved than if the focus is on learning about the end of semester exams.”

-- “The biggest issue for me was that I didn’t get enough of the kind of information I wanted before starting this project. I would have liked to have known what assignments are meant to achieve, or what students should be getting out of them. It is much better when the teacher gives you assistance and help.”

--“Other teachers sometimes make assumptions about students who have are problems in other classes, but if the class work is interesting then they don’t misbehave.”

-- "The combined approach of discussions and do more practical work – like us finding out info and our questions rather than the one the teacher gives you."

-- “I wish all our teachers put a lot of effort and time into making the classes interesting, fully understandable and enjoyable for me to learn in the future. In many areas of my everyday life and future not just from textbooks.”

-- “I had fun learning and remembering things. It will help me with thinking skills and English skills. If only all classes could be like this.”

Appendix L - Participant Observer Record

Participant - Observer Sheet															
		Observations	Notes												
			Groups/Students			**Date**	**Activity**			**Date**	**Activity**			**Date**	**Activity**

Appendix M - Observation Assessment Rubric

Student of Group/Individual Names _____ _____				
Activities to be assesses	Expert (4)	Practitioner (3)	Apprentice (2)	Novice (1)
Exploring				
Questioning				
Engaging				
Planning				
Discovering				
Gathering				
Validating				
Sorting				
Internalising				
Synthesizing				
Evaluation				
TALLY				

