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1.0 Title

A Critical Analysis of eLearning and Case Study of its use in One Secondary School in Essex.

2.0 Abstract

3.0 Introduction

As an ICT teacher with responsibility for developing innovative approaches to using ICT in teaching and learning within my school, I have long held an interest in the role and effectiveness of eLearning as a modern educational tool. I have been fortunate to be involved in piloting a range of electronic learning products with a variety classes and have obviously formulated my own ideas about how effective products are and the most effective ways of using them in the classroom.

For this dissertation I aimed to clarify exactly what eLearning is and how it relates to traditional interpretations and definitions of learning. I felt that many products I have used are predicated on a behaviourist mode of instruction and wanted to investigate if this opinion was reflected elsewhere. At the same time I want to explore the views of other researchers and practitioners into the effectiveness or otherwise of such systems and to test my view that systems are most effective when an element of constructivist learning is used to enliven and enhance the online experience. In addition, I felt that I could illustrate my idea of effective eLearning through literature review and a case study of how we have utilised one particular product within my school.

To summarise, I aim:

- To clarify exactly what eLearning is and how it relates to traditional interpretations and definitions of learning.
- To test my view that many products are based on behaviourist methodology.
- To establish views as to the effectiveness of such systems.
- To explore the idea that systems benefit from a constructivist element.
- To illustrate my idea of effective eLearning through literature review and a Case study.

3.1 Rationale and Focus

Recent developments in technology have made broadband internet access common in secondary schools. Combined with the National Grid for Learning (NGfL) funding and development of an "Information Superhighway", this has made eLearning not just a real option, but increasingly common. The current unprecedented expenditure of £100,000,000 on eLearning in schools (2003-2004) goes to show how serious the government are about developing this facility within educational establishments.

The range of products that offer an electronic or online method of learning is large and growing, however, it is reasonable to assume that some will be better than others. Many of the systems make claims about their effectiveness in terms of learning. Some use their own research to support those claims and then apply it as a marketing tool to sway the ICT budget holders.

The Government have dramatically increased the money available to schools to spend on such systems through a project called Curriculum Online and a funding system known as eLearning credits– my school received £20,000 ring fenced funding in financial year 2003-2004; ICT co-ordinators will have to make judgements about which systems will offer positive learning gains for their students. Schools will be particularly interested in systems which will support individualised learning and the workload reforms currently being implemented. With the claims being made and such funding stimulating greater corporate interest in producing these products, it will be important to ascertain if there is any substance to it. It will be important to examine if eLearning systems have a positive impact on learning, if they stimulate and motivate learners and if they demonstrate any significant benefits over traditional modes of teaching and learning. In addition, there is little in the way of preparation for such a change of culture in classrooms and teachers could use a framework for good practice in teaching and learning via eLearning systems – a conceptual framework.

ELearning is not a new concept, I will explore the different definitions and relevant terms later, but, in general the term refers to learning systems which are

in some way connected to electronic processes or devices. The term has only really been coined in the past few years, I believe since the boom of the 'knowledge economy'. Greater disposable income, cheaper electronic and digital products such as home computers, game consoles and mobile phones have made electronic communication and therefore electronic learning more accessible. For my purposes the term is really used to describe learning facilitated via software or web products – delivered through whatever medium the learner wants to access them. In most cases this would be a computer. I am also limiting my focus to deliberate learning through the use of such systems – not experiential learning through ad hoc computer use or internet browsing – itself a very useful outcome.

The concept of learning machines has been around for many years as Inglis et al observe in their examination of the origins of the knowledge media:

> "The idea of using computers in place of teachers to deliver instruction originated from the pre-war development of teaching machines, mechanical devices that presented the learner with frames of information and required the student to respond to multiple-choice items by pressing buttons corresponding to their choices."
>
> Inglis et al (2002:10)

I will need to examine how modern interpretations of these learning machines relate to our understanding of "learning" in general.

Most of the learning machines and current software solutions have, in my opinion and experience, for a long time been beyond the reach of normal school budgets.

To illustrate, the school which forms the basis for the case study later in this work received funding through the "IT for schools" (previously called NGfL) heading in the last budget of approx £76,000. This is a generous amount, partly determined by the large size of the school. However, it is designated for use in general ICT expenditure including licensing, maintenance and new equipment purchase, etc. This school, because of other funding streams available due to

different initiatives and networks actually spent nearer £200,000 in that year. A 30 license subscription for 1 year to PLATO Web's learning system would have cost this school £10,000. A 30 licence one-off payment (locally hosted) version would have been nearer £25,000. For smaller schools without the benefit of Action Zone, Leading Edge and Technology Colleges money to help supplement funds would have had to commit perhaps 30% or more of the available ICT funds to a one year subscription.

New developments in education funding have altered this and the main focus has been a DfES project called Curriculum Online funded through eLearning credits. Schools have received pupil related funding of approximately £10 per pupil to help pay for such systems – but a school of 1000 pupils would have to commit all of that money to the one product in this example.

To help appreciate the focus of this project it is first useful to summarise the thinking behind the Curriculum Online programme. In the words of the first report into the scheme:

> "The Curriculum Online programme has been developed as part of the Government's vision to *use ICT to raise educational standards in schools*. Curriculum Online is intended to provide teachers with easy online access to a wide range of digital materials to support their teaching across the curriculum. A central element of the Curriculum Online project is the dedicated portal launched in January 20031, where teachers can search for digital material from accredited suppliers that meets their specific requirements. Funding in the form of eLearning credits that can only be used to purchase eligible Curriculum Online software has also been released to schools."
>
> (Kitchen, S & Finch, S. (2003:7))

Curriculum Online has refocused expenditure not just on using computers in "Education", but, specifically, on using such technologies to aid learning. To explain the difference, using a computer to write up a project report for English doesn't necessarily result in any learning taking place. It is an instrument for

presentation in that context. I will be focusing on eLearning systems as ***learning*** tools – where the software and platform play an active (or interactive!) role in the learning taking place. Examples of such systems would include LJ Technical Systems Scantech range, PLATO, The Cisco Networking Academy Programme, SAM Learning, Learndirect to name but a few.

Although the focus is partly driven by recent and unprecedented events and spending in education in England and Wales, and as such Curriculum Online has an influence; I will be looking at eLearning in its broader context. This may include applications and resources that aren't accredited formally through the Curriculum Online system.

Overall, my focus will be on critically analysing what eLearning has become, its current definition. I will also try to analyse how eLearning and "learning" relate to each other in terms of learning theory and application. From there I will illustrate my arguments and learning through a case study focusing on the implementation of one such system within my own educational establishment.

3.2 Demonstrating Mastery

I will demonstrate my Mastery in this dissertation in the following ways:

1. *Show an appropriate level of independence, autonomy and originality in the negotiation and conduct of your studies and its assessment.*
   I have achieved this throughout my work from the initial proposal stages and on into my study and presentation. This can be evidenced through the development of the original proposal into a final dissertation project, discussion with my tutor and is also demonstrated in my willingness to produce an original and challenging approach to presentation.

2. *Read, understand, analyse, evaluate and critique research, theory and literature on education, competently and to a standard appropriate to be considered a Master of Education.*

I will demonstrate my Mastery in this context through the extensive work in the Literature review in which I evaluate and critique existing research, theory and literature as well as arguing my own interpretations and ideas.

3. *Isolate, analyse and evaluate key features and concepts in the research, theory, literature and practice on education.*
   Throughout this work I have demonstrated my ability isolate, analyse and evaluate features and concepts and this is clearly shown within the Literature Review. In addition the Case Study demonstrates my Mastery of analysing practice.

4. *Develop new perspectives on existing knowledge, research, theory and the literature of education.*
   Throughout the whole of this project I have demonstrated my ability to develop new perspectives, this is evident particularly throughout the literature review.

5. *Invoke and develop appropriate theoretical models in order to conceptualise and/or investigate current or evolving practice in education.*
   Within the Conceptual model section of the Literature I develop a framework based on existing theory and practice as well as my own ideas and theories drawn from experience.

6. *Challenge existing knowledge, research, theory, literature and practice through evaluation, analysis, valid argument, and appropriate evidence.*
   Throughout the project, but particularly in the literature review I demonstrate my Mastery by challenging views

7. *Communicate with other practitioners of education those insights and perspectives in an appropriate form and thereby, contribute to the development of educational knowledge and thinking.*

8. *Generalise from and apply their sophisticated and in-depth understanding of education, in a specific area, to practice strategies for the development of practice.*

9. *Show a level of preparation for MPhil/PhD studies.*

4.0 Literature Review

At the start of this project (page 3) I set out to achieve several aims.

- To clarify exactly what eLearning is and how it relates to traditional interpretations and definitions of learning.
- To test my view that many products are based on behaviourist methodology.
- Establish views as to the effectiveness of such systems.
- Explore the idea that systems benefit from a constructivist element.
- Illustrate my idea of effective eLearning through literature review and a Case study.

The literature will show that the issue is a complex one. It was important to remember that much of the literature has been written during a period of rapid technological development and social integration. The last few years have seen the establishment of the internet as an everyday element of peoples' lives, high ownership of both personal computers and computer game modules (such as Sony Playstation) and hugely increased ownership of mobile technologies (including cell phones which can multi-task). I believe this has influenced the perceptions of students and, therefore, the effectiveness of ICT in the educational field, in some ways enhancing and offering new opportunities but in others reducing the novelty factor and possibly starting to engender a degree of antipathy in learners.

- Bearing the issues above in mind it will be seen during the review that the term "eLearning" extends to cover a wide range of technologies and learning methods and should not be seen as a theory of learning, rather an application of tools and techniques using electronic resources to achieve learning.
- The term "Learning" turns out to be equally complex.
- Behaviourist theory does appear to be the basis for many learning products, but by no means all. Its application appears to show popularity with learners even if the processes involved are frowned on by educational researchers!

- The effectiveness of such systems is debatable due to the difficulty in demonstrating that any improvement is due to the system and not other factors.

4.1 Definitions of learning

If judgements are to be made about the effectiveness or otherwise of eLearning it is important to first define a few terms that will frequently occur in this review.

The Collins English dictionary has little light to shed on the definition of learning – "gain knowledge, be taught; find out" so it is important to look to other sources for further definition.

Proponents of cognitive learning theories such as Piaget and Miller define learning in the following manner:

> "*The gaining and reorganization of cognitive structures through which human beings process and store information.
>
> *A process by which changes in mental associations occur as a result of experience.
>
> *Observable changes in behaviour are an indication of what is going on in the learner's head."
>
> (Kreher 2003 18/3/2004)

This suggests a process of maturation which results in the ongoing development and refinement of learning processes. The theory is very different to the behaviourist theories of Skinner and others as it suggests that learning is not just dependant on a stimulus response model, but evolves and develops naturally as a child grows and is exposed to different experiences. As the Funderstanding site puts it:

> "the developing child builds cognitive structures--in other words, mental "maps," schemes, or networked concepts for understanding and responding to physical experiences within his or her environment."
>
> (On Purpose Associates, visited 17/3/2004)

While this is not a formal definition of learning as such, it does highlight that perhaps the term learning is a complex and not easily defined entity.

Vygotsky's social contructivist model of learning suggests, like Piaget, that the development of knowledge and processes for learning are a cognitive process, guided by more experienced members of a learning community. Again, there is no simple one line description learning, but On Purpose Associates list the main elements of Vygotsky's arguments like this:

1.	"Culture makes two sorts of contributions to a child's intellectual development. *First*, through culture children acquire much of the content of their thinking, that is, their knowledge. *Second*, the surrounding culture provides a child with the processes or means of their thinking, what Vygotskians call the tools of intellectual adaptation. In short, according to the social cognition learning model, culture teaches children both what to think and how to think.
2.	Cognitive development results from a dialectical process whereby a child learns through problem-solving experiences shared with someone else, usually a parent or teacher but sometimes a sibling or peer.
3.	Initially, the person interacting with child assumes most of the responsibility for guiding the problem solving, but gradually this responsibility transfers to the child.
4.	Language is a primary form of interaction through which adults transmit to the child the rich body of knowledge that exists in the culture.
5.	As learning progresses, the child's own language comes to serve as her

	primary tool of intellectual adaptation. Eventually, children can use internal language to direct their own behavior.
6.	Internalization refers to the process of learning--and thereby internalizing--a rich body of knowledge and tools of thought that first exist outside the child. This happens primarily through language.
7.	A difference exists between what child can do on her own and what the child can do with help. Vygotskians call this difference the zone of proximal development.
8.	Since much of what a child learns comes form the culture around her and much of the child's problem solving is mediated through an adult's help, it is wrong to focus on a child in isolation. Such focus does not reveal the processes by which children acquire new skills.
9.	Interactions with surrounding culture and social agents, such as parents and more competent peers, contribute significantly to a child's intellectual development.

(ibid)

I have explored the social constructivist model in earlier work and feel very comfortable with its principles. The view, common with Piaget, that learning processes change and evolve in different levels as a child develops is reflected in my own observation and experiences. The view that the way this occurs is also influenced by the culture or environment in which the learner develops also seems eminently reasonable. The different attitudes to learning and to approaches to early years' education, let alone the differing social and cultural influences; must surely impact on a developing learner. As this model is predicated on more experienced members of the community leading the development of less experienced ones, the differences must propagate. This is a model for learning, like Piaget's that suggests learning is a complex and not easily defined set of processes or stages partly defined by the development of the learner, and, in this case, the culture and community they find themselves in.

Wills argues for a 'working' definition of learning, in his words:

> "An organism is said to have learnt when it has increased its options for applying new or different behaviour to a specific set of circumstances which the organism believes will be to its benefit."
>
> Will, M (2003)

This feels a little restrictive and is based on one example of an animal learning to avoid fire. How does it explain a humans desire to learn for the pleasure of knowing something new? The knowledge learned may not directly benefit it, other than in terms of pleasure; and, indeed may not even result in new or different behaviours. One thing Wills does say is that defining learning is not straight forward (ibid) and this is certainly backed up by Di Paolo of the Open University who writes:

> "It's not easy to describe exactly what learning is. One way of thinking about learning is to consider what we do to learn (the process) and what results from that (the outcome)"
>
> Di Paolo (29/01/2003)

Perhaps a little more dramatically Twigg argues that the definition of learning is actually changing with time and with the emergence of new technologies and greater appreciation of psychology. She argues cogently for a consideration of this change without actually creating a new definition, in fact the only basic definition she actually gives is:

> "mastery of a body of knowledge as the way to prepare for life."
>
> Twigg, C (1994)

Another promoter for a new definition of learning is the North Central Regional Educational Laboratory who do specify a more detailed definition and one which is predicated on the need to develop curriculum and approaches to aid the learner. They are basing their definition on new standards in education, in a similar way to Twigg.

> "By focusing on core concepts and treating them in depth, students acquire a firm conceptual base for organizing the content they learn into coherent knowledge structures. By emphasizing the connection to their own experiences and attitudes, the guidelines, when implemented, would validate students' experiences and enable them to become competent 'knowledge workers' in the various disciplines. By uniting process and content, students learn the strategies they need to acquire, produce, use, and communicate knowledge. And, finally, by looking at the subject areas from multiple personal, cultural, and historical perspectives, students develop empathy for the experiences, feelings, and world views of others."
>
> NCREL (29/01/2004)

Although there is little new within this extended definition, it does seem to illustrate the complex nature of learning and the different aspects of the learner that it impinges on.

Finally, in my understanding, learning, as an outcome is dependent on a combined process of physical and cognitive development. The brain develops with age but that development is influenced by the person's exposure to their environment (synapse development). We will not concern ourselves with the biological processes of neural development, but instead focus on the concept of learning as debated in the fields of Educational Psychology and Learning Theory.

4.2 Evaluation of models of learning

I will explore two classifications or models of learning which are said to have had particular impact on the design of educational software (Squires & McDougall 1994:88). These are the 'behaviourist' and the 'cognitive' models.

Behaviourists tend to describe learning as a process in which the learner is passive (Pachler & Leask (1999:7)) where repeated exposure to the same information is beneficial to learning (Warschauer 1996).

I believe an example of behaviourist learning may be the rote practice of times tables. The argument seems to be that by repeating the same drill over and over again it will be learnt. While I can't deny that many students do seem to be able to recall facts learnt in this way, I do question the theory as the only model of learning. It is not clear if *understanding* has been developed. It is possible that the learner has merely memorized a sequence of words and related no mathematical conceptualisation to them whatsoever.

My experience of drill and practice is that it is possible to form a superficial memory of the drill without being able to demonstrate mastery of the concept. That is to say a child could learn "One two is two, two twos are four…." But still be unable to multiply (obviously, this assumes that an underlying aim of times tables is to help children learn to multiply – this may be an idealistic view). I have also argued previously (Norman 2002:) that in some cases it is possible that where a student does not achieve mastery the result can be de-motivation and withdrawal from learning.

