A Case Study on the Use of Personalised Video Tutorials in a Second Level School

By

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Declaration

I hereby declare that this project is entirely my own work, and that it has not been submitted for any other academic award, or part thereof, at this or any other educational establishment.

Signed: __________________

Date: ________________
Abstract

A Case Study on the Use of Personalised Video Tutorials in a Second Level School

Video technology has expanded exponentially over the last decade. With the advent of video hosting websites like You Tube, and the integration of video cameras on mobile phones, the video clip is everywhere. Students are using this technology for entertainment and self-directed learning, but it has not made its way into mainstream education, particularly at second level. The purpose of this study is to investigate the use of this technology to produce Personalised Video Tutorials, as an aid to student learning and revision.

A review of the current literature indicates that the use of Personalised Video Tutorials add significantly to the educational experience gained by their use. While research at second level is limited, similar technologies in third level institutions are in regular use and received very positively.

A case study research model was used to research the issue in a single school involving eight teachers and two hundred students. As part of the investigation teachers recorded a personalised video tutorial for their class. This was hosted on a website for students to access outside of class contact time. Students were tested before and after watching the Personalised Video Tutorial. Both students and teachers involved also completed a questionnaire.

The research findings indicate that both the staff and students responded very favourably to the idea of Personalised Video Tutorials being hosted online as a revision aid. There was a significant improvement in the grades of the students who watched the Personalised Video Tutorials. However, a large percentage of students did not, or could not, access the facility.

While the grades of the students improved significantly, and the reaction of students and teachers was very positive, technical factors would need to be addressed before a full implementation of the technology could be undertaken in second level schools.
Dedication

This thesis is dedicated to the memory of my parents

Robert and Mary Boland

R.I.P.
Acknowledgement

I wish to express my gratitude to the following people who assisted me during the course of this study:

To Noeleen Leahy, who acted as my tutor and supervisor, for her help, encouragement and guidance throughout the period of this Thesis.

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To the Principal and Deputy Principal of my school for granting me permission to carry out the research within the school.

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<td>European Computer Driving License</td>
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<td>ICT</td>
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Chapter 1   Introduction

1.1   Introduction:

Video as an educational medium has been used in Irish schools as early as the 1980s. This was primarily used in subjects like Religion and English where full-length films were shown. Films based on plays and novels, documentaries and historical footage were used as an aid to teaching and were followed by class discussion to explore a theme or concept. There have been many studies on the use of film which have affirmed its validity as an educational medium. (Willis, 2009)

More recently with the widespread use of the Internet, smaller video clips have become available, on You Tube and more recently Teach Tube. The video clips, filmed and uploaded by enthusiasts in a particular field vary in length, but many are quite short, usually around ten minutes. This, along with increased broadband speeds and more computers in the classroom give rise to a new phenomenon, the video clip. While hardly commonplace, video clips are being used in an increasing number of subjects for example Science and Technology. They are used to explain a concept, show a particular use for a process or give students an experience which they could not otherwise get in the classroom situation. A Geography teacher, talking about volcanoes, a History teacher talking about the invasion of Poland, or a Woodwork teacher explaining how trees are felled, to give just three diverse examples, are all valid educational uses. The author, a Design and Communication Graphics teacher, regularly uses videos that have been generated on a computer to explain higher level concepts, which were heretofore explained using complex models, generally homemade.

The traditional classroom, where the teacher puts notes on the board still exists today. The idea of the teacher writing down some salient points from a text, or a
method of approaching a problem, and the students putting this to use later, in a homework situation perhaps, is still a very valid methodology. With technology has come the PowerPoint presentation, which is essentially the same methodology as the chalk and talk of our predecessors. The use of ICT in this way has advantages in terms of reuse, and editing to keep the material fresh and up to date. The teacher gets more time to explain or expand on a concept instead of turning his or her back on the class to write up the notes. This is a more inclusive approach, which allows more time for questioning and discussion.

When a student is studying at home alone, maybe several days later, the notes may not be sufficient, may be incomplete, or may not be there at all. Many students do not cope well with the written word, and visual and audio stimuli work much better for them. (Gardner H., 1993) More students are arriving in second level schools across the country having been diagnosed with learning difficulties, and needing learning support. A video clip at this stage, explaining the concept or procedure, available to the student to view repeatedly if necessary, would appear to have great merits.

This tutorial could also be accessed by a student who was not present for the lesson, absent due to illness or extracurricular activities on that particular day. The tutorial can be accessed again, as an aid to revision an essential part of any teacher’s methodology. The proposal for this study is to make a series of short video clips, for various subjects at various levels, and examine their usefulness as a resource for students outside of the classroom.

1.2 Statement of Topic

This research is a case study of Personalised Video Tutorials in a second level school. It aims to investigate the effect of PVT’s on students’ results, and the perception of staff and students towards PVT’s. All the students involved are within the second level system and all the teachers involved are fully qualified, teaching various subjects at various levels.
1.3 Research Questions

The primary aim of this study is to examine the benefits of PVT’s as a study aid to students working in the home environment. As part of this research, the following questions will be addressed:

- What is the effect, if any, on student results through using Personalised Video Tutorials at home?
- How do teachers react to producing Personalised Video Tutorials?
- How much training would be required to make teachers competent in using Personalised Video Tutorial technology?
- What technical factors might inhibit the use of Personalised Video Tutorials?

1.4 Relevance

ICT has been used in commerce and business for decades. It’s uptake within mainstream education has been a rather patchwork affair. Although the National Centre for Technology in Education (NCTE) was established in 1998 to provide ICT training and support for the primary and post primary sectors, the majority of teachers are self-taught in the use of ICT. Most of the resources used by teachers have been generated by and distributed by teachers themselves. (Williams, 2000)

Student uptake of ICT has taken a totally different path. Young people learn how to use ICT on a need to know basis, from their mobile phone or their music player, or watching video clips online. They are confident in using the medium of the computer, and it is a resource that is underutilised by teachers at large.

The relevance of this study is to investigate the use of PVT’s as a means of increasing student results. PVT’s can be used as a means of independent study and revision by a group of young people who are confident in their use of ICT.
1.5 **Significance**

Within the current economic climate, education is seen as the way forward. Our young people will have to be very well-educated to compete for jobs in an economy that is growing increasingly high-tech. The level of financial support for education has been and will continue to be reduced. It is therefore necessary to gain as much educational benefit as possible from the equipment and facilities that already exist in second level schools.

This study will investigate PVT’s, a concept that is relatively new and also relatively easy to produce using the facilities that are in schools at the moment. A large majority of teachers already have the physical equipment to produce these tutorials. The software required to record these tutorials is available in some schools (as part of a suite of software that comes with Interactive White Boards) and available free on the Internet also. The physical equipment to host these PVT’s will also be present in a large percentage of schools. The software required and the technical expertise may also be available in some schools, and this could be shared at very little cost to other schools in the area.