Feedback on Work in Progress

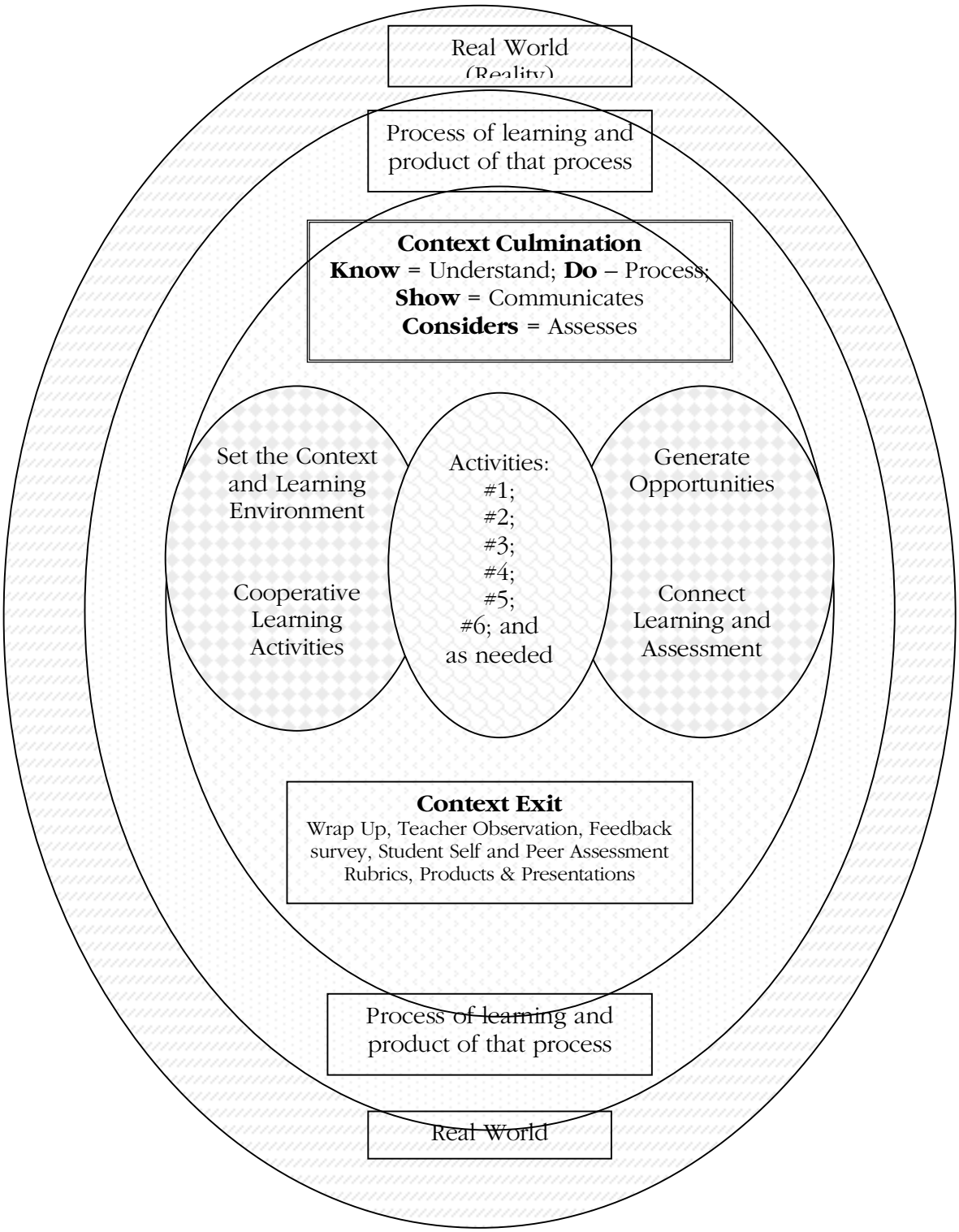
TOTAL POINTS

COMMENTS

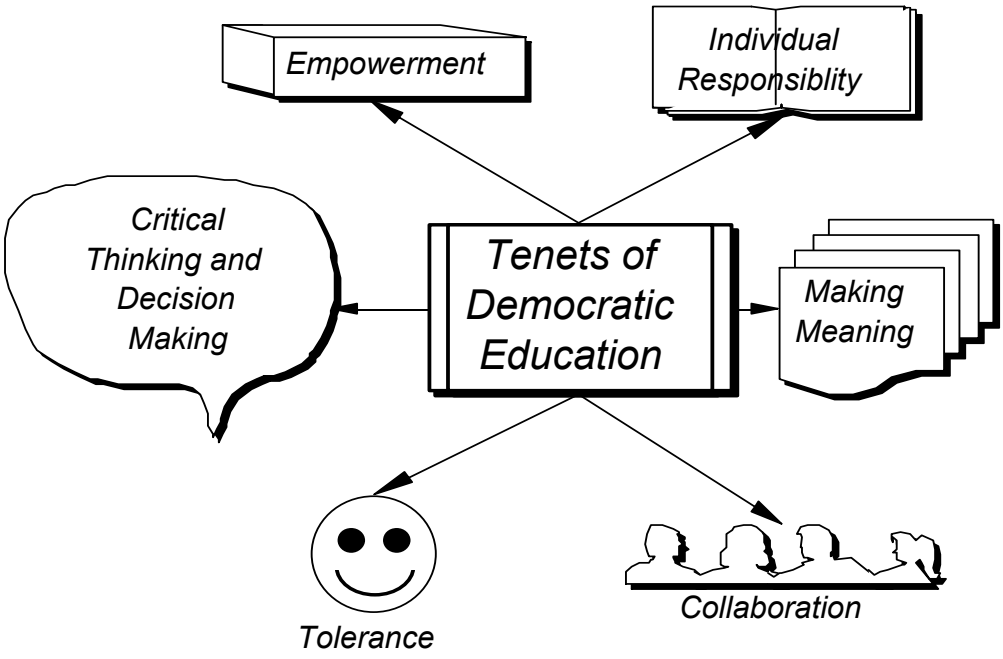
_____
_____
_____
_____
_____
_____

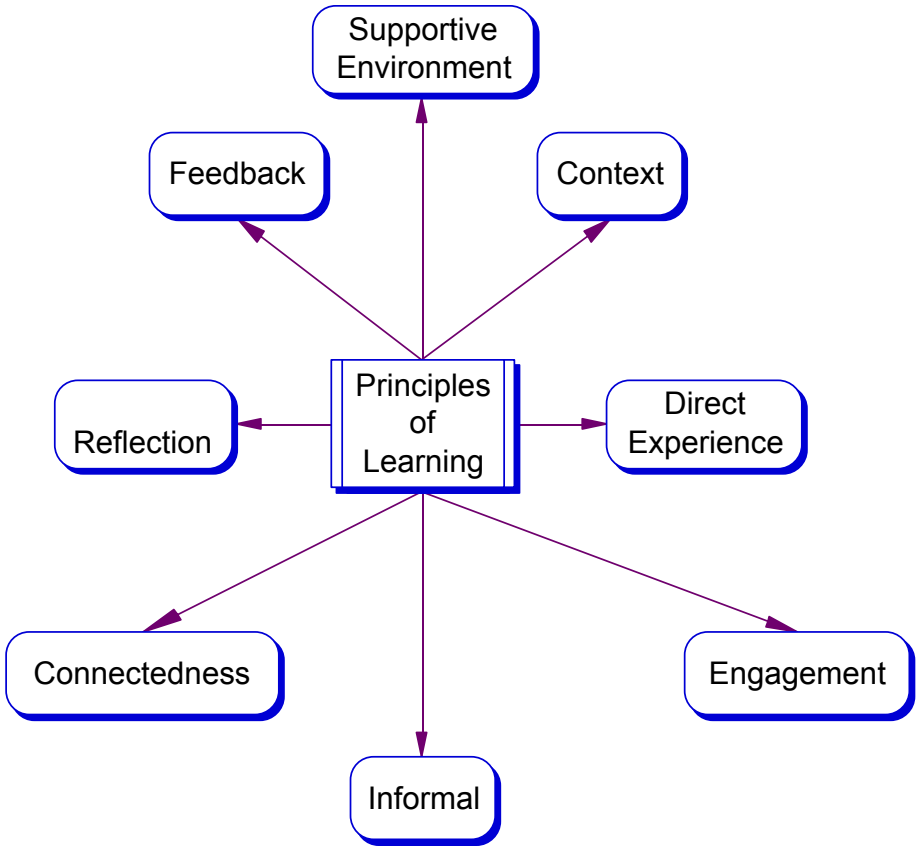
Note: When assessing, you would list 1-4 activities to be assessed. The number rating would be dependent upon the student's ability to act independently and in a group when exploring, engaging, experimenting, and constructing hypotheses.

Appendix N - ELE Context Assessment Planner



Appendix O - Democratic Principals of Learning





Appendix P - Taxonomy of Personal Engagement