Cohen et al (2001:19) rehearse some of the arguments against behaviourism as a social science with a discussion of its weakness. They argue that, like positivism, behaviourism's regard of human behaviour as passive ignores "intention, individualism and freedom". I feel that this is equally true of the behaviourist approach to learning. Trying to define the learner as a passive element which learning is "done to" seems to suggest that the human is an automaton, devoid of free-will that learns through programming.

The stimulus-response mechanism that behaviourists favour (Squires and McDougall (1994:88)) suggests that the learner responds to some material, the response results in feedback – positive or negative and the learner is either encouraged to 'internalise' the learning from the correct response or 'think again' from the incorrect (ibid). This model – promoted by Skinner (Skinner

1938 in ibid) has been damaged by criticism from Chomsky (1959) that says it is too difficult to infer the causes from behaviour, or to determine which stimulus brings about a response (Cohen et al (2001:19)). I read this to mean that, unless the learner is in an environment that shields them from all other stimuli apart from the learning material, it is impossible to categorically state that it was ***that*** material which resulted in the response. In most learning situations the environment is very 'information' and 'socially' rich, offering alternative stimuli. In addition, the statement that correct responses engender an internalisation of the learning does not hold true to me. From my experience delivering online courses and other electronic learning programmes the students often don't internalise at all. The correct response is noted and the student moves on through the material. If the same student who gained the correct response is questioned outside of the context at a later date – they often can not answer the same questions correctly. This would suggest that, from my own experience, learning is more superficial and is only internalised to a degree which allows the immediate objectives to be met.

In terms of how this model of learning manifests itself in computer based learning, Squires and McDougall (1994:88) state that "Computer-based drills are the classic manifestation of the behaviourist approach to educational software design", where:

> "Behaviourist learning materials provide fixed instructional sequences, with each step in the sequence based on the acquisition of a limited piece of knowledge and understanding."
>
> (ibid)

I believe that this is absolutely true, and also that such approaches could and did work when computers were a rarity, a novelty and general classroom pedagogy was a similar pedantic, behaviourist approach. However, I also believe, from my own observations and reflection on my 11 years of teaching experience; that the advent of the internet, greater learner exposure to media rich experiences (such as computer game units - Dreamcast, Playstation, etc) and satellite television, meant the original novelty soon wore off and learners started to say – 'this is

dull, boring and repetitive'. With classroom practice also developing as greater use was made of cognitive approaches to learning and we started to understand more about learning preferences, etc; the drill type approach has become less appealing to learners – who wants rote times tables when you can be pounding through a virtual jungle shooting number animals and still learning about multiplication? This is a view supported by the research of Wishart (1989)(ibid) that suggests increased learner control is most significant on enhancing learning (ibid:90). I would venture that the behaviourist model – due to its 'passive' view of the learner, is the antithesis of that view.

The alternative 'cognitive/ interactionist / humanist / progressive' model sees a wider range of theories including 'Experiential Learning' (Kolb), 'Situated Learning' (Lave), 'Constructivism' and 'social constructivism' (Vygotsky, Papert, Piaget). All of these models see the learner as active (Pachler & Leask 1999:9) with learning taking place through more revelatory or discovery based paradigms.

The table below helps to illustrate some of the differences between the Behaviourist (here called instructional) model and the more cognitive – particularly the constructivist.

View	**Instructional** (Skinner, Tolman)	**Revelatory** (Bruner, Ausubel)	**Conjectural** (Kolb, Vygotsky)
Key concepts:	Knowledge transfer	Intuition, revelation	Experiential, social learning
Curriculum orientation:	Content	Student	Interdependence
Curriculum delivery:	Quality instruction Linear programmes Atomistic: parts prior to whole.	Staged opportunities for discovery learning. Strategies include using questions to increase the degree of learning	Scaffolding, modeling, collaborating. Cross-discipline. Holistic. Whatever learning experience works. Specified outcomes
Knowledge:	Storehouse of facts	Terrains to explore	Bicycle to ride

Learner image:	Consumer/ competitor	Explorer, team worker	Producer, collaborator
Learning process:	Throughput	Discovery	Output, input
Evaluation of learning:	Internal	Shared	Self- and external evaluation
Role of computer:	Structured, hierarchichal presentation, feedback	Simulation, information handling, things to explore	Manipulable space for collaborative creation of knowledge
Assumptions:	Behaviouristic learning theory	Theory of learning by discovery	Problem-oriented theory, cognitive theory
Idealisation / caricature:	Patient tutor/page turner	Rich learning environment/ 'black box'	Milieu, venue/ expensive toy

(Adapted from Barr and Tagg (1995) in: Mitchell, A (2000))

The theoretical basis for the two approaches is evident in the assumptions section of the table showing the clear link between the instructional model and behaviourist learning theory. There is a clear difference in definition with the instructional model being shown to focus simply on the transfer of knowledge which to me suggests a ‘do this and you will know this.’ approach; while the conjectural model is based on an experience and social interaction.

In terms of learner image, the instructional model in the table sees the learner as a consumer / competitor. The transfer of knowledge seems to be seen as a service to the student – they are being provided with information / knowledge that the teacher believes they need to know. This reminds me of my own experience as a school child – ‘copy this off the board!’ Students are motivated to gain the knowledge to stand them in good stead against others – ‘I know this so I am better than you’. This contrasts significantly with both other models where the image is based on collaboration or team work – a community of learners working together.

Perhaps the most interesting comparison is in the curriculum implications element. The instructional model see the curriculum approach as atomistic, delivering smaller discrete blocks of information to be learned, specific to the

subject; while the conjectural model sees it as an opportunity to collaborate, and to achieve learning objectives through a range of approaches which could, in reality, be common to many different subjects. This is again a significant difference in approach with almost diametrically opposed views, although, ironically, the argument that the conjectural model should use whatever works best does not exclude an instructional approach!

Selinger comments on the transitional or knowledge transfer (instructional) model when she says:

> "The flaws with this model are that there is an implicit assumption that knowledge is discrete…."
>
> (Selinger, M 2001:88)

It is a particular skill of human tutors and learners that they can adapt the learning approach to the needs of the individual learner. Sometimes this may mean adapting an approach or even simplifying a concept in a way that a computer can't. If you assume that knowledge is a discrete 'package' that can only be delivered in one or two ways you are implicitly accepting that, should those methods fail, there is no alternative approach. Cognitive and collaborative approaches have the benefit of more knowledgeable tutors being able to use their knowledge and understanding to help the learner develop theirs – supporting Vygostky's theory of the Zone of proximal development. Adaptability and intersubjectivity are important in making learning accessible (ibid)

The role of the computer in the learning for these models is also interesting. The table's authors suggest that the conjectural approach is facilitated by the computer to become a "space for collaborative creation of knowledge" (Barr and Tagg (1995)). This for me sums up the social constructivist theory of learning expounded by Vygotsky (1978). He sees the process of learning as a social process. A community of learning is formed in which learners collaborate within the learning process. The exposure to new experiences or knowledge already held within the community – a form of learning scaffolding facilitated

by a more knowledgeable 'other'; helps the learner develop. (Selinger, M. 2001:86) This in turn has led Vygotsky to his definition of a '***Zone of proximal development'*** defined as:

> "the distance between the actual development as determined by independent problem solving and level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers."
>
> (Vygotsky 1978:86)

Note the emphasis on collaboration. The table suggests that, conversely, the instructional approach sees the learners as 'consumer / competitor'. I feel this is a bit over simplified in its definition as, from my experience, students can be both competitor and collaborator at the same time. They may be competing with people from another group whilst collaborating in their own or even competing / collaborating within their own group. However, it is also my experience that where such group dynamics are at play, learning does not necessarily take place as effectively as when the collaboration is foremost.

In a similar argument to Vygotsky's, the development of understanding is a cognitive process that Piaget describes as being one of maturation where a balance between what is known and what is being experienced is developed (Williams and Burden 1997), in my interpretation the learner ***constructs*** their understanding from what they have already internalised and what they are currently experiencing. This seems to suggest that learning is more a process of exposure and subconscious cognitive development than a conscious action undertaken by the learner. Many of the arguments for this are predicated on examples of early stages of learning where the learning must take place independently of deliberate strategies – i.e. learning takes place purely through exposure to family members and the learner's environment, rather than through a formal learning environment (school). Squires and MacDougall describe it as a:

> "..personal and idiosyncratic experiential process"

Squires & MacDougall (1994:88)

Of course, most parents will have been told that the greater the interaction with their child the better their educational chances, speed of development, etc. Health visitors will actively promote learning strategies in the form of play, reading, rhymes etc as a means to accelerate or even maximise a child's development.

Lave (1997) takes the argument a little further with his description of 'situated learning' - knowledge is situated, being in part a product of the activity, context, and culture in which it is developed and used (REF). In this case it is not just the actual experience that is important but the cultural and social background. As Mayes says, Lave and Wenger (1998) argue for a concept of a 'community of practice' where the social relationship of the learner to others in their community is an equally important influence on learning. The membership of these groups can have a very strong impact on the learner's motivation (Mayes 1999:18). This can work two ways, of course, and if the underlying view of the group is that learning is bad – it can have a very negative effect. I would argue very strongly that the evidence for this can be seen in almost any British community where, for some, all of their family and friends have negative attitudes to school and learning - the "I dropped out and it never did me any harm" factor. The attitude is often passed on to the learner. Conversely, in some cultures – learning is seen as one of the most desirable aims in life, both socially and spiritually and the resultant 'community of practice' is overwhelmingly positive about learning.

The argument also describes how it is easier for students to learn within socially and culturally relevant contexts. Seely-Brown discusses Lave's view that:

> "Less abstract, situation-specific knowledge, on the other hand, appears to be much more easily acquired"

This would suggest that a learner will benefit more readily from immediately relevant experiences. We often express surprise that our children are so media

savvy and competent with technology but they are immersed in it from an early age – it *is* their culture and context.

4.3 Definition of eLearning

Having taken a brief look at the main learning models, I shall now analyse how they relate to the concept of eLearning. Again, it will be useful to define the term eLearning. One website offers a summary of interpretations from other sources, although neglects to identify the sources themselves:

- "The convergence of the Internet and learning, or Internet-enabled learning."
- "The use of network technologies to create, foster, deliver, and facilitate learning, anytime and anywhere."
- "The delivery of individualized, comprehensive, dynamic learning content in real time, aiding the development of communities of knowledge, linking learners and practitioners with experts."
- "A phenomenon that delivers accountability, accessibility, and opportunity allowing people and organizations to keep up with the rapid changes that define the Internet world."
- "A force that gives people and organizations the competitive edge to allow them to keep ahead of the rapidly changing global economy."

(http://www.linezine.com/elearning.htm on 1/2/2004)

The first two points are good basic descriptions of the Each of these definitions have elements that ring true, although, obviously the business focused definition is less relevant within a school context.

My own definition is that it describes any form of learning that is primarily facilitated by the use of, or exposure to electronic media. In its own right I would not describe eLearning as either behaviourist or cognitive in nature. It is a *method of* learning rather than a *model for* learning. The materials that are

used, however, could be classified under the descriptions given above and we will explore this a little further in this section.

Different types of learning system have been developed and there are now a plethora of three letter acronyms to describe them, four examples are given with interpretations.

VLE	Virtual Learning Environment	"the components in which learners and tutors participate in "on-line" interactions of various kinds, including on-line learning. (JISC 2000b)" Becta 2003:6
MLE	Managed Learning Environment	"include the whole range of information systems and processes of the College (including its VLE if it has one) that contribute directly or indirectly to learning and learning management. (JISC 2000b)" Becta 2003:7
VTLE	Virtual Teaching and Learning Environment	As a VLE but with the added benefit of tools which allow teachers to construct courses from the resources available and make those courses available to set groups of learners. e.g. Kaleidos (RM's new system) (*own definition)*
ILS	Independent / Integrated Learning System	Many ILS resources offer comprehensive objective mapping and tracking for the course units. e.g. LJ Systems Scantech Range. (*own definition)* "A system that includes extensive

		courseware plus management software usually running on a networked system" *(OTA 1988 in:Underwood and Brown 1997:3)*

A useful sub-section of the JISC definition of a VLE is the sub definition of what they believe constitutes learning activity / content for a VLE. The authors of that particular document see the components of a VLE as including:

"· notice-board/bulletin board
· course outline (course structure, assignments, assessment dates)
· email facility
· conferencing tools (asynchronous conferencing or discussion groups)
· student home pages
· metadata (ability to add metadata to resources)
· assignments (ability for tutor to create assignments)
· assessments
· synchronous collaboration tools (such as whiteboards, chat and video conferencing)
· multimedia resources (accessing, storing and creation)
· file upload area (ability for students to upload their resources to a shared area)
· calendar."

Becta (2003:6)

Having been involved in the use of VLEs since they became more common place in schools, I would not have included several of the elements that are within this definition. However, it is possible that more significant investment in such systems through the FE and HE sectors has led them to this conclusion while we in schools have been satisfied with the more straight forward learning and assessment resources at lower cost.

I agree with the potential of those tools in terms of collaborative learning and would like to see such approaches develop in schools as they obviously have in the higher sector

4.4 Ongoing development of eLearning

The earliest attempts at what could arguably be called ‘eLearning’ were with the mechanical teaching machines developed in pre-war years. These were designed very much around a behaviourist model of learning emphasising the importance of practice and feedback (Inglis et al (2002:10)). The 1950’s and 60’s saw the introduction of more advanced approaches as:

> “Psychologists and educationalists who favoured the associationist model saw possibilities that computers might succeed where the teaching machine of the 1950’s had failed.”
>
> (Papert)

These utilised the incredibly expensive computer technologies – limiting the availability to Universities and the Military. One of the earliest and best known projects was PLATO from the University of Illinois. The system used technology innovatively and they employed their own programmers to develop the software (Inglis et al (2002:10)). Eventually the system was turned into a commercial product for the PC and still exists in this form and through a newer web-based version.

Inglis et al describe PLATO as being:

> “a particularly ambitious attempt to substitute teachers with computers”
>
> (ibid)

and this ‘appears’ to be a perennial driving motivation behind the development of such systems. This view is reflected throughout the literature, through Government papers on the future of education and also through my own

discussions with colleagues. Many teachers seem to feel threatened by the development of such systems, as Light and Light observe:

> "Critics bewailed the impending "dehumanisation" of teaching / learning process"
>
> (Light and Light :145)

My conversations have drawn me to the conclusion that, in fact, the impending de-humanisation is less important to teachers than a perceived risk to career – however far off or unlikely that risk is. This may not be acceptable in a philosophical sense as, surely, society would perceive the education of the next generation to be far more important; but to an individual teacher with a family to feed the possibility exists and is uncomfortable.

I believe that the perceptions that the human element of education will disappear completely in the way that Douglas Adams parodied in Hitchhikers Guide to the Galaxy, have been gradually eroded as educationalists and government recognise the importance of the teacher even within an eLearning environment. As Selinger (2001) discusses, that is not to deny the potential impact on the workforce as such systems could, at least, leave a proportion of the teaching population redundant, but the fear has perhaps been eroded to resignation. Thus, Papert's comment:

> "The suggestion that there might come a day when schools no longer exist elicits a strong response from many people."
>
> Papert (1994:177)

Is perhaps less true today than 10 years ago. In fact, my experience shows that, contrary to Säljö's statement that the:

> "authority of the teacher as the most knowledgeable conversation partner will be challenged"
>
> Säljö (1999:144)

Teachers are now seeing that the reality is different. From my fairly extensive experience of working within and facilitating a range of such environments, I would suggest that a knowledgeable and skilled teacher or instructor is always seen as a higher authority than the computer resources and students will usually seek confirmation or validation from their teacher even when engaged on eLearning activities (although this could quickly change if use of unskilled "facilitators" was to be introduced).

These views are supported by the observations of Angela McFarlane who comments on the "behaviourist" nature of most ILS type systems and the fact that they are designed around a view of learner as solitary and isolated. No interpersonal or social interaction being allowed to dilute the 'learning' despite the transformations of understanding that can occur from such interaction (McFarlane 2000:17). She refers to a comment made by Bracey (1992) that:

> "until developers understand cognitive processes better, and design software which better supports the way people learn, ILS systems will be of limited value"
>
> (Bracey 1992)

Although this presupposes that the developers are able to accept this interpretation of learning theory and aren't themselves grounded in behaviourist ideology, I agree. I would suggest, though, that the main reason that such systems have been slow in coming is because they will result in outcomes which are far harder to measure on a simple day to day basis and this is what education currently demands. It is a lot harder to sell a product which you can not clearly claim can show you the progress being made in a graphical or numerical way. Despite my own misgivings on the behaviourist approach, if I am to spend £10K per year on a product, I need to be assured that there will be an impact on learning outcomes. This view is echoed by Ellis (2001:134). It does also beg the question asked by Underwood and Brown:

> "One of the systems (Successmaker) which comes out well in the formal evaluations offered in this book has a distinct behaviourist feel to it. The

> system focuses on details of a learner's procedural activity, seeking to identify and repair any errors, providing frequent feedback and forcing the learner along specific solution paths based on predetermined algorithms. *Many educational researchers and theorists will abhor it! But pupils appear not to; nor do many of their teachers who have many good things to say about the ILS. To whom should we listen?"*
>
> *My emphasis* (Underwood and Brown 2000)

I believe that I have indicated one reason for teachers to tolerate it, another is the lack of preparation or marking that the system creates. In a busy profession, that will always win teachers over. As for the students, I believe there are two possible reasons for their acceptance.