1.6 **Background to the Study**

Three years ago a new course was introduced to replace Leaving Certificate Technical Drawing. The new course, Design and Communication Graphics places a greater emphasis on the understanding of concepts, the application of ideas and independent study. The use of computers and software is an integral part of the new course, and the students of today are very computer literate. As part of the support material provided by T4, (an umbrella organisation to support practical teachers), there is a large selection of PowerPoint presentations, and pre-prepared worksheets. As many of the students find some of these concepts, very difficult to comprehend, the author has developed a small collection of videos, posted online, to which the students have access outside of school hours. There is much anecdotal evidence from the authors’ students to suggest that these videos are of great benefit to the student working at home. They are posted within a few days after the lesson is taught and they remain online indefinitely. The videos are
used for homework, and also for revision for various exams that take place throughout the year. From this, it was decided to investigate the benefits, if any, of PVT’s.

1.7 Knowledge Base

In the school in which this study will take place, the majority of teachers are competent with using ICT in their everyday lessons. Most of the teachers have produced Power Points, which they use regularly. The technology is available in the school to record these Power Points, along with a voiceover, transforming them into PVT’s. As part of this project, the author will be demonstrating to the volunteering teachers this process of producing PVT’s using their own Power Point presentations. This technology is readily available, and the teachers involved will receive support and direction from the author, while preparing the video tutorials for hosting on the school website.

1.8 Research Methodology

To undertake this study, the author intends to approach several teachers in the school from a variety of disciplines. The author will demonstrate the procedures involved in producing a Personalised Video Tutorial based on one of his own Power Points. This training will take approximately forty five minutes. Each staff member will be invited to produce their own Personalised Video Tutorial, with the author being on hand to provide technical guidance.

Each teacher will then use their selected PowerPoint presentation to teach a single lesson with their class. They will advise their class group that they will have a test on this topic within the coming days. When the students have sat their test, teachers will note their results. Students will be informed by the teacher that the test will be repeated after their Easter break, and that a Personalised Video Tutorial is available on the school website to help them with their revision.
After returning from their Easter break the students involved in the study will repeat the same test that they took before their break. When the teachers have corrected the test they will enter the second set of results on the results sheet provided (Appendix B) and forward the form to the author. This will give the author two sets of results to analyse. The control group will be those students who did not (or could not) view the Personalised Video Tutorial online.

This part of the investigation will be quantitative and it is hoped that by getting several teachers from a variety of disciplines that a sufficient amount of data can be collected to make this a valid study.

As part of the qualitative research it is intended to interview the ICT coordinator involved and gather his opinions on how the technology worked. Finally, a questionnaire will be issued to the students and teachers involved, to get their reactions on using video clips in this manner.

1.9 Scope and limitations of research

The study is limited to a second level school in County Kildare, with six hundred students of mixed ability. The teaching staff is enthusiastic and computer literate, and all have been provided with laptops, which are in use every day. The classrooms are well-equipped, with most having data projectors and whiteboards. Internet access is provided wirelessly. There are two dedicated computer rooms, to which students have access for junior and senior cycle. Each student has their own account, on the school server.

While a study involving up to eight teachers and two hundred students may be quite small, it should represent a reasonable cross-section of the teaching and learning that exists across the Irish Education system.
1.10 Overview of thesis

Chapter 2 will contain a review of literature in the area of education and the use of ICT in education. Specifically it will focus on a number of established learning theories and examine the issue of how the use of computer-aided technology benefits the learner.

Chapter 3 will outline the research methodology and the research paradigm to be employed in the study. Research questions and research instruments will also be addressed.

Chapter 4 will outline the findings of the study and will be presented in textual and graphical form. Cross-referencing between the various research tools will be used to test the validity of any results gained.

Chapter 5 will discuss the findings of the study in relation to the literature review undertaken in chapter 2.

Chapter 6 will present the conclusions from the study as a whole and make reference to any relevant data found in the Literature Review chapter or the Findings chapter during the course of this research. Recommendations for further research will also be made.
Chapter 2  Literature Review

2.1  Introduction:

Teaching is an activity which endeavours to impart knowledge to students. The efficiency of this activity has been under the review since the activity first began many centuries ago. Student engagement has always been an issue. (Newman F. m., 1992) Over the years, the technology of the day was introduced to the classroom as a means of improving the teaching and learning that happened in the classroom. This technology became more prevalent as the costs involved, plummeted. While most of us won't remember children working in classrooms with chalk and chalkboards, we know it happened until it was replaced by pen and paper. Indeed, the pen itself also underwent a transformation, from split nibs and ink wells, to the humble ballpoint. More technical innovations happened in recent years, with the introduction of photocopiers and overhead projectors, all part of a good teacher's arsenal to affect good teaching and learning. Pritchard recognises the importance of the teacher in the process, referring to the teacher’s professionalism and experience in choosing the correct technology and pedagogy for any given situation. (Pritchard, 2007).

More recently, technology has been taken to another level. Computers and ICT in general are commonplace in business and in the home, and it was only a matter of time before they also worked their way into the classroom. As early as the 1980s, computers were slowly making their way into education. Running alongside that was the medium of television and video. Video as an educational medium was primarily used in subjects like Religion and English where films were shown. Films based on plays and novels, documentaries and historical footage were used as an aid to teaching and were followed by class discussion to explore a theme or concept. There have been many studies on the use of film which have affirmed its validity as an educational medium. (Willis, 2009), (Horst, 1989).
With the widespread use of the Internet, more and more technology has made its way into the classroom. As these advances in ICT have revolutionized society at large, they have also dramatically changed the learning and teaching processes. The Internet has expanded new learning opportunities and has given access to educational resources not previously available. The use of ICT when successfully integrated into teaching and learning, can ensure meaningful interaction of learners with information. (Ning Zhang, 2008). They conclude that our education system must create graduates who use information effectively and constantly keep abreast of technological advances. They conclude that graduates should be as comfortable with ICT as with the traditional reading and writing, as in the future this will be equally important.

Also, many schools in Ireland are becoming multi cultural. The difficulty this poses, for both staff and students, is simply understanding the spoken word. From the students point of view listening and re-listening to a teacher explain a particular point would improve that understanding. An option for the future is to combine slide shows with audio podcasts to create a blended and focused vodcast. (Parson, 2009)

2.2 Learning theories:

Before this review can proceed any further, it is necessary to look at some common learning theories associated with learning in the western world. As these learning theories form the basis for the education system itself, a working knowledge will need to be in place before discussing the integration of ICT into education. It will also be necessary to look at learning styles, before examining the benefits, if any, of integrating ICT. The principal theories of learning can be divided into three, Behaviourism, Constructivism, and Cognitivism, and each is explained below.