1. Such systems are relatively new in schools and have a 'novelty' appeal which engages the students, at least superficially. (I am already seeing this wear off in my school)
2. Laziness – using an ILS or similar system demands little physical or real cognitive effort of the student.

The current changes in the way schools and the teaching profession are perceived by the Government, with the Future Schools work being undertaken and work force reforms being enacted all seem to be partly predicated on increased use of eLearning. Certainly, within my own school we have sought and continue to seek eLearning solutions that will enable us to meet the individual needs of our students and approach teaching and learning in far more flexible ways than we currently do. We are looking for ICT to be a complimentary approach as Littleton and Light say:

> "What if anything, can computers offer as adjuncts to (or substitutes for) classroom education?"
>
> Littleton and Light (1999:1)

David Blunkett, whilst Secretary of State for Education, outlined the desire to utilise the potential of digital technologies in the Curriculum Online consultation paper and his suggestion that the Government knew:

> "..that ICT cannot be an ad hoc addition to what schools do. It must be a carefully thought through contribution adding real value to more traditional teaching methods and reinforcing our investment in the basics of education."
>
> DfEE (2001:1)

The cynical might claim that this is merely a cover for providing more money for computer based tutoring systems before cutting back the number of teachers, thus achieving the earlier discussed aim of replacement. However, I prefer to be more supportive of the view that the government have responded to the growing base of research which shows that such learning systems are not as successful in isolation of an instructor or teacher, and is a genuine attempt to satisfy the need to maintain the traditional whilst enriching it with the modern. I am also hopeful that the provision of Government money, coupled with the ongoing research into learning using such systems, will generate a commercial viability for more stimulating and less behaviourist systems.

4.5 Effectiveness of eLearning.

Having explored a little about how eLearning is defined and how it has developed, what does the literature have to say about its effectiveness in terms of learning outcomes?

The authors of the article "Effectiveness of eLearning" at: http://cai.au.edu/concept/effective.html claim that the range of approaches employed and variously categorised under the eLearning mantle is:

> "..so large that no study could adequately prove eLearning's effectiveness."
>
> Ibid:13/01/2004

I would fully concur with this outlook. The research available includes comment on distance and distributed learning, much of which has televisual content as opposed to just computer based (ibid). This makes it harder to judge how well it helps achieve learning objectives if not all models are using the same methods of 'delivery'. For my purposes I am mostly interested in the effectiveness (in terms of achieving learning objectives) of VLE / ILS type systems where the learning resources and assessment are conducted within the same system. However, although I feel that narrowing my reading to that particular frame of reference would enable a more rigorous and justifiable set of conclusions to be drawn; the reality is that there is insufficient detail in the research for me to determine exactly what approaches are being evaluated, as Angela McFarlane says in her examination of the effectiveness of ILS:

> "The published literature relating to the use of ILS is vast and spans three decades. It is also of variable quality and relevance to present day implementations of current commercial product due to the rapid development of the technology and content"
>
> (McFarlane 1997:15)

I will, therefore try to focus on articles which specify VLE / ILS or online approaches.

The same article (ibid) does comment on how the findings of learning programs that use web technologies have had generally positive findings in terms of effectiveness with students demonstrating parity with traditionally taught peers. This falls someway short of the implied belief that ICT is a panacea for learning with amazing outcomes.

The eLearners.com site quotes extensively from a report by the Sloan Consortium called "Sizing the opportunity". This is a site which offers online / eLearning courses and I expect it to look for positive spin. The report, apparently, claims that:

> "a majority of academic leaders (57%) already believe that the learning outcomes for online education are equal to or superior to those of face to face instruction"
>
> eLearners.com 13/01/2004

The relatively small 'majority' renders the claim fairly redundant to me. We are unaware of the sample of the survey – if it was an extrapolated sample and, if so, whether the sample was biased toward users of eLearning. I would also like to know what the real view of the substantial minority was.

Business and industry have been seen to adopt eLearning approaches for their employees at a fairly impressive rate in the last few years. The optimist could claim this as evidence of wholesale belief in the efficacy of the approach, but unfortunately the literature shows another side. Judith Mottl discusses the distance learning culture being developed in the world of Industry and clearly explains the motivations:

> "it's the only way to bring new and current employees up to speed on new technologies without spending a lot of time and money in the process".
>
> (Mottl 3/1/2000)

The world of business is, of course, dominated by the need to improve profitability. There is a danger that the drive to eLearning based systems to save costs could be seen as short-sighted in terms of quality of learning. After all, the decision seems to be on the basis of money – not effectiveness. The difference, though, as Lockheed Martin group are showing (ibid), is that business also has the money to invest in researching the best solution. In other words, ensuring the best level of effectiveness but maintaining the main benefit of cost effectiveness and therefore maximising profitability. Some companies, though, recognise that there is an inherent value in hands on training and are developing other solutions. Video conferencing proved too much of a distraction to both students and instructors (ibid) and the result is a development of a virtual classroom. One side benefit is that money invested by commercial organisations

can often be recouped by making products commercially available, thus giving school and colleges opportunities to develop their own use. In terms of effectiveness, business obviously believes that the potential is there, but as yet there is no agreed standard for measuring that effectiveness or the real cost of such approaches (ibid)

Within the school context there are a range of interpretations of the effectiveness of eLearning, but the situation is complex (McFarlane 1997:15). However, from the range of studies on ILS type systems available it appears that the:

> "majority of studies carried out to date show a mildly positive effect on learning outcomes, generally more evident for more able students."
>
> (ibid)

McFarlane highlights the complexity of comparing products which may be designed and used in different ways and how comparison of data can be 'misleading'. However, she confidently claims an exception, where:

> "there is good evidence from sources in a variety of circumstances that the most benefit is obtained from ILS when the system is manipulated by teachers who are fully trained in its management and use"
>
> (ibid)

This observation certainly backs up my previous work where I have suggested that a core part of developing use of ICT in learning is the importance of fully evaluating and testing the resource and the need for the teacher to be an expert user (Norman 2002:24).

The use of eLearning systems, such as ILS, even have varied reports on their effectiveness within the same articles and this suggests that the method of implementation and the support offered to learners alongside the electronic media have as much of a role to play as the learning systems themselves. For example, Becker (1992b) states that:

> "the level of instruction must be appropriate for the learner, who must have the incentive to learn, academic learning time must be sufficient and the instructional quality should be adequate. Moreover the relationship between these factors is multiplicative; the outcome can only be as good as the weakest component"
>
> (Becker 1992b)

From experience I would agree with this view. Poorly designed software or a poorly prepared teacher can almost negate any positive potential for learning of a system and an unmotivated and unfocused pupil can do likewise.

More telling are Becker's observations that although high and low ability pupils can show positive gains in learning, this is not evident in the 'average' pupil. This is explained as being due to the fact that the material being 'delivered' will be appropriate to the learner's level (ibid). I assume that this interpretation is suggesting that the student will be adequately prepared to cope with the level and nature of the task without significant further learning taking place – whereas the more difficult nature of the work will extend the less able learner more noticeably and the most able will be able to / willing to extend themselves anyway. I would say, from experience, there may be some truth in this interpretation and, certainly, systems where there is a degree of ongoing adaptation to learner ability seem to offer a better solution.

One very important question as to the effectiveness of such systems is how much of the 'moderate' gains are down to the ILS / VLE itself and how much of a role is played by the teacher. (Selinger 2001:158).I have already touched on the importance of an expert user, so perhaps, even in the behaviourist world of such systems the social constructivist model is helping to promote greater learning. Passey (1998), despite claiming some noticeable gains for a new ILS for Primary Maths suggested that children would need 'support, encouragement and opportunities to learn through social interaction' (Selinger 2001:170).This is an area for greater research.

As previously discussed, there is a great deal of uncertainty about how effective elearning is. In business, effectiveness may be measured more in terms of cost than learning outcomes. In schools, effectiveness may be measured on very limited scales – such as test score improvements; and where such systems have shown positive gains the results are not always clear. How much influence has group size, teacher / pupil ratios, novelty factors, etc had on the quality of learning, or at least on the measurable outcomes? Do any positive gains last as long as through traditional methods? Is learning internalized or superficial? The literature I have read is overwhelmingly cautious on the issue, but with a generally positive trend. I think that Inglis et al make a powerful statement within their analysis of effectiveness:

> "The knowledge media hold the promise of delivering education and training more effectively by providing students with a much richer environment in which to learn. Whether that promise is realised depends on how the media are used."
>
> Inglis et al (2002:51)

Having looked at the definitions of learning and eLearning as well as some reflection on the ongoing development of eLearning systems, what can we say about the relationships between the two issues?

Learning is a process of developing knowledge and understanding that can be viewed from a behaviourist or cognitive viewpoint. I have already discussed this in some depth. ELearning is a *method* of facilitating learning and as such is neither innately behaviourist or cognitive in nature. However, the way that software or systems designers view the world may well play a role in determining the approach that underpins their products. Further, I believe that there may be an innate predisposition toward a behaviourist route in such systems as they can be viewed, in my opinion, in a more mathematical / algorithmic way. Such approaches would be far harder to model and track if designed following a more flexible cognitive system. Harder means longer development time and this means greater cost to the developer. While current

behaviourist systems continue to be popular, despite the cost, the developers have no real incentive to look for alternative approaches.

In addition, how the teacher actually employs the resources in the classroom may also have an impact. We have discussed how important the role of the teacher is in facilitating such systems.

I have argued previously that Multimedia based approaches to learning, either through CD Rom or the internet; are most likely to show positive impact when they are used in a cognitive or constructivist way. Students should be given complete and unrestricted access to the whole non-linear experience in order to have full flexibility in constructing their understanding (Norman 2001). By the same token, a teacher who restricts the students to just a small sample or section of the non-linear resource is actually also restricting the potential for development and is employing the resource in a more 'instructional' or behaviourist fashion. There is insufficient research into this area to justify statements about 'effectiveness' for learning and of course it all depends on what you want to achieve and in how much time.

The VLE and ILS type systems that I have been focussing my reading on seem to be designed on a behaviourist model of learning, using drill and practice approaches or content / test routines to establish learning. I have already explored how this began with teaching machines and has continued to develop. I have outlined what I believe to be some of the justifications for such approaches. It is also true that, despite researchers' questions over the validity of such approaches, both teachers and students seem to like it.

4.6 Key Concepts and conceptual model

At the start of this work I suggested that I felt that many products currently being used for eLearning approaches (and I have refined that to focus on VLE / ILS) were predicated on behaviourist philosophy and that has been demonstrated. I also suggested that constructivist learning may still have a role to play within the learning of students engaged on a VLE /ILS type programme. Having completed this review I have

developed a conceptual model for what I perceive to be the most effective use of these systems in terms of maintaining performance of students in the classroom context.

I believe that the behaviourist approach in these systems is, on its own, insufficient to maximise the learning benefits to the students. Particularly as the learners are exposed to more and more technology and the novelty of the elearning programs starts to wear off. I have experienced this myself within the group of learners discussed later in the Case Study. By making best use of the learning programs but encouraging a collaborative approach with both peer and teacher support and by ensuring that students are given opportunities for more creative learning approaches within the program, I feel that the learning benefits are maximised. A disciplined read and response system *enhanced* with cognitive and social constructivist practice.

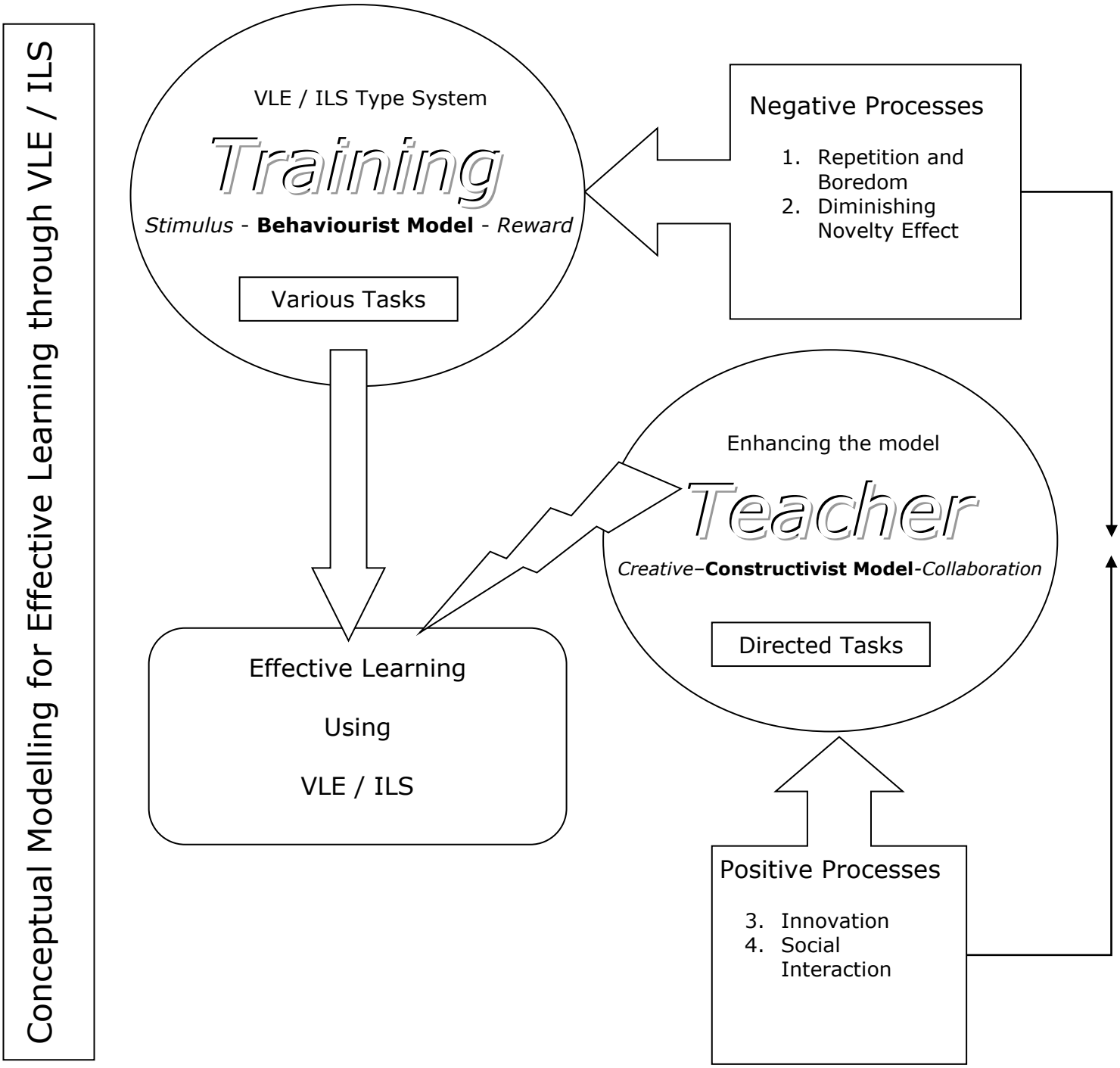
Some of the key issues raised by the research that the model needs to consider are:

- Behaviourist systems should not negate collaborative work
- Some elements good – score tracking / accountability etc
- Collaboration can increase the effectiveness of learning
- Novelty factor wearing off / Playstation effect – learning from purely system based approach is not well internalised.
- Students can find repetition boring and de-motivating.
- Role of teacher is crucial – intervention can be key to success
- Students are social animals and benefit from social interaction – isolated approach may suit some, but better effects with some constructivism?

So there are useful elements to the systems which allow the learner to access the knowledge to be learned – a virtual member of the community of learning. The potential blocks to moving beyond the zone of proximal development are repetition, boredom and lack of interactivity with others. In addition, as I have already expressed, I believe that the increasing exposure to electronic and computer based gadgetry is decreasing the “Novelty effect” that was a positive benefit for learners a few years ago – in that the attraction of doing something different acted as a learning motivator.

These blocks can be overcome with the inclusion of more constructivist elements. Interaction and collaboration with peers, teacher directed innovative and creative tasks to contrast with the ILS / VLE approach. The positives balance or outweigh the negatives and effective learning takes place.

The model can be represented graphically like this



4.7 Gaps in existing research

Although the research in to ILS types systems is, for a relatively new subject; quite extensive, the age of the research related to the fast moving nature of the issue is of concern. Although there is not a "gap" in the research generally, the changed nature of education and the higher levels of exposure to learning media and general technology mean that the environment which most research (prior to the last few years) was done in is no longer the same. As a result, the research should be repeated or revisited to refine conclusions in the light of developments.

From my reading I feel that there are gaps in the study of some key issues.