2.2.1 Behaviourism:

Behaviourism is often called stimulus response learning, as it places an emphasis on observable and measurable outcomes from a specific stimulus. Behaviour
theorists define learning as nothing more than the acquisition of new behaviour. Behaviourists refer to a term called conditioning, which can be subdivided into two subdivisions, classic conditioning and operant conditioning. Classic conditioning is a natural reflex to a given stimulus: the most common example is Pavlov's dog. Pavlov noted that dogs salivate when they eat or even see food. In his experiment he rang a bell just before he fed the dog, and after some time if he just rang the bell, the dog would salivate. It had associated the ringing of the bell with food. Operant conditioning occurs when a response to a stimulus is reinforced. If a reward is given for the correct response to a stimulus then the response becomes more probable in the future. BF Skinner, used reinforcement techniques to teach pigeons to dance and bowl a ball.

Behaviourism in people depends on sequencing the knowledge and skills in logical limited steps. Learning happens when the correct response is demonstrated following the presentation of a specific environmental stimulus. Instruction is to elicit the desired response from the learner who is presented with a target stimulus. The learner must know how to execute the proper response as well as the conditions on which the response is made and instruction utilizes consequences and reinforcement of learned behaviours. Some of the learning strategies associated with behaviourism include practice paired with target stimuli, and enforcement for correct responses. This is often referred to as drill and practice.

"Teachers arrange special contingencies which expedite learning, pacesetting the appearance of Behaviour, which would otherwise be acquired slowly or making sure the appearance of Behaviour, which otherwise never occur." (Skinner, 1968, page 10).

Purists that subscribe to the behaviourism type of learning include Skinner, Thorndike and Pavlov.

There have been many criticisms of behaviourism, in that it does not take account for all kinds of learning, such as the recognition of language by young children, for which there is no reinforcement. Behaviourism is often used by teachers in classroom situations, both in relation to learning situations and behaviours. Gold stars, extra playtime, and other treats are quite common in the primary school
system, to reinforce good behaviour and punishments, while on the decline, can be used to deter bad behaviour.

"The behaviours school sees the mind as a black box, in the sense that a response to a stimulus can be observed quantitatively, thereby ignoring the effective thought process occurring in the mind. The schools therefore look at overt behaviours that can be observed and measured as indicators of learning." (Good, 1990).

2.2.2 Constructivism:

The second learning theory is called constructivism. It is inquiry-based and often referred to as “discovery learning”. Here, learners build a personal interpretation of the world based on experiences and interactions. Learning is seen as an active process of constructing rather than acquiring knowledge. Instruction is seen as a process of supporting knowledge construction rather than communicating facts or knowledge. Theorists to support this type of learning include Vygotsky, Piaget and Bransford. Constructivism is founded in a philosophy that says it is by reflecting on our experiences, we construct our own understanding of the world we live in. As we experience more and more events in our lives we adjust our mental models, to accommodate these new experiences, and learn from them. Learning is seen as a search for meaning and sees the student as trying to actively construct meaning from his experiences. The learning process should focus on concepts rather than isolated facts, as parts need to be seen in the context of wholes. It also focuses on understanding, and not just memorizing the “right” answers.

From a teacher’s point of view, it requires focusing on the student’s prior knowledge, and fostering new understanding. It also emphasizes hands-on problem-solving. Students are encouraged to analyse and interpret information, rather than learn facts by rote. Assessment should form part of the learning process and not just be an end in itself. It should also be a motivating factor for the students. (University of Victoria, 2009)
2.2.3 Cognitivism:

A third learning theory is Cognitivism. This type of learning sees the student as building mental models or schema. During the learning process knowledge acquisition is described as a mental activity that entails inner coding and structuring by the learner. The learner is viewed as an active participant in the learning process and there is huge emphasis on the building blocks of knowledge, i.e. identifying relationships between today's content and previous knowledge. Theorists to support this type of learning include Gagne, Gardner and Brunner. This theory stipulates that there are several different types or levels of learning. The significance of these classifications is that each different type requires different types of instruction. Gagne identifies five major categories of learning: verbal information, intellectual skills, cognitive strategies, motor skills and attitudes. Different internal and external conditions are necessary for each type of learning. For example, for cognitive strategies to be learned, there must be a chance to practice developing new solutions to problems; to learn attitudes, the learner must be exposed to a credible role model or persuasive arguments. (Gagne R., Military training and principles of learning., 1962)

Gagne suggests that learning tasks for intellectual skills can be organized in a hierarchy according to complexity: stimulus recognition, response generation, procedure following, use of terminology, discriminations, concept formation, rule application, and problem solving. The primary significance of the hierarchy is to identify prerequisites that should be completed to facilitate learning at each level. Prerequisites are identified by doing a task analysis of a learning/training task. Learning hierarchies provide a basis for the sequencing of instruction.

In addition, the theory outlines nine instructional events and corresponding cognitive processes:

1. gaining attention (reception)
2. informing learners of the objective (expectancy)
3. stimulating recall of prior learning (retrieval)
4. presenting the stimulus (selective perception)
(5) providing learning guidance (semantic encoding)
(6) eliciting performance (responding)
(7) providing feedback (reinforcement)
(8) assessing performance (retrieval)
(9) enhancing retention and transfer (generalization).
These events should satisfy or provide the necessary conditions for learning and serve as the basis for designing instruction and selecting appropriate media. (Gagne R. B., 1992).

While Gagne's theoretical framework covers all aspects of learning, the focus of the theory is on intellectual skills. The theory has been applied to the design of instruction in all domains. In its original formulation special attention was given to military training settings. However, in what may be more relevant to today, Gagne addresses the role of instructional technology in learning.
The following example illustrates a teaching sequence corresponding to the nine instructional events for the objective, recognise an equilateral triangle:
1. Gain attention - show variety of computer generated triangles
2. Identify objective - pose question: "What is an equilateral triangle?"
3. Recall prior learning - review definitions of triangles
4. Present stimulus - give definition of equilateral triangle
5. Guide learning- show example of how to create equilateral
6. Elicit performance - ask students to create 5 different examples
7. Provide feedback - check all examples as correct/incorrect
8. Assess performance- provide scores and remediation
9. Enhance retention/transfer - show pictures of objects and ask students to identify equilaterals (Gagne R. B., 1992)

2.2.4 Taxonomy of Learning Objectives

Benjamin Bloom developed a hierarchy of levels of thinking, going from knowledge to evaluation. He divided his levels of understanding into six distinct categories: knowledge, comprehension, application, analysis, synthesis, and evaluation.
Knowledge at its most basic consists of remembering dates, events and places and consists mainly of observation and recall of information. Typical questions include, list, show, label, name, or five W.’s: who, what, where, when, why. 