- It is far from clear if increasing exposure to interactive technologies impacts on the motivation of learners using electronic learning systems. We need to try and determine if there is a reduction in "Novelty factor" and a corresponding reduction in motivation, engagement, etc; or if the situation is no different today than when ILS research began.

- There is much research into the use of ILS, but little that I could find specifically focused on when systems become an ineffective tool. It should be possible to determine when it is disadvantageous to certain learners to be exposed to that type of system.

- There is, as far as I can ascertain, no current research which attempts to show if there is a "measurable" difference in learning outcomes for ILS users who use the system completely independently or collaboratively. This is a challenging task and would need to be carried out over an extended period of time to give any feel of robustness to the study. Obviously, the whole issue will continue to develop around the research with new technologies and greater exposure continuing to be an issue.

4.8 Discussion of research questions

4.9 Conclusions

- The whole area of discussion is very complex. Research is of varying quality and it is very difficult to compare systems.
- Systems develop very quickly and research that was current a few years ago may no longer be valid as systems have evolved to make best use of new technologies – such as the internet.
- ILS type systems appear to show positive results, at least for the more and less able, but it is not clear how much influence instructors / facilitators have had.

- Many ILS/VLE type systems appear to be based on behaviourist approaches and teachers and students seem to like them – at least initially.
- The instructor / teacher has a key role to play in effective implementation of any system of eLearning.
- Teacher as ‘expert user’ with full knowledge and mastery over the system being used is important for successful implementation.
- Even within a ‘behaviourist’ system there is a role for collaborative learning which supports the social constructivist model, and this can be promoted by the instructor / teacher.

5 Methodology & Methods

This section will explore the reasons and justifications for my chosen approach to this research, from the epistemological principles underlying it to the practical considerations for choosing particular approaches.

5.1 Methodological Paradigm

Before exploring the Methodological paradigm, I feel it is important to address the underlying ontological and epistemological basis for this work. All of the work will be predicated on some fundamental assumptions.

Firstly, that a Nominalist ontology holds true, where, as Cohen et al say:

> "..objects of thought are merely words and that there is no independently accessible thing constituting the meaning of a word."
>
> (Cohen et al 2000:6)

Although I accept that each individual may hold an identical or similar interpretation of a meaning for a word, perhaps generated by their own exposure to the interpretations of parents and others within their communities of learning, as well as their own perception and viewpoint; I firmly believe that each individual will develop or construct their own interpretations. I am not able to subscribe to the realist view that all objects have an independent existence outside of the knower – one man's footstool is another's chair. This is not the place for philosophical debate, but it is important to demonstrate that my view of the world, and therefore the way that I will interpret my research is underpinned in such a way.

Perhaps unsurprisingly, given the above, the underlying epistemology for my research will be anti-positivist in nature. Both the ontology and epistemology are grounded in subjectivist view of the world and as such will determine how I approach the research and the methods to be used. In general terms I would expect to apply a humanist approach using methods which rely on personal observation, interview, etc.

The paradigm itself will be interpretive as opposed to normative.

5.1.1 Features of selected Paradigm and Justification

There are several different terms used to describe anti-positivist approaches to research – or paradigms. The terms naturalistic, qualitative, interpretive are not exactly interchangeable as there are subtle differences in the epistemological viewpoints (ibid:19). However, it is fair to say that they are all rooted in the same anti-positivist view of social reality.

In the positivist view, human behaviour is governed by universal laws and humans will conform to them in the way they behave. In the anti-positivist view humans are autonomous entities who, to a greater or lesser extent, define their own place in the world. As a consequence, researchers who prefer the anti-positivist approach also believe that behaviours and experiences can only be understood from the perspective of those experiencing the "ongoing action" (ibid) and not the cold clinical observer method favoured by positivists.

Cohen and Manion (2000:21) also explore the distinguishing features of the anti-positivist approach to research:

- People are deliberate and creative in their actions, they act intentionally and make meanings in and through their activities (Blumer, 1969);
- People actively construct their social world – they are not the 'cultural dopes' or passive dolls of positivism (Becker, 1970; Garfinkel, 1967);
- Situations are fluid and changing rather than fixed and static; events and behaviour evolve over time and are richly affected by context – they are situated activities;
- Events and individuals are unique and largely non-generalizable;
- A view that the social world should be studied in its natural state, without the intervention of, or manipulation by, the researcher (Hammersley and Atkinson, 1983);
- Fidelity to the phenomena being studied is fundamental;

- People interpret events, contexts and situations, and act on the bases of those events (echoing Thomas's (1928) famous dictum that if people define their situations as real in their consequences – if I believe there is a mouse under the table, I will act as though there is a mouse under the table, whether there is or not (Morrison, 1998));
- There are multiple interpretations of, and perspectives on, single events and situations;
- Reality is multi-layered and complex;
- Many events are not reducible to simplistic interpretation, hence 'thick descriptions' (Geertz, 1973) are essential rather than reductionism;
- We need to examine situations through the eyes of participants rather than the researcher.

(Cohen and Manion 2000:21)

The view of reality as being complex and that humans are effectively unpredictable and can control, monitor and adapt their behaviour as they deem appropriate; is a view that I have long held. It is the essential reason why I feel that the positivist view can not hold sway in classroom research – children don't conform to a set of uniform rules! Thus the importance of utilising the views of the learner as the final bullet suggests and of recognising that one situation can engender multiple interpretations dependent on the views and opinions of the observers.

By its nature, the interpretive paradigm is predicated on the above beliefs and features and aims to understand human experience from the viewpoint of those doing the experiencing (ibid:22). It is focused on the actions of those involved in the research, and, according to Cohen and Manion, is future oriented as the behaviour is considered intentional. While I can see the argument, I am still to be convinced that all behaviour is intentional, the statement in itself is, to me, a rejection of the principles of the anti-positivist viewpoint. Although humans are able to monitor and control, there are many biochemical and psychologically induced occasions when, in fact, they don't or can't – at least on a conscious

level. This is not to suggest the anti-positivist view is incorrect, just the statement that all behaviour is intentional.

The interpretive paradigm infers that in order to make sense of the focus of research we must look at it from the perceptions and interpretations of those experiencing the situation. From this will arise the theories and explanations which will help make sense of the situation and the human behaviours driven by it. In addition, because of the wealth of possible behaviours, perceptions and interpretations that may arise from the research there will be a correspondingly potentially large number of theories. (ibid: 23).

Part of the aim of this research is to try and examine the effectiveness of eLearning and, in particular, a specific application used in a school. It is quite reasonable to test the 'effectiveness' of such a system by examining the differences in pre and post test data, such an approach was used by Tolmie (2001). The problem with such a positivist approach is that it rejects the 'realities of interpretive thinking' (Norman (2001:11)). This assumes that the test is completely controlled and that the measurable outcomes are consistent and would remain so with different groups and students. I don't believe that this is possible. The implications on learning of different students, teachers and learning structures (timetable, etc) could all impact on the outcomes, making the test lack rigour, in my opinion.

Another issue that I have with such an approach is in the use of pre and post test data. As a measure of short term learning, I can accept that there is some validity; in fact it would be hard to measure in any other way. I am interested, however, in how well such learning is internalised – if the students are learning at a surface level to pass the tests or if they are experiencing 'deep' learning. It would be more effective to examine the same test again after a set period of time. I have applied such an approach within action research and it has proven very telling.

I have previously argued that Human Nature itself makes the positivist approach redundant in such research as it will, effectively, be impossible to completely

control the experiment and ensure precisely equal experiences for each learner (always assuming that their actual lives were also not allowed to intrude!) In a small scale study, such as the one I will be conducting, the possible impact on results of even a small anomaly in a small dataset could be very misleading.

Having discussed why I feel that the positivist approach may not be appropriate it is important to justify my choice of an interpretive alternative.

I aim to study the experiences of a small group of students. They were the first group to experience this particular course and the only group to have almost completed the whole experience. If previous students had been involved, there would be a comparative dataset available for me to draw comparisons from. This will not be possible, so even if empirical data could be realistically and robustly gathered, it would not be possible to draw conclusions outside of the immediately relevant group. It would be fair to argue that the measurement of pre and post test results constitutes an appropriate empirical basis for analysis of 'effectiveness' and achievement – but as this is a pilot group working with a teacher who is not expert on the system, I do not believe that the results would truly indicative. The learning is affected by the whole experience of the course, including the elements outside of the online resource.

The alternative is to draw on the experiences and observations of the learners. This immediately suggests a humanist approach. The students have been deeply engaged in an extended learning experience over a two year period. They are intelligent and capable students (comparative to the rest of their year) and began the course with no prior experience of such approaches – ie: they all started from a similar position with no pre-formed opinions. Over the course they have experienced a range of resources and learning approaches, not all of which are integral to the online resource but have been instigated by the tutor – known as enhancements tasks. These tasks have been designed as independent learning focused, discovery based experiences to deliberately contrast to the perceived behaviourist nature of the online resources. The students should be able to not only give their reflective opinions and thoughts on the online resources and the approaches employed within it, but also on the enhancement tasks in

comparison. Such opinion will be entirely subjective and may be prejudiced by student bias or quality of experience – even mood at the time of interview. However, the interpretive approach must recognise this as an issue while valuing the 'data' as being from the view of those experiencing the test environment – ie: truly anti-positivist.

While previous comment would be useful to compare the experiences of different groups of learners it would be hard to ensure that the experiences were completely alike and that such comparative comment was truly set in the same context. In addition, its absence will not preclude me from forming conclusions based on the interpretive analysis of the current group's comments – they can, effectively be seen to stand alone.

5.2 Data Collection Methods

- 5.2.1 Tools
- 5.2.2 Methods of recording
- 5.2.3 Sampling and sample
- 5.2.4 Reasons for selection and design
- 5.2.5 Advantages and Disadvantages of methods and tools
- 5.2.6 Limitations and bias
- 5.2.7 Ethical considerations

5.3 Data Analysis Methods

6 Case Study

The purpose of this case study is to review the use of a single ILS type package within one specific school and to draw conclusions from the experiences of those involved. As the tutor the case study also offers a reflective mode of analysis for my own practice akin to action research. The students were not aware of this intent until the final stages of their course when I invited them to reflect on their experiences for a video interview.

6.1 The School Context

The school in this case study is a large, fully mixed secondary school in North West Essex. The school serves a large rural catchment with a high proportion of students being bussed in. Despite this, the school situation is in a fairly affluent area and although there are pockets of deprivation, standard of living and level of income would be considered, on average, to be well above the national norm.

The school is now in its 4th phase of specialist status with the focus being on Technology. Successful bids have consistently brought in higher levels of funding from Government and much of that money has been invested in developing the ICT infrastructure and approaches to teaching and learning with the use of ICT. The school was recently designated a “Leading Edge” school and is also a member of a nationally recognised education action zone. Part of this range of foci has been on developing and piloting new products and courses and a particular focus has been given to elearning and ILS/VLE type systems. The school is a Cisco Networking Academy offering high level online training to post 16 students, but the course in this study is another Industrial certification course aimed at 14-16 year olds.

Facilities in the school are exceptionally good. Current computer to student ratios are 1:4, far better than the national average. All teachers are provided with laptops and the school network runs both wireless and wired high speed communication. There are separate networks for administration and curriculum use. Access to the internet is via a 2MBps Broadband connection provided by the Eastern Broadband Consortium. All staff and students are provided with email accounts and have access to the school

resources from home via the internet. The school employs a full time Network Manager who maintains the networks with the support of a team of 4 technicians.

The school is highly successful being in the upper quartile performance bracket for schools of its type. It is heavily oversubscribed and consistently demonstrates superb performance on most measures at GCSE and above. A recent OFSTED inspection rated the school as “Very good with many excellent features” (OFSTED 2003) and the sixth form as “Outstanding”. Performance has improved consistently year on year and the school is performing well above national and local averages. (see Fig 6.1.1).

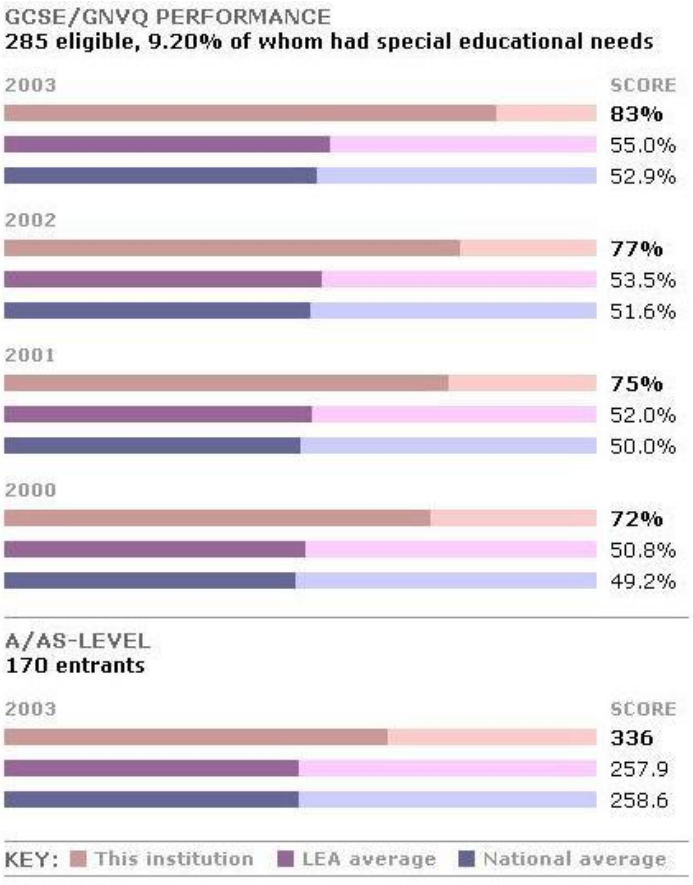


Fig 6.1.1 (Source www.bbc.co.uk)

6.2 The Student Context

As can be seen from fig 6.1.1, the school performs well in terms of GCSE and A/As level outcomes. The student body themselves can be described as slightly more capable than the national average. This is reflected in the use of CATs (Cognitive ability tests)

to measure cognitive ability in year 7. The tests are scored for Verbal, Non-verbal and Quantitive ability and an average score generated from them. Nationally, and there are a large number of centres participating in the CATs scheme; the average child scores around 100 on the average CAT. At the school in this study the average is around 107 – the range being from 70-140. The scores have a high correlation to performance at GCSE and are used to set learning targets and measure performance throughout the KS3 years. Fig 6.2.1 demonstrates this for each cohort since 1998.

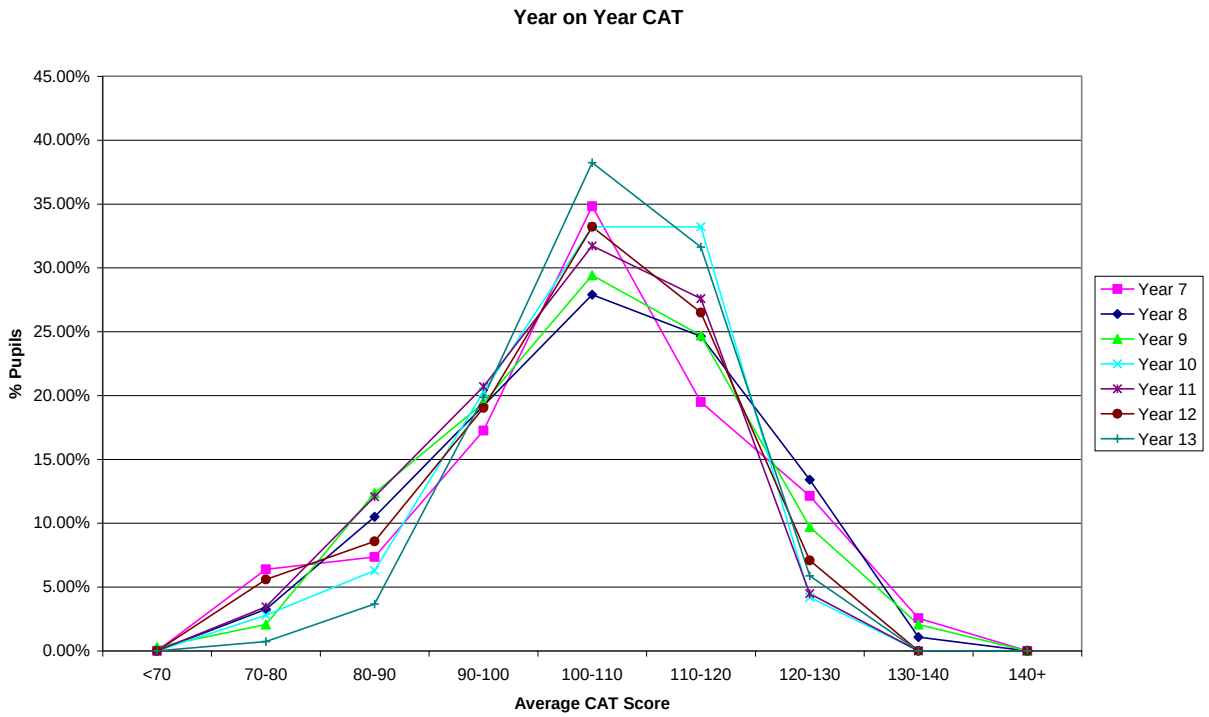


Fig 6.2.1 (the group in question are year 11)

The group of students in this study are on the brighter side of the year group. Those students with an average CAT score of <110 are close to the 110 mark and there are several students who fall in to the top third of students in the year. Table 6.2.2 shows the distribution for the year while table y shows the group in question

<70	0.00	0.00%
70-80	10.00	3.45%
80-90	35.00	12.07%
90-100	60.00	20.69%
100-110	92.00	31.72%
110-120	80.00	27.59%
120-130	13.00	4.48%

130-140	0.00	0.00%
140+	0.00	0.00%

Table 6.2.2

Forename	Form	Gender	AV CAT	AVERAGE	KS2 AV SAT
Michael	11RC	M	107.00	5.67	4.0
Scott	11GS	M	106.00	4.67	4.0
Gareth	11ER	M	108.00	6.00	4.7
Samuel	11ER	M	113.00	7.33	5.0
Matthew	11CH	M	117.00	7.00	4.7
Edward	11HB	M	127.00	8.00	5.0
Robert	11GS	M	108.00	6.00	4.0
Leo	11GS	M		6.67	
Oliver	11ER	M	117.00	6.67	4.7
Maxim	11TKH	M	104.00	6.00	4.3
James	11TKH	M		7.33	
Zehan	11ER	M	119.00	7.33	5.0
David	11HB	M	123.00	7.33	5.0
Laine	11EB	M	108.00	6.67	4.3
Jamie	11RC	M	112.00	7.00	

Table 6.2.3

When compared to the schools overall performance for the past 5 years in terms of Key stage 3 outcomes measured against average CAT score, the students in the study (marked in red – fig 6.2.4) fall into the upper 50% of the data and most are either close to the school's norm or median – shown by the thick black regression line. Many are in the upper quartile in terms of performance against school data. It is also worth noting that the school median line is situated within the upper quartile band for national performance – so even those performing below that level are probably above average nationally speaking.