Comprehension expects the student to understand information, to interpret the facts grasp the meaning or compare and contrast. Questions to demonstrate this level of understanding include terms such as describe, interpret, distinguish, and differentiate.

Application of knowledge is the next level and expects the student to use the information, apply to new situations, or solve problems using knowledge or skills gained above.

Analysis of knowledge is the next step in a hierarchy, where students are expected to see patterns, recognise hidden meanings and are examined using questions like analyse, explain, and compare.

Censuses is where a student builds on old ideas or can generate new ideas from given facts or combine knowledge from several different sources or predict and draw conclusions. The question types include plan, create, design, integrate and generally come under "what if" scenarios.

Evaluation is the final level in Bloom’s Taxonomy, where a student has to compare and discriminate between ideas and presentations, and be able to access the value of something based on reasoned argument, and be aware of subjectivity. Questions to examine evaluation include decide, grade, recommend, judge, explain, or conclude.

The further a student can get down that list of competencies, the more in depth his knowledge would be of a particular topic. At certain times, a basic understanding is acceptable, or perhaps the application of knowledge may be acceptable for a particular age group, but the ultimate goal has to be evaluation. (Bloom, 1956)

2.2.5 Multiple intelligences

There are many different types of people in the world, all with their own abilities and talents. Because of this variety of talents and personalities, it would be wrong to assume that everybody learns in the same way. However, for many years students were lined up in rows, and all taught using the same methodology. While many people did some work in this area, Howard Gardener’s multiple
intelligence is seen as the benchmark. Multiple Intelligences are seven different ways to demonstrate intellectual ability. The various intelligences are outlined below:

**Visual/Spatial Intelligence**
This is a student’s ability to perceive the visual. These learners tend to think in pictures and need to create vivid mental images to retain information. They enjoy looking at maps, charts, pictures, videos, and movies.

**Verbal/Linguistic Intelligence**
This is a student’s ability to use words and language. These learners have highly developed auditory skills and are generally elegant speakers. They think in words rather than pictures.

**Logical/Mathematical Intelligence**
This is a student’s ability to use reason, logic and numbers. These learners think conceptually in logical and numerical patterns making connections between pieces of information. Always curious about the world around them, these learners ask lots of questions and like to do experiments.

**Bodily/Kinaesthetic Intelligence**
This is a student’s ability to control body movements and handle objects skilfully. These learners express themselves through movement. They have a good sense of balance and eye-hand co-ordination. (E.g. ball play, balancing beams). Through interacting with the space around them, they are able to remember and process information.

**Musical/Rhythmic Intelligence**
This is a student’s ability to produce and appreciate music. These musically inclined learners think in sounds, rhythms and patterns. They immediately respond to music either appreciating or criticizing what they hear. Many of these learners are extremely sensitive to environmental sounds (e.g. crickets, bells, dripping taps).

**Interpersonal Intelligence**
This is a student’s ability to relate and understand others. These learners try to see things from other people's point of view in order to understand how they think and feel. They often have an uncanny ability to sense feelings, intentions and motivations. They are great organizers, although they sometimes resort to manipulation. Generally they try to maintain peace in group settings and
encourage co-operation. They use both verbal (e.g. speaking) and non-verbal language (e.g. eye contact, body language) to open communication channels with others.

**Intrapersonal Intelligence**

This is a student’s ability to self-reflect and be aware of one’s inner state of being. These learners try to understand their inner feelings, dreams, relationships with others, and strengths and weaknesses. (Armstrong, 2009)

Keeping in mind that most teachers operate within mixed ability class rooms, it is likely that they will meet students with all the intelligences outlined above, and a good professional should make every effort to draw the best out of every student in their care. Any activity, visual, auditory, tactile, etc that can be brought to the classroom, will make the learning experience more interesting for as many people as possible. (Gardner H., 1991)

### 2.2.6 Learning Styles

In an average class, of mixed ability, there will be people with varying levels of the intelligences as outlined above. It cannot be assumed that all these people will learn in the same way. Students will also have different learning styles, and different approaches to learning, which they find effective. Gagne divided up the various learning styles as follows:

**Visual learners** are people who learn by watching or observing. These learners need to see the teacher's body language and facial expression to fully understand the content of a lesson. They tend to prefer sitting at the front of the classroom to avoid visual obstructions (e.g. people's heads). They may think in pictures and learn best from visual displays including: diagrams, illustrated text books, overhead transparencies, videos, flipcharts and hand-outs. During a lecture or classroom discussion, visual learners often prefer to take detailed notes to absorb the information.

**Auditory Learners** learn best by listening. They learn best through verbal lectures, discussions, talking things through and listening to what others have to say. Auditory learners interpret the underlying meanings of speech through listening to tone of voice, pitch, speed and other nuances. Written information
may have little meaning until it is heard. These learners often benefit from reading text aloud and using a tape recorder.

**Tactile/Kinaesthetic Learners** learn best by doing or moving. They learn best through a hands-on approach, actively exploring the physical world around them. They may find it hard to sit still for long periods and may become distracted by their need for activity and exploration. (Gagne. 1988) (Hawk, 2007)

It is incumbent then on all teachers and educators to engage with the students on as many levels as possible, so that their various learning styles and intelligences can be accommodated. Any new methodologies or technologies to increase the effectiveness of the teacher in the classroom should be adopted. New technologies by their very nature are expensive, but existing technologies should be used to the maximum benefit of the students. In the following paragraphs new technologies will be addressed, and the teenager’s role in adopting new technology in the world at large. A small amount of research has already been done into the effectiveness of these technologies in classroom and lecture situations, but as of now, it is still unknown if the educational value can justify the cost.

### 2.3 Teenagers and Technology

Teenagers have always been comfortable with new technology. The modern term used to describe this phenomenon is “digital native”. Perhaps the reason for this is that teenagers traditionally follow music trends. When a new method of distributing music becomes available it will be used by teenagers first. This happened with LPs, cassette tapes, and CDs, all before music went digital. When music became digitally available in MP3 format, it was the teenagers who perfected the art of transferring music from computers and from CDs onto MP3 players. They learn these skills from their peers, and the knowledge transferred seamlessly without any obvious intervention by teachers or parents. Now teenagers are exchanging and downloading songs from the Internet causing great difficulty for the powers that be in the music business.

When You Tube was launched, it was teenagers and young adults that made it successful. They became quite accomplished at recording video clips and loading
them onto the web in a very short time. In the space of a 12 month period You Tube had gone from zero to receiving 50,000 videos per day. The fact that cameras have been integrated into phones has helped You Tube enormously. The humble mobile phone, the absolute must have of every teenager in the western world, itself has undergone huge change in the last 10 years. The most recent incarnation from all the major manufacturers includes touch screen, music player, e-mail, and the ability to surf the Internet, all in a neat little package reasonably priced. Far from being fearful of the massive change it could be argued that this technology revolution is being driven by teenagers. Teenagers of today are experiencing instant access to information, high resolution graphics, interactivity, and sound in their world. Isn’t it time we engaged them at their level?