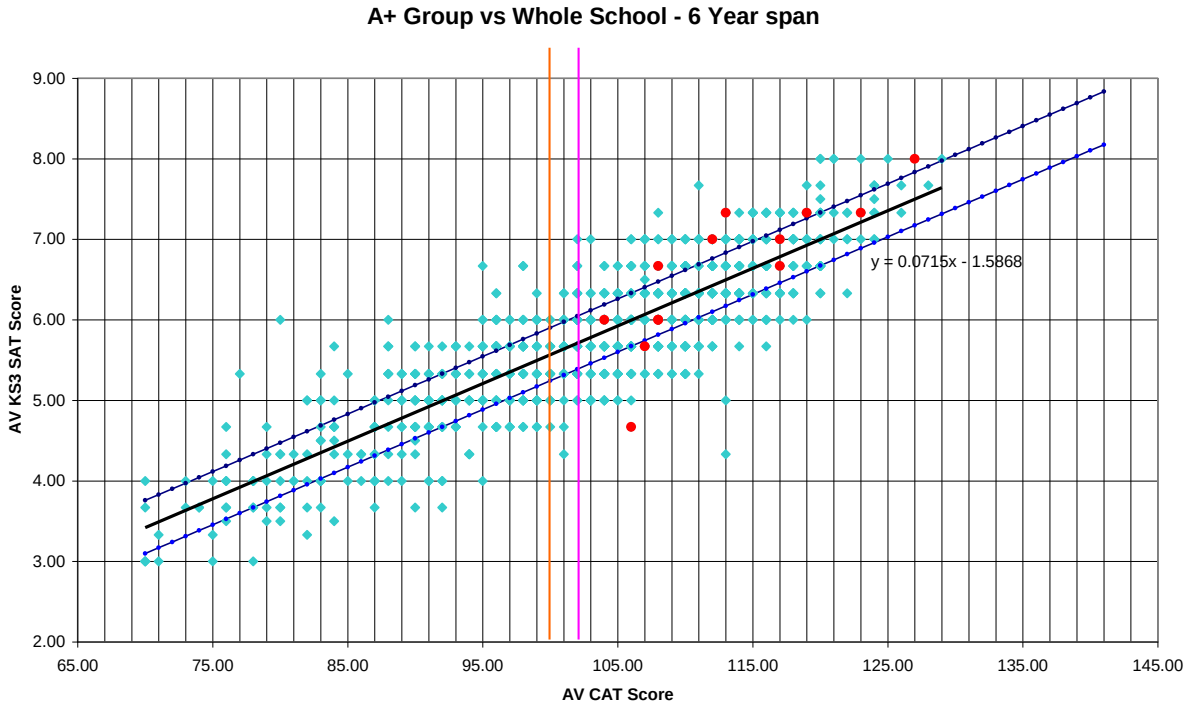


Fig 6.2.4

6.3 The Course structure and method

The course that this study is focusing on is known by the school as the "A+". It is an internationally recognised qualification certified by CompTIA – the computer trade industry association. The certification focuses on knowledge of computer hardware and operating systems and is aimed at basic level PC technicians or those who want to maintain and repair PCs for a living.

The courseware itself is produced by LJ technical systems as part of their Scantech range. It incorporates a range of modules designed to develop a student's knowledge and understand of the certification objectives.

The A+ course is divided into three major modules.

- Computer Maintenance and Upgrade
- Computer Troubleshooting
- Investigating Computers

In addition there are some supplementary units produced to keep the courseware up to date with newer computer applications and technologies. These units include Windows 2000 and XP. Finally, the courseware material also includes what is known as a Test Prep module. This is an exam simulator which uses real exam questions and a similar tracking and assessment engine to the exam system that the final certification is tested through. This allows students to develop exam technique and build up familiarity with the question style and content. Obviously, there is no guarantee that the questions would ever occur in the real exam, but it is a good introduction.

One additional element of the learning experience these students have received does not actually sit within the courseware. In order to offer respite from the standard diet and to broaden the students understanding of computing issues, I integrated a series of research led assignments fondly known as “Enhancement Tasks”. The tasks ranged from researching and producing a presentation discussing the future of computer gaming, to web sites about new technologies such as Blu Ray DVD. The tasks were all research led and students were given a set period of time to research and present their findings. They had some flexibility in the method of presentation and we used both teacher and peer assessment to help stimulate the process.

The courseware is broken into two sections. Each of the main modules has a 10 hour introductory section followed by a 30 hour main learning module.

To begin the teacher creates a class and enrols the students in the class assigning them a number to access the system with. The student then logs into the management system by using the group number combined with their user number. This also enables tracking and assessment to take place.

6.3.1 Investigating Computers

These modules are, perhaps, the hardest work. There are two tests, one before the learning and one after – this is to allow progress to be measured in an empirical form. The units are then split into learning chapters focused on different issues, such as printing, operating systems, etc. The student works through the modules reading the content and answering questions as they

proceed. The responses are tracked and recorded for teacher analysis and reporting.

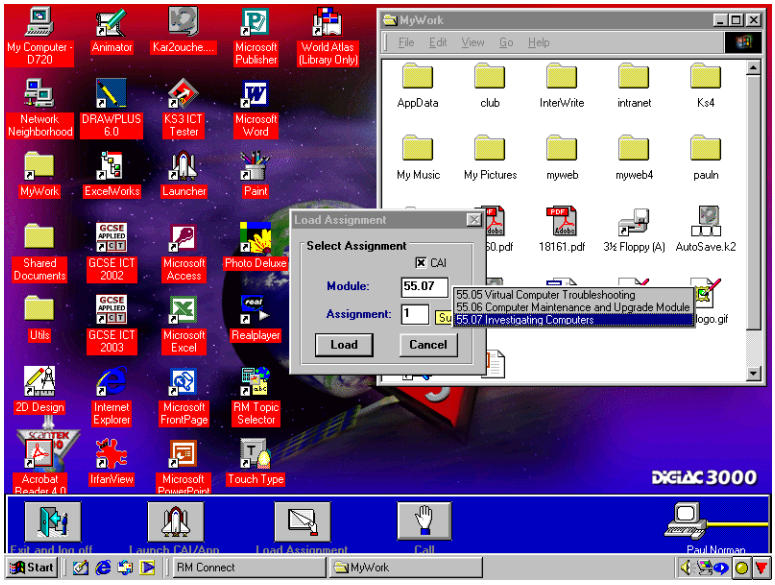


Fig 6.3.1.1 Module Selection Screen

For each chapter or section the system will tell the student what their learning objectives are:

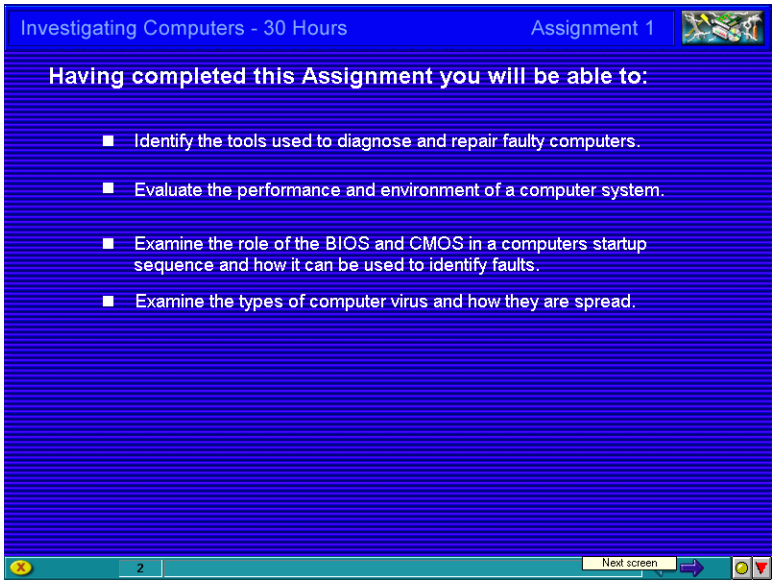


Fig 6.3.1.2 Module Objectives Screen

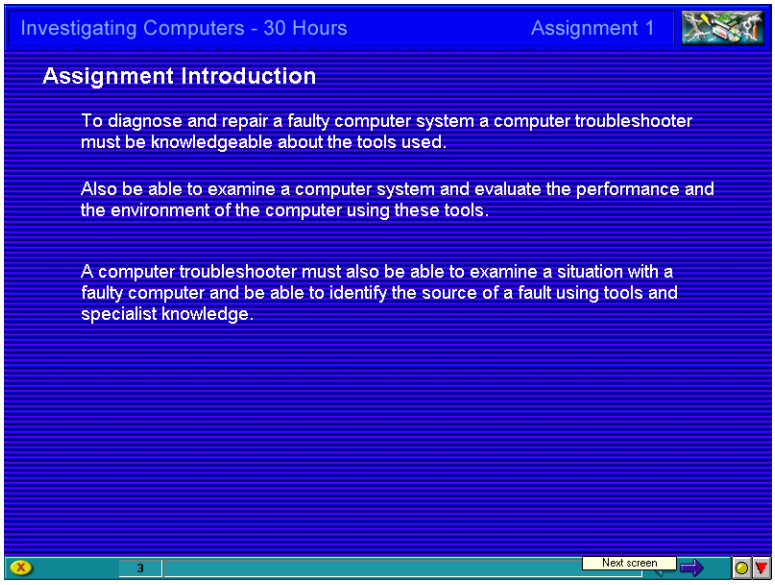


Fig 6.3.1.3 Typical Assignment Intro Screen

The students then work through the courseware a section at a time. They are able to seek help from the tutor and, in our case, were encouraged to consult each other even though the course doesn't require a collaborative approach.

Students are required to work from text books as well as online learning materials, the courseware prompts them to know when they should be using different resources.

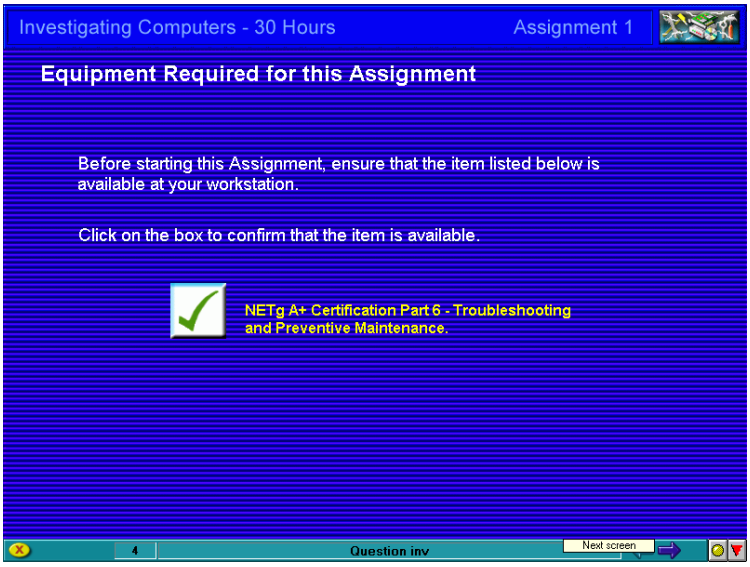


Fig 6.3.1.4 Courseware Information Screen

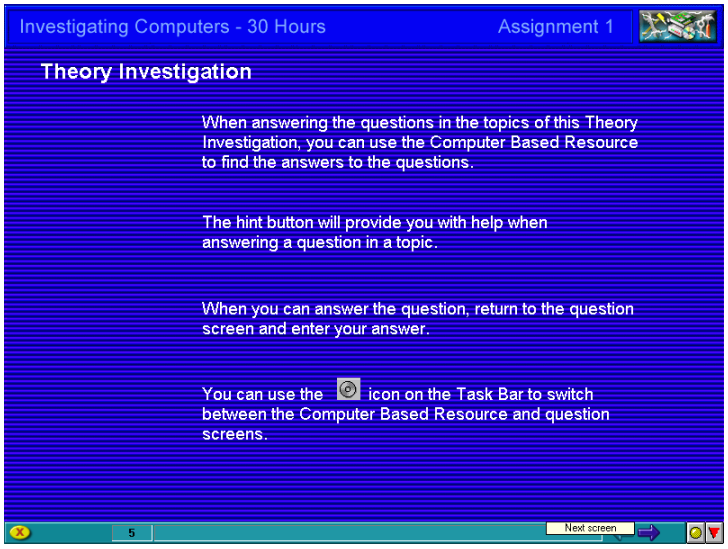


Fig 6.3.1.5 Student Instruction Screen

The skill builder material or online text books are an interactive, easily navigated content system. The materials are well presented and are written to meet the requirements of the certification. Students access the skill builder and then navigate around to find the information they need for their current module.

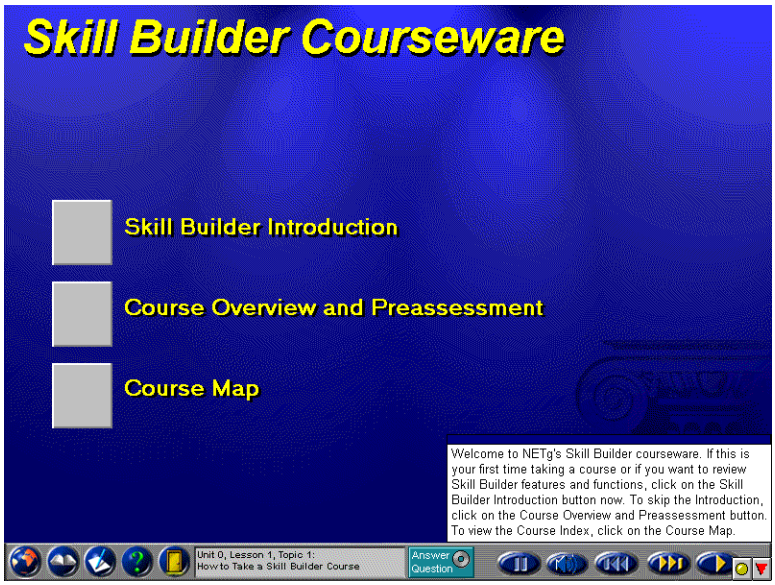


Fig 6.3.1.6 Courseware Intro Screen

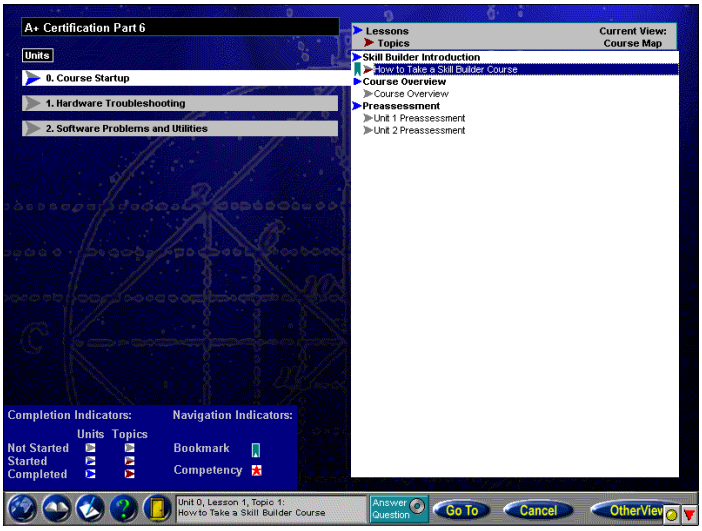


Fig 6.3.1.7 Courseware Selection Screen

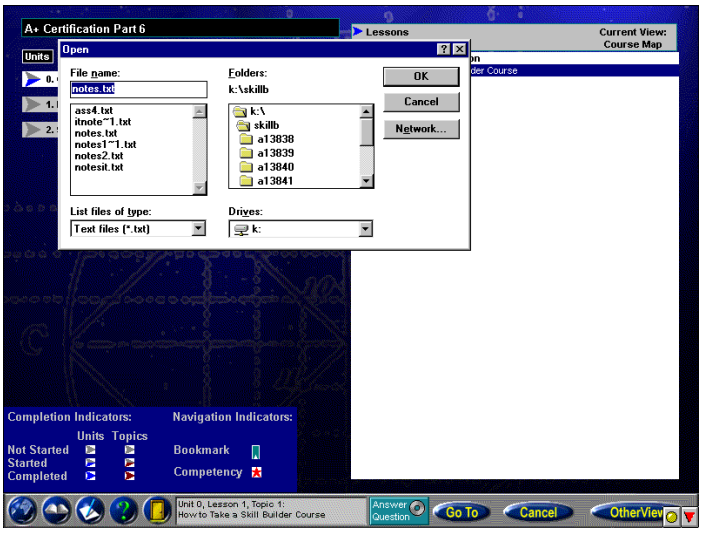


Fig 6.3.1.8 Courseware Navigation

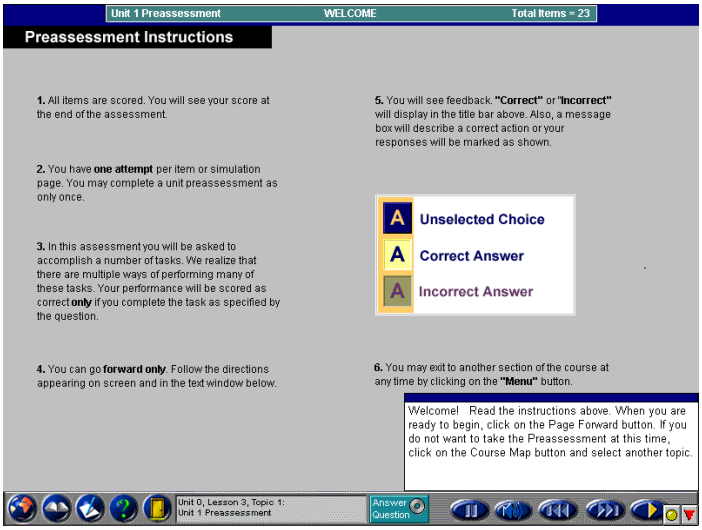


Fig 6.3.1.9 Courseware Instruction Screen 1

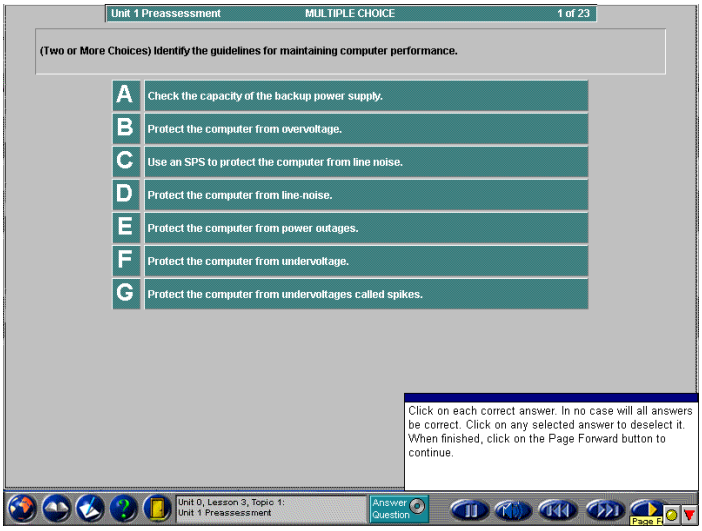


Fig 6.3.1.10 Typical Multiple Choice Screen

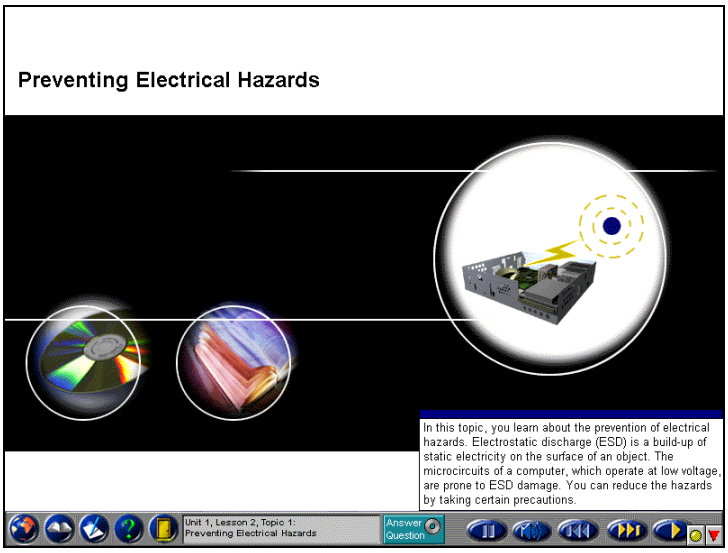


Fig 6.3.1.11 Typical Courseware learning material screen

Other than this process there is little else within the Investigating Computers Module, it is entirely read and test based.

6.3.2 Computer Troubleshooting

The computer troubleshooting module follows essentially the same process as Investigating Computers for much of the module. Read and test. Again,

resources are provided in the form of an online text book and references to paper based texts.

The big difference in the troubleshooting module is the inclusion of an interactive element in the form of simulations.

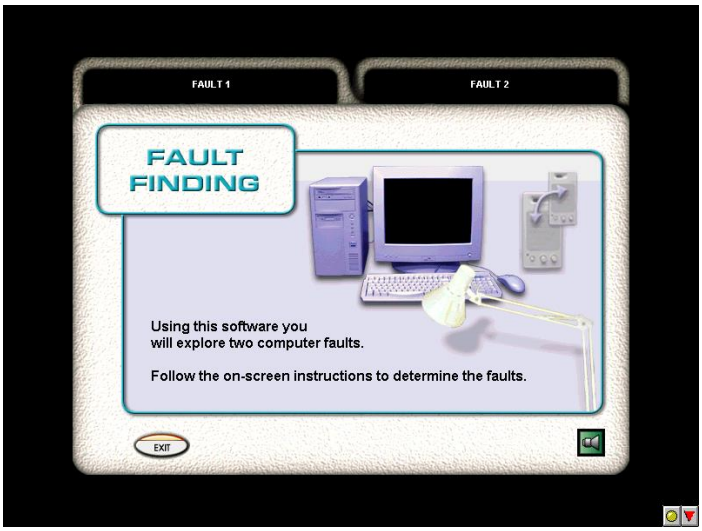


Fig 6.3.2.1 Basic 10 hour Module Simulation Screen

Essentially, throughout the module, students are presented with problems. An audio visual presentation will introduce them to the problem and what led up to it. This usually takes the form of someone reporting the problem to replicate the scenarios that may be experienced in a technician's job. Having recorded what the problem is on a service report form, the student is then able to try and solve the problem through interacting with a virtual computer.

The virtual computer is a simulation that allows a fairly wide range of actions to be performed on it. The student can start and stop the computer and watch screen messages appear. They can test software and utilities on it, once running and, most importantly, they can simulate processes of servicing and repair.

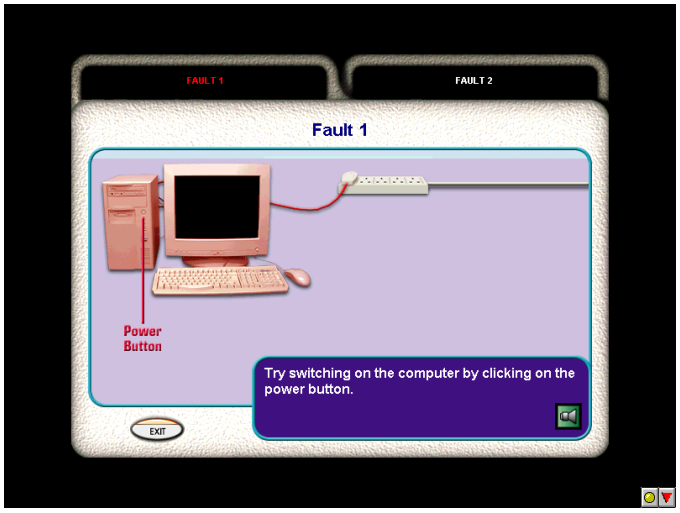


Fig 6.3.2.2 Simulation Instruction Screen

In one example they are told the monitor won't switch on and they have to test the system (not in real time, but it gives a realistic feel). They then interact with the virtual machine telling the system to reseat or replace parts and then checking to see if the problem is solved. When they ask for something to be done a video plays showing the process requested (replacing the motherboard, etc). Students can jump through this to save time and just make their selections. Once they think the problem is solved, they have to follow a specific series of tests to check system stability before the module is considered to be complete.

Having finished the task the student is shown what they did do and what they were supposed to do. This allows them to identify unnecessary actions. In addition, each activity has a time element linked to it and as they carry out the tasks the time adds up. At the end they are effectively able to see where they have wasted time – and of course, in industry, time is money.

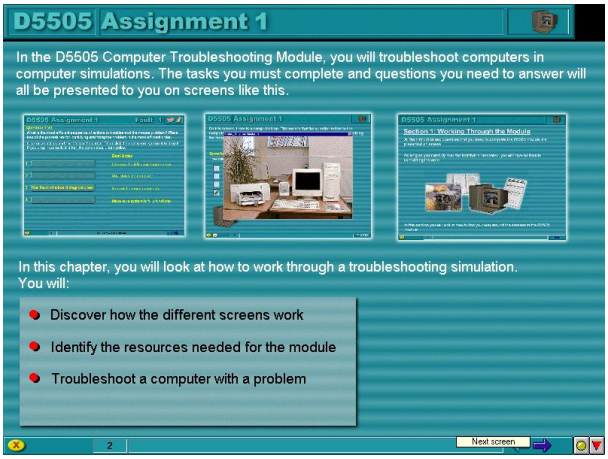


Fig 6.3.3.3 30 Hour module Simulation Screen

Each of the 20 or so virtual troubleshooting problems there are a range of hardware and software related problems to solve, varying in sophistication. Many require the use of reference manuals, again developing a good professional approach to problems. The simulation even allows the use of virtual multi-meters for measuring voltages within the unit and students need to know what correct reference voltages should be.

The Computer troubleshooting module follows a very similar path to the Investigating Computers. Again, there are the pre and post tests and the learning tasks combined with the tracked questions. The resources used to support the module are identical mixing text books with online learning resources.

6.3.3 Maintenance and Upgrade

On the final module the students are again exposed to the range of read and answer exercises. This forms the greater part of the unit and is very similar in nature to the Investigating computers module.

Like the virtual troubleshooting module, there is an alternative learning method employed, but in this case it doesn't involve a virtual computer but a real one. The course includes three PC kits including all of the part required in the main processing unit as well as printer, scanner, web cam, etc. Within this module students undertake a range of hands on installation and configuration tasks.

These range from installing speakers or a printer to replacing the hard drive or adding additional memory.

Fig 6.3.3.1 The practical setup

Each module begins with a series of questions supported by the usual learning resources, online materials and text books. The students work through these sections with an aim to developing their understanding of the practical issues prior to attempting the practical assignment.

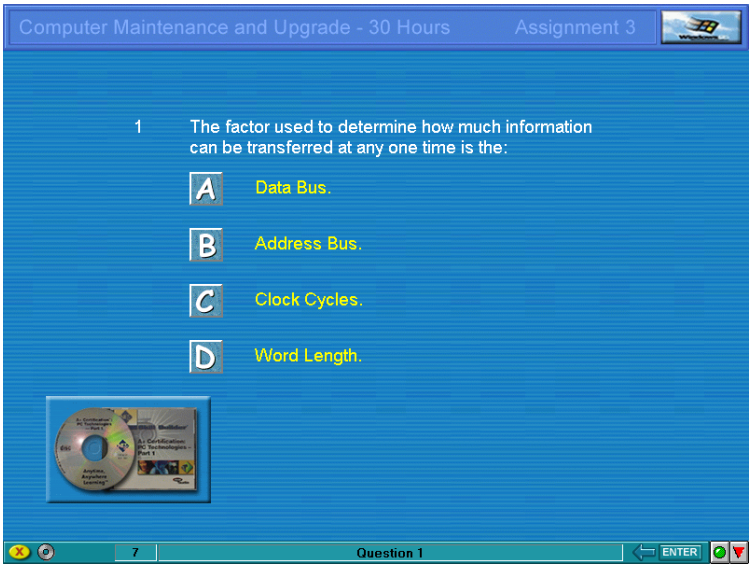


Fig 6.3.3.2 A question screen from this module

Each task requires the student to follow a set of instructions to complete the task correctly and then they are asked a few simple questions on the process they have carried out.

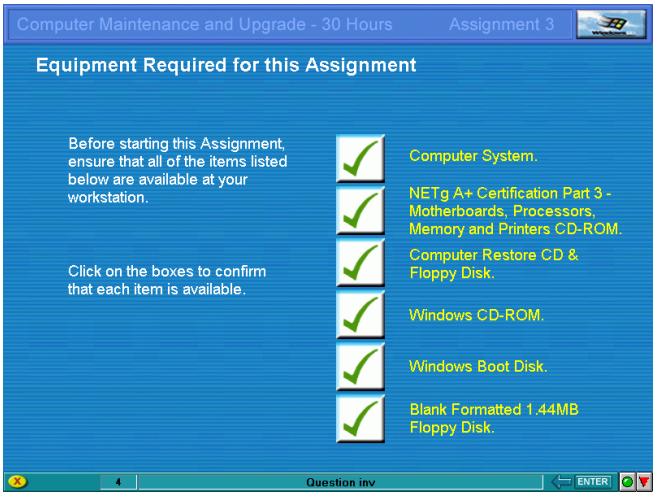


Fig 6.3.3.3 Equipment Check Screen

The practical assignments start by asking the student to check that they have all of the equipment required before moving in to the step by step practical tasks.

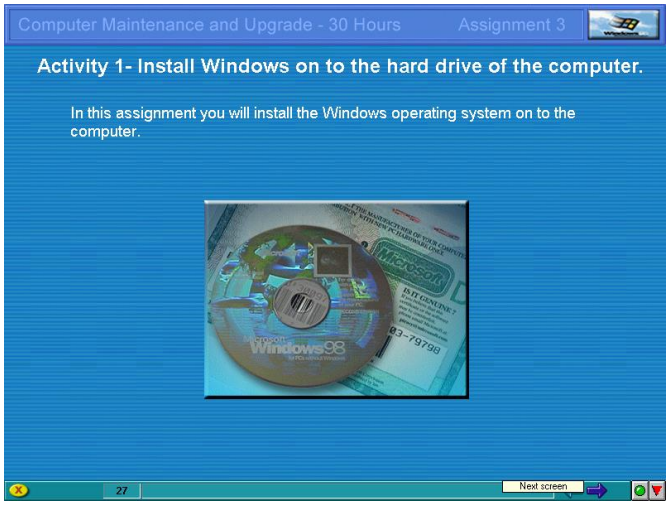


Fig 6.3.3.4

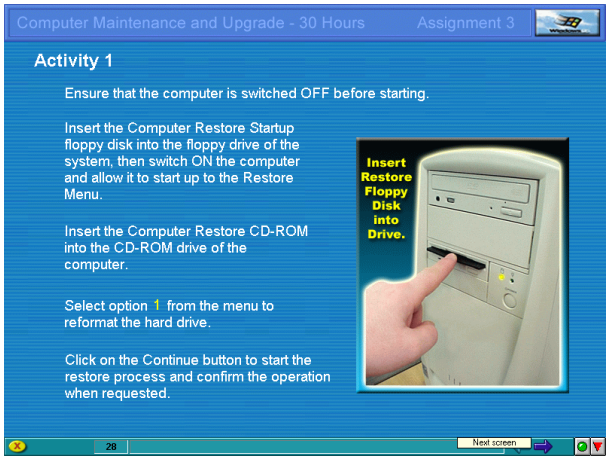


Fig 6.3.3.5 One of the activity instruction screens

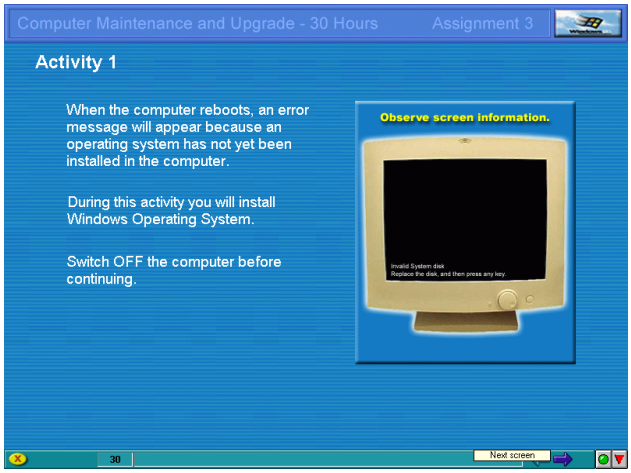


Fig 6.3.3.6 Another example of an activity Screen

Once the students have completed the practical work and filled in any documentation they move on to the next activity, again starting with the read and answer exercises.