2.4 Technology in education:

For many years it has been suggested that new technologies should be incorporated into education. It is argued that they increase learner control over their own learning and thus increase motivation, and allow learners with different learning styles, to achieve their full potential. As far back as 1998 Kosakowski stated:

“Technology has been shown to have positive effects on the instructional process, on basic and advanced skills. Technology is also changing the instructional process itself.” (Kosakowski, 1998)

Education in the developed world today is very different to twenty years ago. Most schools have computer rooms, and most students have computers at home. The vast majority of students have used computers in primary school for educational purposes, but many students gained their computer knowledge through social use. The introduction of MP3 players and iPods has meant the students upload, download and burn music and film, and it is almost intuitive. They store digital content on their personal music players, their phones and on the Internet. This comfort with this medium has largely come about through collaboration with their peers, and it is their parents and teachers who are struggling with the medium. This however should not be a reason to avoid using
ICT in schools: on the contrary, if we don't introduce ICT our students are at a disadvantage. They will not get the best from the system, and they may disengage altogether. (Newman F. m., 1992)

In 1998 Kosakowski said: “Today, students use multimedia to learn interactively and work on class projects. They use the Internet to do research, engage in projects, and to communicate. The new technologies allow students to have more control over their own learning, to think analytically and critically, and to work collaboratively. This "constructivist" approach is one effort at educational reform made easier by technology, and perhaps even driven by it.” (Kosakowski, 1998).

That “drive” continues today.

With the introduction of the World Wide Web information has never been easier to access. A person with a computer and a broadband connection can surf the web, and find information about any topic, in many languages, from around the world. This instant access to information has revolutionized the way we think of information, and therefore the way we teach and learn. The advantage of the Internet for education system is that it is a wonderful resource, and all that is necessary to tap into this resource is a computer and a phone line or broadband connection.

“The World Wide Web, which has revolutionized Internet use, for example, was only created in 1994, yet the pace of adoption is eclipsing all technologies before it. Radio existed for 38 years before it gained 50 million listeners, while television took only 13 years to reach that point.” (Leach, 2000)

In a recent survey by the Irish National Teachers Organization it was claimed that there is only one computer available for every nine pupils. By comparison our nearest neighbours in Northern Ireland have a ratio of one computer for every five students. This is now being referred to as the "digital divide". (I.N.T.O., 2011).

This cannot be allowed to happen, if our educational system is to keep pace with that of other countries in the euro zone and the world at large. It will have a negative effect on our children's education, and our economy in the future.

Technology in education has been on the increase in parallel with industry at large. But while the effect of technology on running a business can be assessed
under headings of increased productivity or profitability, the educational benefits of using technology in the classroom are more difficult to quantify. One of the most prolific writers in this area is Richard E. Mayer. He has investigated in depth how students learn from multimedia presentations.

2.4.1 Multimedia learning

Multimedia learning is a term used to describe a method of presentation that uses various techniques for presenting, mainly audio and video. It relies on the concept that students learn through various channels, as we’ve seen above. One of the most prolific writers on this topic is R. E. Mayer. His learning theory was based on a number of research studies on multimedia learning. He states that the learner possesses three different channels for processing information: visual, auditory, and verbal. He also identified three critical stages in the learning process: selecting, organization, and integrating. (Mayer, 2001) Mayer refers to the first process as selecting, for the learner identifies relevant information to verbal and visual cues. A second process, organization, is where a learner uses both visual and auditory cues to organize and build relations between these verbal and visual pieces of information. The final part of the process is where the learner builds connections between the visual and verbal, creating connections, and integrating this information to aid understanding.

In his book, The Cambridge Book of Multimedia Learning, (2005), Mayer went on to outline his principles for good multimedia design. His theory of multimedia learning has three core assumptions:

1. Humans possess separate information processing channels for learning, seeing and hearing, and we process information differently through each channel. This is called the dual channel assumption.

2. Each channel is limited as the amount of information it can process at any one time, and this is referred to as the cognitive load.

3. Processing information from these channels is a cognitive process, where students construct mental representations of the information presented.

Following on from this, Mayer built a theory of how people learn from multimedia instruction, and he developed seven principles for the design of multimedia presentations to aid learning.
1. Multimedia principle: students learn better from words and pictures than from words alone

2. Spatial contiguity principle: students learn better when corresponding words and pictures are presented near rather than far apart from each other on the page or screen.

3. Temporal contiguity principle: students learn better when corresponding words and pictures are presented simultaneously rather than successively.

4. Coherence principle: students learn better when the extraneous words, pictures, and sounds are excluded rather than included.

5. Modality principle: students learn better from animation and narration than from animation and on-screen text.

6. Redundancy principle: students learn better from animation and narration than from animation, narration, and on-screen text.

7. Individual differences principle: design effects are stronger for low knowledge learners than for high knowledge learners and for high spatial learners rather than for low spatial learners

(Mayer, 2005)

If followed, these principles should lead to better student engagement.

2.4.2 Student engagement:

It is commonly accepted that students with high levels of engagement enjoy the learning process, persist longer, get more from it, and consequently get better results. There is evidence of the cognitive value of multimedia (Moreno, 2000), but very little research has been done on personalised multimedia, as opposed to commercially produced multimedia. In his article "Personalised Multimedia in the Online Classroom." Mandernach, (2008), hypothesized that personalizing a multimedia presentation would increase student engagement, over commercially produced multimedia supplements.

"Specifically, the students completing a standard online course with no instructor personalised multimedia will report lower levels of student engagement than
students completing an identical course with the addition of instructor personalised multimedia supplements: additionally, as a course has more instructor personalised multimedia components students will report increased course engagement." (Mandernach, 2009 p.6)

Mandernach used an introductory level psychology course all sections of which were taught online. All the students had the same instructor and identical course structure, assignments, and instructional material. There were four separate groups of students divided as follows:

1. Control: no instructor personalised multimedia
2. Video: brief weekly videos of the instructor
3. Audio PowerPoint: weekly videos and PowerPoint, that was narrated by the instructor
4. Video PowerPoint: weekly videos and narrated power points, along with a PowerPoint that is video narrated.

In the control group, the students had access to an array of multimedia components, including PowerPoint presentations and flash animations, all of which were professionally produced, not by the course instructor.

In the video group, the students had access to the same multimedia with the addition of a short video each week. The videos were one to three minutes long.

In the video plus audio PowerPoint group, an audio PowerPoint was produced using software that combines the PowerPoint presentation and a narration by the instructor into a single compressed flash file. This is added to the material as outlined above, and three to eight minutes in duration.

The final group of students had all the above, with the addition of a video PowerPoint presentation. This presentation combines web cam video of the instructor presenting the material, with the instructors PowerPoint presentation. Each presentation was five to eight minutes in duration.

All four groups of students were asked to fill out a questionnaire, and had terminal exams after the 10 week course. There was surprisingly little difference between the overall course grades of the four groups, considering the amount of extra material that was given to the second, third and fourth groups. In their final exams, the first group, the control group averaged 65%, whereas the video
PowerPoint group averaged 68%. In their overall course grade, the control group averaged 84%, as compared to 83% for the video PowerPoint group.

On analyzing the questionnaires however, the feedback was much more positive from the three groups, by comparison to the control group. Students in the instructor personalised multimedia conditions acknowledged of the course material was interesting and stimulating and showed an increased interest in taking future courses with this instructor. One student commented:

"The online class was organized perfectly. The one that made me feel that I was actually part of her class was posting from her web cam, all her actually explaining her favourite things each week in detail and also her slide presentations with her voiceovers." (Mandernack, 2009, p. 12)

And there were several such positive comments; Mandernach acknowledges the discrepancy between the academic results and the positive comments. He also points out certain flaws in the research, such as a small group of students and the fact that the researcher was also the instructor, something that will have to be addressed in this thesis. While this study is one of very few done into this area, and much more work in this area will have to be done in the future, Mandernach concludes that,

"It is necessary to assist universities in developing policies surrounding course design expectations as well as to guide budget decisions concerning the investment of resources in the multimedia component of online course development." (Mandernack, 2009, p. 14)

2.4.3 Teacher Engagement

Teachers may also have issues with technology in the classroom. Apart from the obvious that the technology may not be available, there are a host of problems in using the technology that is available for teachers. The most obvious problem that teachers encounter is the huge amount of time involved in creating resources and up skilling themselves. There are many teachers who are not very computer
literate, and who have an innate fear of computers and their associated technologies. (Robertson, 2007) These teachers require a large amount of in-service training to bring up their skills and confidence, to a level where they feel comfortable to use the technology and develop new resources. For all the people that are at this level, even finding resources on the Web, or on CD, can be a time-consuming task. Following an in-depth study on Web-Based Learning Tools (WBLT’s) Kay et al. concluded that most teachers consider WBLT’s easy to use. They found these tools engage students and promoted successful learning. However teachers also noted that searching for these learning tools and preparing the lessons required significant time. (Kay, Knaack, & Petrara, 2009)

As part of this study both students and teachers were given a questionnaire. Teachers were asked about the difficulty in finding a resource, preparing the resource for use and using the resource in the classroom. Students are also questioned on the resource. One of the more interesting results from this study was that when teachers perceived the resource to be effective, student's performance increased.

"In other words, student performance was better when teachers perceived WBLTs as engaging" (Kay, 2009, p. 35)

2.5 New Technologies:

When people think of technology, and in particular information technology, it almost invariably a computer and Internet access that spring to mind. But each year new pieces of equipment, which can be attached to the computer, become available. These pieces of equipment, when attached to the computer increase the interactivity possible with the information contained on the computer or on the World Wide Web. Interactive white boards and visualisers also allow the teacher to record a video clip for use at a later time, which would make PVT’s easier to produce.
2.5.1 Data Projectors

Apart from the internet and the computer itself data projectors have had probably the greatest effect in the classroom. A data projector is a device that connects to the computer, and allows a teacher to display what is on their computer screen to the whole class. The image can be projected onto a proprietary screen, but is often used with a whiteboard. This allows the teacher to make notes on the image displayed if necessary. A data projector when connected to a computer can be used to show PowerPoint presentations, photographs, videos, and allow a whole class access to the information contained on the teacher’s computer. (NCTE, 2010)

2.5.2 Smart Boards

The next piece of technology that can be attached to the computer is the interactive whiteboard. This is a touch sensitive whiteboard that allows the teacher to interact with their computer. The teacher’s finger works similar to the pointer on the computer screen, traditionally controlled by a mouse or touchpad. It allows the teacher to open programs, select objects, input data, etc. Interactive boards are generally referred to as smart boards, and most come with an array of added features. Some of these features include videoing software, keypads on-screen, sketching and drawing abilities, and a large collection of symbols and diagrams that may be useful. Many of these smart boards are height adjustable, allowing the students to also participate. (NCTE, 2010)

A study has recently been completed in Ireland by the Drumcondra Education Centre into the use of interactive whiteboards which has come up with very positive results. While the study had a small number of participants, (12 teachers) and the teachers were obviously very enthusiastic about the use of ICT in their classroom, the results seemed to mirror similar research carried out in England. It seems to have much greater appeal with the teachers by comparison to the traditional computer, perhaps because it replaces, or works beside any teacher's best friend, the blackboard. It was also suggested by the teachers involved that the extra workload required to make resources would diminish over time as these resources can be built up and filed for later use. Teachers also commented on the
interaction and enthusiasm from the students. While this may be put down to the novelty effect, a clearer picture will emerge following the second year of the study. (CBI, 2007)

It should be noted at this point however, that the National Centre for Technology in Education (NCTE.), does not feel that the interactive whiteboard is value for money. A complete system, including board projector and speakers would cost in excess of €5,000. Instead it recommends the purchase of short throw data projectors, to be used in conjunction with the standard whiteboard. As an interactive whiteboard also requires the use of a data projector, interactive whiteboards can be purchased later if necessary.

“Fixed, short-throw digital projectors and teaching computers should be installed in as many classrooms as possible rather than installing a limited number of interactive whiteboards in a greatly reduced number of rooms. Digital Projectors provide excellent value for money and are essential to ICT-enabled classroom learning. It is worth noting that digital projectors are a prerequisite for subsequent interactive whiteboard purchase and, so, do not militate against purchasing an IWB later.” (NCTE, 2010, p. 22)

2.5.3 Visualisers

One of the more recent technologies is the visualiser. This is a camera, similar to a Webcam, mounted on a stand which looks directly down on a surface. The camera is connected to the computer and will project live images onto a screen using the data projector mentioned above. This visualiser has great potential in any subject that requires demonstrations of processes or skills. Science, Woodwork or Art could all benefit from this piece of equipment. It allows the student body to get a bird's eye view of what the teacher is demonstrating, while sitting in their seats. Traditional demonstrations have the students collected around the teacher, most of which are looking at the demonstration upside down. When a teacher uses a visualiser the students remain sitting in their own seats, and they can also make notes as the demonstration proceeds. These demonstrations
can also be recorded, and used later either for revision or for a new group of students. Some other uses for the visualiser include displaying textbook, so people without the book or weaker students will remain on track. Small objects can be displayed, and notes written over it if required. These visualisers, which may not be of benefit to every class teacher, every day, but there can be a strong case made having one per school and even one per department. The cost of the visualiser is not excessive by comparison to most other IT equipment. They range in price from €300 for a basic model, to €600 for a top of the range model. (NCTE, 2010)

All of the equipment mentioned above can have great benefits in a classroom situation. However, when the student is not in the classroom, there needs to be some technological innovation to maintain the momentum achieved in school. Relying on a textbook or handwritten notes is not satisfactory. Some third level institutions have overcome this by releasing podcasts and video casts, of revision material, that students can download from the Internet, and use at their own discretion.