6.4 Assessment and tracking

There are several facilities available to the class instructor as the students carry out their work. There are a range of administrative tools, class management tools and reporting / tracking tools.

In order for the students to access the system the teacher must first log on. This enables the system for students to log in to. Having done this the teacher is able to view the students' workstations from a central console, watch them answer questions as well as send messages and additional information to them (fig 6.4.1).

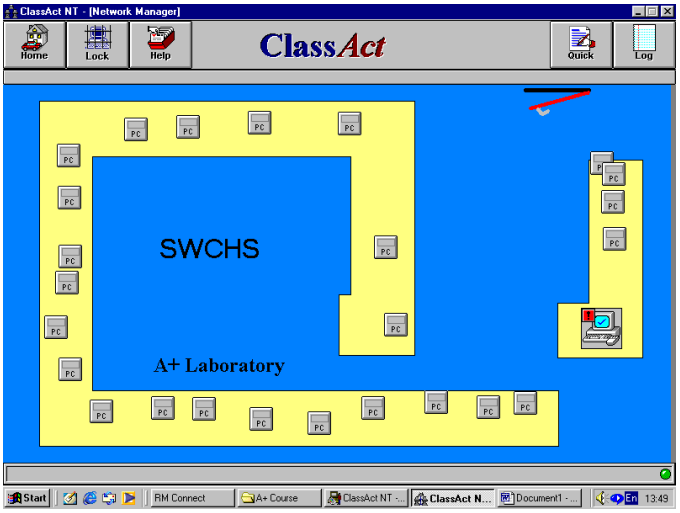


Fig 6.4.1 The main network monitoring screen.

The admin tools include class and student creation, course creation (allowing customisation of the course from the units available) and other management tools Fig 6.4.2).

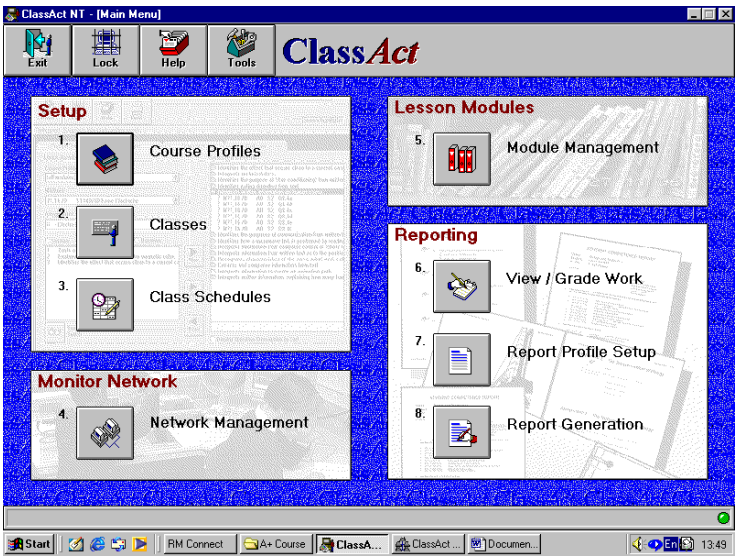


Fig 6.4.2 The main Administration Screen.

The class management tools include student workstation monitoring; messaging, statistical overview and timing monitors. This is the screen which allows the tutor to create new groups and new users and to manage them once created. (Fig 6.4.3)

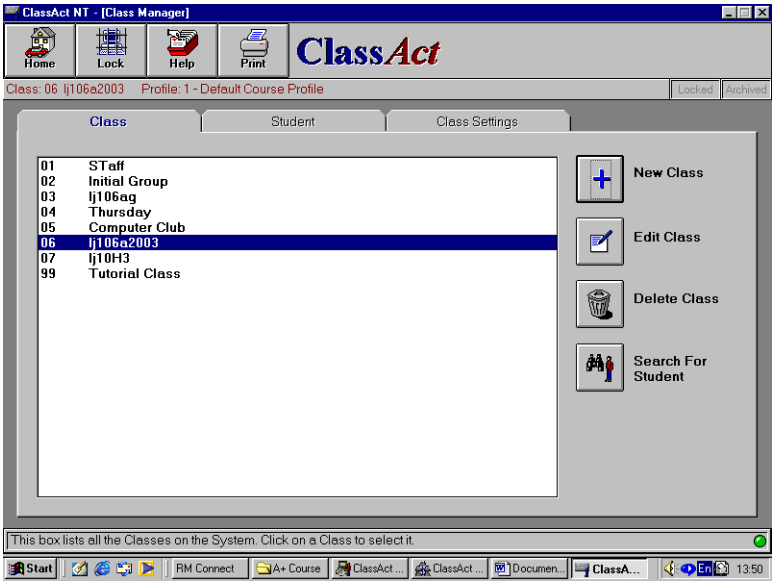


Fig 6.4.3 Class Management tools

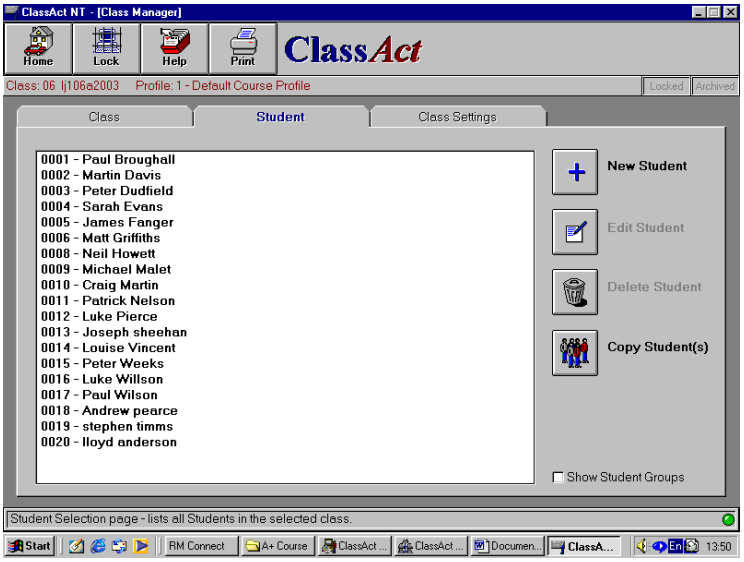


Fig 6.4.4 Student Management Tools

The reporting / tracking tools offer a range of statistical analysis reports available on a class or student basis. These allow the teacher to look at each individual module to see which questions have been answered correctly and also to adjust marks when appropriate. The screens show the student's answers as well as the score and the correct responses (see fig 6.4.6)

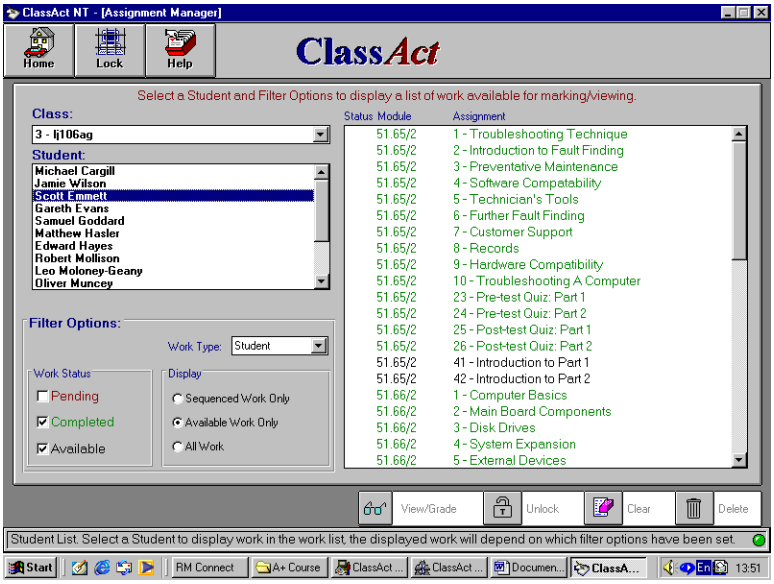


Fig 6.4.5 The student assignment monitoring screen

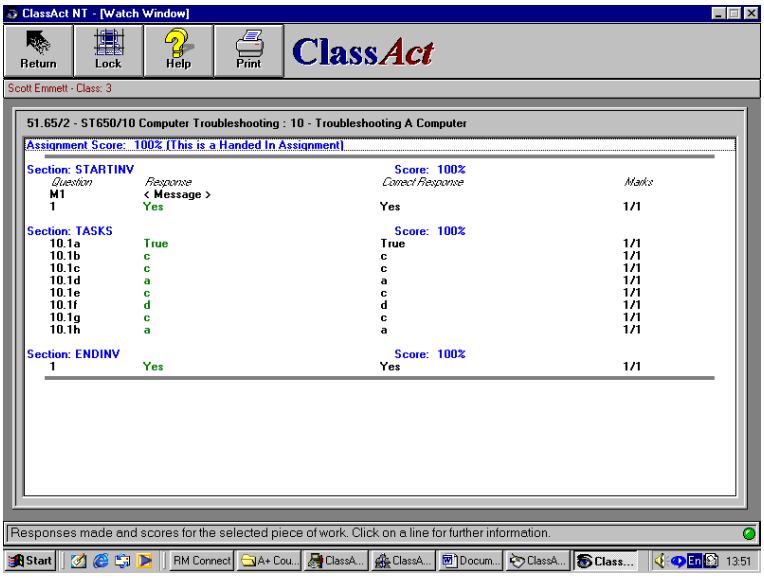


Fig 6.4.6 Example of a student assignment record screen.

The facility also allows the teacher to delete modules so that students can retake them. It is also possible to generate reports which give a summative breakdown of students' marks or class performance for overall analysis. It is also possible to view the reports by objectives achieved and by skills learned. The tools are only available on the teacher's workstation.

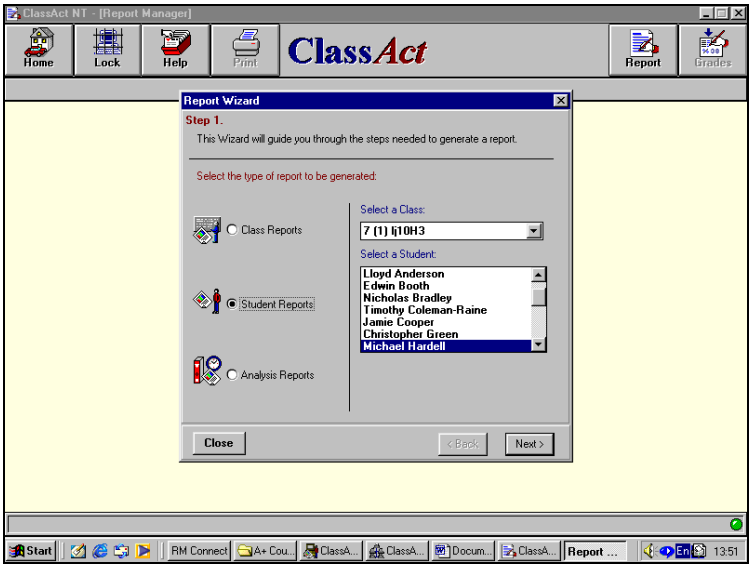


Fig 6.4.7 Report selection screen.

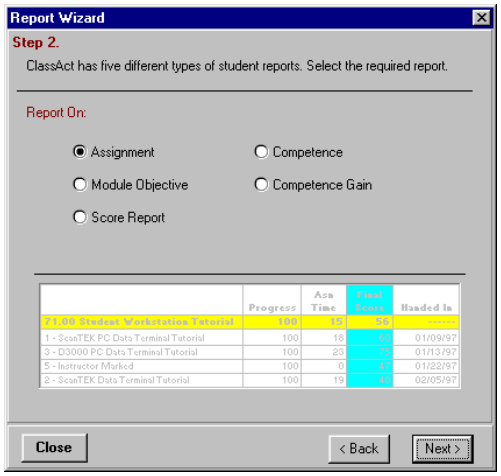


Fig 6.4.8 Report type selection box.

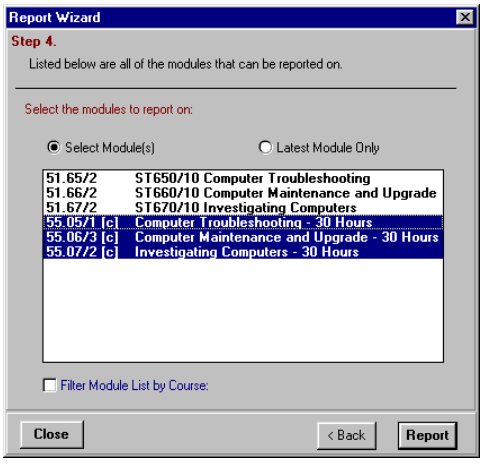
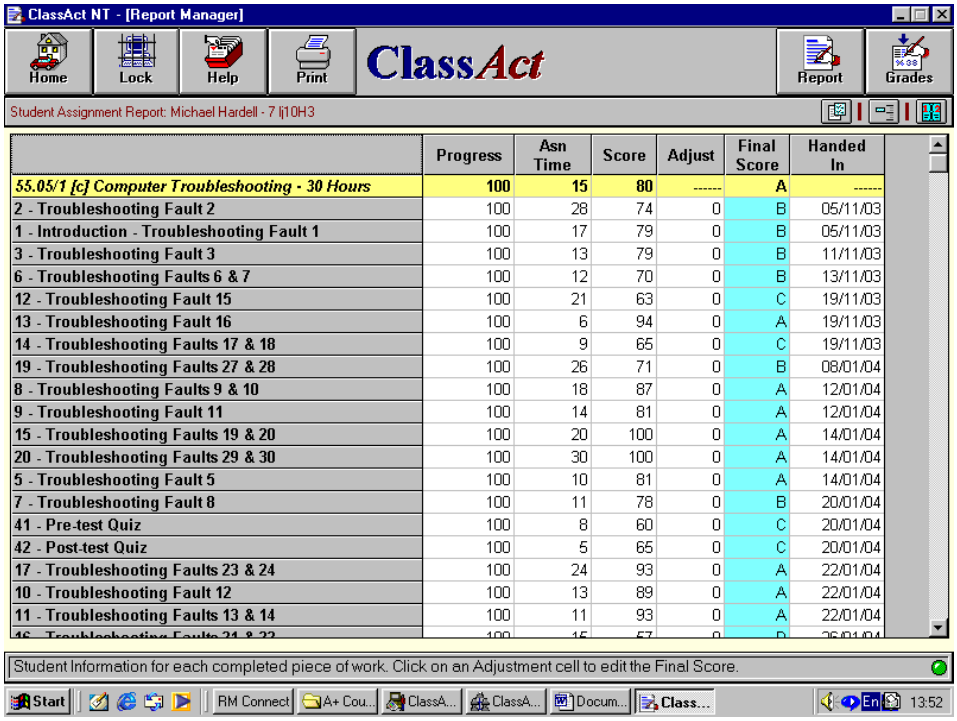


Fig 6.4.9 Module selection screen for reports.



	Progress	Asn Time	Score	Adjust	Final Score	Handed In
55.05/1 [c] Computer Troubleshooting - 30 Hours	100	15	80	------	A	------
2 - Troubleshooting Fault 2	100	28	74	0	B	05/11/03
1 - Introduction - Troubleshooting Fault 1	100	17	79	0	B	05/11/03
3 - Troubleshooting Fault 3	100	13	79	0	B	11/11/03
6 - Troubleshooting Faults 6 & 7	100	12	70	0	B	13/11/03
12 - Troubleshooting Fault 15	100	21	63	0	C	19/11/03
13 - Troubleshooting Fault 16	100	6	94	0	A	19/11/03
14 - Troubleshooting Faults 17 & 18	100	9	65	0	C	19/11/03
19 - Troubleshooting Faults 27 & 28	100	26	71	0	B	08/01/04
8 - Troubleshooting Faults 9 & 10	100	18	87	0	A	12/01/04
9 - Troubleshooting Fault 11	100	14	81	0	A	12/01/04
15 - Troubleshooting Faults 19 & 20	100	20	100	0	A	14/01/04
20 - Troubleshooting Faults 29 & 30	100	30	100	0	A	14/01/04
5 - Troubleshooting Fault 5	100	10	81	0	A	14/01/04
7 - Troubleshooting Fault 8	100	11	78	0	B	20/01/04
41 - Pre-test Quiz	100	8	60	0	C	20/01/04
42 - Post-test Quiz	100	5	65	0	C	20/01/04
17 - Troubleshooting Faults 23 & 24	100	24	93	0	A	22/01/04
10 - Troubleshooting Fault 12	100	13	89	0	A	22/01/04
11 - Troubleshooting Faults 13 & 14	100	11	93	0	A	22/01/04

Fig 6.4.10 Example of report on screen

The reports are fully customisable and allow the teacher to select different criteria for display. These include percentage results as opposed to graded results and detailed breakdowns of module grades.

6.5 The student interviews

In order to demonstrate the realities of student experience on the system a video interview was carried out. The students were given notice of the questions in order to have time for reflection prior to interviewing. The full transcripts of the interviews are available in the Appendices and the summative review of the comments is part of the data analysis.

Fig 6.5.1 Group 1 students E, M and W

Fig 6.5.2 Group 2 Students O, J1 and M2

Fig 6.5.3 Group 3 students L, G and S

Fig 6.5.4 Group 4 students S2, Z and J2

7 Analysis, Synthesis and Discussion

- 7.1 Scrutiny of Findings
- 7.2 Discussion and Analysis of theories, ideas, issues and challenges
- 7.3 How findings impact on questions
- 7.4 Critique of research method, validity and reliability.

8 Summary and Conclusions

- 8.1 Implications for policy and practice
- 8.2 Recommendations for action
- 8.3 Further research questions
- 8.4 Summary and conclusions

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Appendix A – Student preparation information

LJ Technical Systems - A+ Certification Research

Video Interviews

Hello Gents,

Next lesson I hope to start the interviews for the research I have undertaken. I will be talking to you in groups of 2 or 3 but would like to lay down some ground rules in advance.

- Be absolutely honest – give your opinion – do not concern yourselves with what others in the group say.
- Please be serious and reflective – your comments and views could help us shape the way we use this type of learning in future.

It would be useful for you to have some time to reflect on the issues that I will want to ask about so here are the questions I will be posing.

1. Why did you choose to study the A+ course?
2. How much of a factor was the online learning approach?
3. How accessible have you found the materials in terms of language?
4. What have you enjoyed the most about the course?
5. What have you enjoyed the least about the course?
6. In comparison to your other lessons how do you rate your quality of learning?
7. Which of the A+ learning techniques do you rate highest and lowest?:
    a. Online textbooks and texts
    b. Enhancement tasks
    c. Virtual troubleshooting
    d. Hands on practical work
8. Why?
9. Which elements of the course do you feel could be improved and how?
10. Have you genuinely learned at your own pace or have you been influenced by the progress of others?
11. How useful are the ongoing tests in helping you improve?
12. How useful is the management system (reports) to you as the learner?
13. Having experienced a wide range of learning approaches, what would you say would be your ideal approach or combination of approaches?

Appendix B – Letter to Parents re. Video Interviews

Dear Parent / Guardian

As you are already aware your son has been following a new online course aimed at developing the skills, knowledge and understanding required to pass the CompTIA 'A+' accreditation exam. The course itself has offered few difficulties and all of the students have or are coping with it superbly, but we are now faced with the very real prospect of students sitting the certification exam itself.

In order to qualify a student must sit the exam at an accredited examination centre- the nearest one to us is Frog Training in Great Shelford (although I am currently investigating whether the school can be accredited). I can arrange the exam session, but I am afraid it will be incumbent on you to actually get them to and from the exam session.
A major drawback of this particular course is the exam cost. At £200 per student, I am sure you will appreciate that we will be unable to fund re-sit exams, and so it is very important that students don't take the exam until they are ready and have the best chance of passing.

The exam – like all industry certificates, has a high pass grade and offers no other level than Pass. I would like students to realise that completion of the course itself is an achievement for them and regardless of whether they pass or not, they can rest assured that they have all developed useful and important skills. Obviously, passes would be nice too – but the course is new to us and feedback from other centres offering the course is fairly foreboding – Industry certificates are not designed to be easy to acquire!

Finally, as part of the process of evaluating this new course and approach to learning, I am undertaking some research that will require me to interview the students about their experiences. I will be doing this within a video case study and will need to have your permission to video the students at work and in the interview. Please sign the slip below to indicate if this is OK. Please don't hesitate to ask me about this or any other issue at parents evening should you want further information.

Yours faithfully

Paul Norman

I / we give permission for our child to participate in the video case study research into the effectiveness of the A+ online course.

Child's name: _____ Form: _____

Signed: _____ Date:_____

Appendix C – Interview Transcripts

A+ Research Interviews – Group 1 Transcript.

Int: Right, you can still whisper, yeah, as long as it's quiet. If you guys can speak up so that the mike picks you up because it's not that good I'm afraid. Okay, right, have you had a little chance to have a look at the questions and have a think about them?

All: Yes

Int: Right, so first of all then, why did you choose to study the A+ course, what was it that made you want to do something that was so different to what you'd done in the rest of the school?

M: Um, 'cos, well 'cos I was interested in computers and I wanted something a bit different to do, it's like, I wasn't really sure what to do for my extra, that the er, when we first had to choose them that I heard about it, thought it sounded interesting.

Int: So, it was the fact that it was unusual that actually attracted it to you?

E: When we were told about it in assembly there were 15 new computers, or something and it was like a new course being introduced that we could try out, sounded more exciting…

W: Yeah, it's just that I am really interested in computers so that's basically the reason why, although it was work it just made it seem more interesting…

Int: Brilliant, thank you. Were you at the time aware of it being online course or was that a factor at all in deciding to do it?

E: We'd had the two years or something of online learning for Latin which was a complete failure, so, it wouldn't really have helped that much….

Int: Right..

W: I don't think it was much of a factor, I can't remember if we knew or not, but if it had been I don't think it would have, ..I still think I would have gone for it – it was more the fact that it was a lesson about IT than the fact we were doing it online.

M: yeah

Int: Would you say having had that experience of the Latin, would you say that what you've experienced on this course fits in with the concept of online from the Latin course or is it very different?

E: No this is much better, simply because it's more suited to online learning whereas stuff like Latin is much more useful to be taught by a teacher, it's like, you have to understand everything, whereas, um, this has worked pretty well online.

Int: Excellent, anything else on that?

All: No

Int: Right, Okay, so now looking at the actual online materials themselves, from the 10 hour units through to the 30 hour units, including all the different aspects; what would you say, how accessible would you say the material is, in terms of the language it uses and everything else?

E: It's quite accessible but there are obviously some areas, due to it being American, so you get like random stuff you don't understand and there's always the glitches, where you have two answers the same, so it's been…

W: Yeah, they're not very common, are they, like, possibly one in each..

E: So it's been pretty good.

W: So , what I was going to say, it's not many..

Int: Is there any element of the course where you think the language has actually been not helpful?

M: I thought in the, er, Investigating Computers bit, I thought you were working up to, you were working up to that and it seemed fairly easy and you have a really steep learning curve going in to that, it kind of mentions something once and then expects you to know exactly what it is for the whole rest of the course and, you had to keep going back and checking..

E: Yeah, it's more the sheer volume of stuff you're meant to take in as you're going along, and ..

W: Which one was the book which had the, er, strange sort of analogies stuff in it, 'cos that really was not helpful?

M: How

M,E: How Computers Work..

M: They use Cities and signs…

Int: And that wasn't helpful in helping you understand the concepts that you were looking at on screen?

M: Yeah, it was just confusing.

Int: Right, what have you enjoyed most?

E: Um, the self, like going at your own speed..

Int: So the independent learning aspect of it has appealed to you?

E: Yeah, and it's more interesting subjects like, um, rather than knowing, you have, like Geography you know you are going to write an essay, it's kind of ICT and you work at your own speed, and it's just much easier to get along..

Int: And build animations.

E: Yeah and build animations…

Int: What else, is there anything else that sort of…think about the different types of learning that have taken place?

W: The virtual troubleshooting one was probably the most enjoyable for me.

Int: So that's the online simulation, what was it about that that you liked?

W: Um, er, I don't know, it was sort of, it was like the hardware one where we actually worked with computers, apart from it was a lot less hassle than having to get out all the pieces..

E: It was also Part of the, like, most of it you don't see how it will possibly help, like, outside school knowing anything, whereas in ICT you get home and you, like, if something's wrong with your PC you might actually know what's wrong. It's really obvious how it is going to help outside school.

Int: So it's directly relevant to things that you might want to do as well.

E: The troubleshooting showed that really well by having by having a PC and simulating what'll go wrong with it.

M: Yeah, that was definitely my favourite part.

Int: Yes, the simulating? What about the least, though? What was "pants" about it?

E: Well the investigating one, mainly just, just 'cos it, the others are interesting because it's like investigating, um, troubleshooting you get the computer and you get to muck around with it. The, um, Maintenance and Upgrade you also get a proper PC, you get hands on; whereas investigating was just reading stuff and remembering stuff and it was just really monotonous.

Int: So. Monotony – would you agree that was right?

W: Yeah, and

M: There was no, no variation at all from reading and answering questions.

W: Some of the stuff in it is quite interesting, sort of in concept, but reading about it in that, just in that particular way having it all being thrown at you at once. If you had just had to read, like, a little bit occasionally in between some of the other tasks, you probably would have taken it in a lot more and been more enthusiastic about reading it in the first place.

Int: So, do you think that is down to the material or down to the way that we have actually undertaken the course?

M: I think it's, I think it's down to the way it's presented really – cos I mean the Virtual troubleshooting stuff – I found that really helpful and easy to understand, whereas the Investigating Computers it's just the way it's presented to you.

W: I think, if they, um, instead of the 30 hour modules, or possibly still have 30 hour modules – but instead of dividing them up into the actual areas possibly make it so you did a theory bit, like the investigating computers, but break that up with the other bits. But without having to swap yourself, it was just part of the actual way they had laid it out, instead you had to change modules.

Int: Do you think that part of the course, part of the course could really benefit from a rethink, or…

E: Yeah, yeah I do.

Int: Okay, that's great. Okay, so thinking about the A plus course – you've said you like the independence of it, you said there's elements of it you really like – there's some you don't like – In comparison to other subjects that you study at GCSE level how well do you think you learn? What about the quality of your learning, is it high quality, medium, not good at all in the short term?

E: It's more enjoyable, but it's at the moment it seems to be more short term, like, that week you will be able to remember what you've done in IT, but, I think the post test quizzes at the end have shown that we don't really retain the information that well.

W: I wouldn't say it was bad, but I wouldn't say it was, like, the best.

E: The way it's presented, um, it kind of encourages just finding the stuff you need to answer the question. It doesn't really reward, I mean if you read everything it would take you forever and you'd fall behind and so it's not really much of an incentive to read up properly.

Int: That's a very good observation.

W: In fact you can access the material at the same time as answering the questions and you just switch between the two probably encourages you just to flick through and find the answer you need..

Int: But what about your own personal learning management because you haven't done a lot of writing down, have you?

E: No

Int: Would you feel that would have helped you if you'd taken the time to do that?
W: Possibly, although I think….

E: The time it would have taken would be so much and you would, you wouldn't have been able to write down everything so I reckon at this point we'd have, like, some notes on each subject, but not enough to really – 'cos the questions we're doing are really detailed – you have to know exact things..

Int: So you think that, in order to make it..in order to make writing things down a very useful learning tool, it'd require a lot more time than you actually have to make it worthwhile?

M: Yeah,

E: Yeah, or we'd have to spend so much of our time just writing down.

Int: Okay, so your saying, basically, short term learning absolutely great, same as other subjects – longer term, not so hot?

E: Yeah, and also it is.. we do have to learn much more specific facts, whereas in History or something you have to learn what generally happened, in this you have to know the exact, like what kind of and that makes it a bit easier.

Int: OK, so of the different learning techniques I listed four; online text book and text which is the investigating computers type stuff, enhancement tasks which aren't technically part of the system but were put in to help broaden things; Virtual troubleshooting and the hands on practical work for Maintenance and Upgrade. Of those what do you think you'd rate the highest and what would you rate the lowest?

M: I'd definitely rate the Virtual troubleshooting highest because it's interactive but it's not too much hassle so you can just do it as your sitting there but you are actually getting involved.

Int: So you are learning as you do it and that interactivity appeals to you?

W: You actually remember it more, as well when answering some of the questions in the revision topics, you remember – oh yeah in virtual troubleshooting, it was something like that – you remember how you either fixed it or you didn't by doing something, whereas if you were just told this is how you fix something you probably wouldn't remember it.

M: Yeah, you remember how you did it so then you remember why it works and stuff, whereas if you're just reading something you are just taking information in with nothing to link it to.

E: I also remember what we have done in enhancement tasks although that's possibly more because with enhancements tasks we spend quite a long period of time on one subject so you then, you put time into it and you get to know it really well; whereas everything else we've done we've spent really short amounts of time on each bit so enhancement tasks in each subject are good.

Int: So what you seem to be saying between you is that the activities where you have actually been able to get involved interactively, either through researching it yourself or through actually doing things on screen rather than just reading and having to

remember; you found that the highest quality learning compared to the others, OK.. What do you, I mean I think I know what you are going to say; but what do you think was the least?

M: It was the text books and just the reading you can't. it's really hard to remember – you feel like you should remember it but you just can't make yourself – it just slips out of your mind.

Int: Do you agree with that?

W: Yeah

Int: What about the way it tests you and gives you your feedback, does that stimulate you at all, does it get you motivated?

M: Yeah, it's useful actually, you sort of think, oh..cos you want to get 100% on every single one so that is actually really useful the way it gives you feedback..

E: It is a bit of a disincentive though, that non of the work we do in class goes toward our final grade, there's no …I reckon I'd do better if there was some coursework so that you can go into the exam knowing that you had something, um.. and you knew that the work you were doing was actually important, whereas what we are doing at the moment is really just preparation, there's nothing we can do to get a good grade.

Int: Yes, so the fact that it all comes down to one test on one day at the end of it, no matter what you've done previously is, is a bit of a

E: Yes it's not really….

Int: OK, we've touched on what elements of the course you feel could be improved – if you were being given the responsibility of improving that text book bit – how do you think you would do it?

M: Um..maybe, I don't know – make up some little games or something you could play – if you're trying to think about what operating system what different things..I don't know.

Int: Build in interactivity.

W: I think a lot of it could be done in a similar way to the virtual troubleshooting, and just say you had to learn how to reg edit or something – how to get into that and stuff – just as simple as having a virtual windows desktop showing you what you have to do would help you remember it a lot more than just reading.

Int: Just reading…yeah – so bringing some of the techniques they've used on the other modules into that module

W: A lot of the questions in the revision things we've done actually say stuff like how do you reach this particular window in the control panel, which is quite tricky to remember, if the computer was there in front of you and you had just done it you would

know where to go, instinctively, but actually remembering the exact path…it would help if you'd done that a couple of times.

Int: More interactively, yes I see what you mean.

M: Yes, there are things about how people learn in different ways with reading you're only learning it one way and so if you learn better within something that's interactive you don't really stand much of a chance.

Int: That's an interesting point as well, because of course what the materials on there do is in many cases they mix an audio element with the written bit and sometimes you've got this visual animation or simulation – so are you sort of suggesting that having multiple modes of giving you that information is supporting your learning and where you only have the written text you find that's not as…

E: Some of them have um.. most of them have text and a picture, but the pictures usually seem irrelevant to the text.

W: They just added them to it so they had a picture there..

Int: Just filling a space

E: So you don't, you can't remember a picture and thus remember text because the pictures nothing to do with it.

W: Like the firewall which was a brick wall with fire round it…

E: Well that's relevant, but there's some stuff that I think they had a symbol that they associated with windows2000, so every time windows 2000 came up you got a random piece of clipart and it's slightly altered each time and its just really not useful, just wasted space.

Int: OK…Right, last couple of bits then lads, um.. We have the management system which allows me to generate reports and feedback based on your test results and things. How useful or not have you found that part of the system?

E: Quite useful

M,W: Yeah,

W: It's useful to be able to see an entire summary of every single mark you've got, especially cos then you can see which you're weaker areas

Int: Is the fact that it is only located on the management system a problem for you, would you like to be able to access that directly yourself?

M: It would be quite useful to access our results.

W: It's not much of a problem, but..

E: Yeah it would be easier for us curiosity and every now and again just to check how we are doing.

Int: So you've found generally that that's a….Of the sorts of things that we can produce on there, with the personal reports and the looking at individual results from the tests, what do you think is the most useful thing that it does?

E: Um..looking at the, when you have all the things that you've done and the grades that you got – going through them and noticing that the post test quizzes are much lower than the others, or, maybe in the troubleshooting you're worse than in something else..

Int: So the overview is the most useful?

E: Yes you need to…

Int: Right, OK, now – I think I've probably covered question 13 as well actually, so thank you very much! Extremely good – thank you very much indeed.