2.6 Podcasting:

Podcasting is a relatively new phenomenon, but one which may have great benefits for education, especially second-level education. It has been used extensively for third level education, and recreational functions. The idea of recording a lesson, for dissemination to a group later, has major potential for teachers who do a lot of talking in class. This could be potentially useful in subjects like English and History, which has format a more suitable to lecture style, and of great benefit to students who learn best, using auditory learning.

In his article “A review of podcasting in education” Oliver McGarr suggests that the use of podcasting falls into three distinctive areas.

“……point to three broad categories along a continuum of use: substitutional use, supplementary use and creative use.” (McGarr, 2009, p. 12)

Substitutional use is where the student substitutes to podcasting for attending the lecture, and he argues that this is the most basic use of podcasting. Supplementary use on the other hand, is where podcasting is used to supplement
the lecture, e.g. a summary. This can be used for revision purposes and does not substitute the original lecture. A third use of podcasting is where the student is active in creating content and is not just a passive recipient of information, which has a higher educational benefit. He argues in his conclusion that the best use of podcasting will be determined by the pedagogy of the institution involved, and that the development of podcasting should not be directed by those involved in dissemination of the technology. (McGarr, 2009)

In his article “There is something in the Air, Podcasting in Education”, (Campbell, 2005), Campbell investigates the use of podcasting at third level. He gives several reasons why podcasting is a valuable medium for education, and increasing in popularity with the students. He uses the analogy of a newspaper, and how you can get it delivered to your door. But unlike the newspaper, the podcast can be listened to while on the move, walking, in the gym, and even driving. He also uses the analogy of radio, and claims that podcasting is the new radio. And the idea that radio began as an enthusiast’s medium of communication, and entertainment, but moved into the stream of education bears more than a passing resemblance to podcasting.

2.7 Video in Education:

Video has been used extensively in education for the last 20 years. Video has been shown to be an effective means of transferring knowledge and skills, both within the school community and outside it. In 2009, Hill et al. performed an investigation into the effectiveness of using a workbook and a DVD to address patients on the risk of falling in hospital. 221 patients took part in the study, 100 of which watched a DVD and 121 of which were given a workbook. Hill concluded that there were far less falls within the group of patients who had watched the DVD.

“These findings form an emerging evidence base indicating that DVD-based education should be employed in the hospital setting, particularly for older adults.” (Hill, 2009)
A study by Parson et al into the use of podcasting and vodcasting in University claimed that:

“Traditional distinctions between part-time and full-time study, campus based and distance learning, and work, play and study are breaking down, presence and absence are becoming blurred.” (Parson, 2009)

And far from students not attending lectures to pursue other interests, it was found that attendance was every bit as high as before the vodcasts were introduced. Students relied on the vodcasts for revision and only missed lectures as a last resort. The recommendations from the students were to combine the vodcasts with PowerPoint presentations. This could be one of the experiments addressed in this thesis.

2.7.1 YouTube:

As mentioned above technology usually works its way into education some years after its initial inception. This is no different with video. As the prices fell more and more video players and TVs were seen in class rooms. Students and teachers are now comfortable with watching a documentary on a particular subject relevant to the course. (Willis, 2009) A new phenomenon, YouTube, has revolutionized this practice, and introduced a new term, "the video clip".

In 2005 a new phenomenon was added to the Internet, YouTube. The idea was simple, allow people to upload video clips of themselves and their activities, so other people could watch online. One year later, over 50,000 videos per day were being added. YouTube was purchased by Google for 16.5 billion at the end of 2006 and today, over 100 million videos are being watched daily by people all around the world. It is free to set up an account with YouTube, and apart from certain restrictions on copyrighted content, users are free to upload any material they like. As a result, YouTube has become a phenomenal resource for teachers and students alike. It is not uncommon for a teacher to start a class with a video clip, followed by discussion or reference to factual material from a text book.
It should be noted however that YouTube, because of its very nature cannot be relied upon for factual information. Instead you're getting a person's opinion, which may not have access to all the relevant factual data.

One thing YouTube is quite good at is giving visual and auditory demonstrations of skills and events: an experiment, a demonstration of a process, a volcano erupting, all events available in YouTube, which can be used in the classroom. Moreno, a strong supporter of the use of video in the classroom argues that the lecture style of teaching only applies to "linguistic learners", and the lessons that use audio video presentations, “Reach more students and provide greater opportunities for learning." (Benny, 2010)

As mentioned above there is a huge amount of video available online. There is also a huge array of WBLT's available, and the issues that teachers had in sorting through those, to find appropriate resources for their class,’ has also been discussed. The same can now be said of video, where teachers and students may spend a lot of time searching for a particular video clip. From a student’s point of view, it is very easy to get distracted on You Tube, as all sorts of entertainment and funny videos can lead students astray. Of course teachers can also be distracted!

As these videos are often made by enthusiasts the video quality and the sound quality may not be adequate for a classroom situation. Willis in her article "Video: the Good, the Bad and the Ugly" compares video production to that of literary skills. She argues that the quality of video production will not be high unless there is some intervention to teach people the value of good production techniques. Writing is a skill that can be taught, and there will always be good and bad essays and articles. Likewise video production can be taught, and should be taught, to increase the quality of videos that are available online.

“In short, while video is everywhere, the mandate for educators should be to direct creative and critical attention to its emergent forms and possibilities.”
(Willis, 2009)
It would be convenient therefore, if there was one website where teachers could research video clips that would have been deemed appropriate by other educators. It is this problem that led to the setting up of Teacher Tube.

2.7.2 **Teacher Tube:**

As an indicator of the success and use of You Tube in education, a spinoff called Teacher Tube has come into existence. Teacher Tube as the name suggests, is an online portal run on the parallel platform to You Tube. However, its main contributors and users are educators around the world. To get an account on Teach Tube, one must first register as an educational account holder. Once registered, the teacher has access to a vast array of content categorized by subject, which has huge advantages. The most obvious saving is the time, by not having to sift through amateur video, which is not relevant.

One of the limitations of both Teacher Tube and YouTube is that these videos are usually hosted on an external site and may be removed without warning. This may cause difficulty if the video clip is embedded in the presentation (copy and paste the URL of the video into the educator’s own presentation). Some videos, but not all, are downloadable i.e., they can be saved to a folder on a personal computer for use at a later date. Herschel and Jones (2005) declared that there is great potential for use of video within the educational remit:

"Of all the technology is used in knowledge management, video holds the most promise for enabling the effective transformation of tacit knowledge to explicit knowledge via externalization." (Herschel, 2005)

2.8 **Conclusion**

To conclude, it is likely that in this time of recession, there will be major cuts to education. However much of the spending that has already happened in education has brought new technologies to the classrooms. It is incumbent on teachers to get the best possible value from this technology, and at every opportunity use it to its maximum. Communication technology is around our students in everyday life,
and we should build on their familiarity with it. It is the opinion of the author that
any money to be spent in the future should be spent on the education of the
teachers, and how to maximize use of this technology.

“Effectively teaching this form of awareness and skill is no small task, as we
educators likely do not possess these ourselves. This is the task before us,
nonetheless. Not to be misconstrued, I am by no means an unabashed cheerleader
for technological innovation. However, I take it is a fact that communication has
changed and is changing, and technology and multimodality are inextricably
linked to those changes.” (Nelson, 2006, p. 72)

It is important to start now, to use this technology to its full potential so that we
can help those students who learn differently. This is not a new idea, but in the
present climate it is more valid than ever.

Technology works in the classroom, (Hill, 2009), (Parson, 2009), and as study aid
outside of the classroom (Parson, 2009), (Moreno, 2000), (Willis, 2009).
Students are comfortable with using technology, with social networking, and
video hosting sites. From the small number of studies done, most teachers
embraced technology enthusiastically, especially if it is seen to work. (Abrams,
1996) (Baler, 2002). When working with interactive whiteboards, teachers could
see that resources could be prepared and saved for later. This meant that even
though there was work involved initially, this workload will decrease over time.
(CBI, 2007) As this technology moves into various departments, sharing of
resources would reduce his workload even further.

On a personal note, the author embraces technology wholeheartedly. As a student
who struggled with English throughout his student life, he is now writing this
thesis using voice to text software. Spell Check has improved his grammar and
spelling. He can now confidently produce written reports and PowerPoint slides
both for his students and his fellow teachers. It has made him a better teacher,
and an inspiration to students with various learning difficulties.
Chapter 3 Methodology

3.1 Introduction

This chapter outlines the method of research to be used in this study. It outlines some of the more popular types of research, and ultimately decides which type is best suited to this project. It also looks at collecting data, analysis of data, and drawing conclusions from the information gained. Piloting of surveys will also be discussed.

3.2 Research Questions

The purpose of this study is to investigate the use of Personalised Video Tutorials, and their effect on student learning, and teacher’s teaching. The previous chapter, the Literature Review, gave strong indications that there is an educational benefit from students viewing PVT’s. (Mandernack, 2009) This chapter will set out the methodology to be used in this study, and why this method is deemed appropriate.

There are three different areas that need to be investigated.

1. There is a need to collect data from student results, having undergone the process of watching PVT’s. A group of teachers of various subjects spread throughout the secondary school system, with students at various levels and of varying ability, will be involved in both producing the videos and the subsequent testing.

2. There is also a need to assess the student's perception of the PVT’s. This will be achieved by asking them to fill out a questionnaire at the same time as their final test.

3. Finally, the teacher’s view of the process has to be assessed. The teacher’s view in the whole process is crucial. If teachers find this process beneficial, then there is a much greater likelihood that they will embrace the technology and use it in the future.
3.3 Background to the Research

The Literature Review showed that video is an effective means of communication. Studies by Hill (Hill, 2009) and Parson (Parson, 2009) both showed the effectiveness of the medium in education. Marshall stated that lessons which use audio and visual presentations,

"...reach more students and provide greater opportunities for learning". (Marshall, 2007, p. 4)

Most of the aforementioned research has taken place outside the second level schools system. While there is much anecdotal evidence of second level students using You Tube for entertainment, there has been no research to date into the use of PVT’s. This research aims to address that issue.

3.4 Research Setting

The school chosen for this study is a second level school, with students ranging in age from 12 to 18 years old. It has over 600 students, both boys and girls, taking a broad range of subjects. It has over 50 teaching staff, both men and women, all with varying years of experience and qualifications. The students involved in the study were non-exam classes, including first year, second year and fifth year. Various members of staff were approached, with a view to having an even subject distribution and age profile. A total of eight teachers agreed to participate in the study, with varying levels of competency in I.T.

3.5 Types of Research

Anderson defines research in education as a disciplined attempt to try and solve problems through the collection and analysis of data for the purpose of description, explanation, generalization and prediction. (Anderson, 1998)
Burton and Bartlett (Burton, 2005) hold the view that educational research is simply the formalization of everyday interactivity. Watching other people doing what they normally do becomes observation. Asking questions about the activity becomes interviewing. Having questions in a written format becomes a questionnaire. The principal difference then, between educational research and normal interactivity is the formality by which the information is collected, collated and analysed.

### 3.6 Research Paradigm

A research paradigm is a term used to describe different types of research, and the different methods of collecting data within each. The positive paradigm is concerned with observation and understanding human behaviour. This paradigm often uses research carried out in two identical groups where one is a control group in which nothing is altered and the second is the experimental group where some conditions have been altered in a controlled manner. This allows the researcher to measure any changes that have taken place in the experimental group. This type of research is often seen as being objective, in that it produces findings that are unaffected by the researcher’s bias. (Anderson, 1998)

The anti-positivism paradigm states that knowledge must be personally experienced, rather than gained from somebody else's work. As a consequence, the only knowledge of value within this report would be that gained by the researcher while participating in the study himself and all information from external sources such as other teachers and students is inadmissible. (Anderson, 1998)

### 3.7 Methodologies

Outlined below there are three methodological approaches to conducting research, with a view to selecting an appropriate method for the purposes of this study.
3.7.1 Action Research

Action research combines practical problem solving combined with scientific research. It involves the researcher examining their work, with a view to discover new opportunities to improve. This is a process that the majority of teachers use regularly, but on an informal basis. Cohen suggests that action research involves,

"..... identifying a problem, planning an intervention, implementing the intervention and evaluating the outcome". (Cohen, 2005)

This could be seen as a cyclical process, where a problem is identified, a solution implemented, an evaluation undertaken, further problems identified, a solution implemented, etc.

The advantage of action research is that it tackles problems in a practical way. It’s main disadvantage however, is it’s focus on the specific, and the difficulty in drawing general conclusions. Another disadvantage is that the researcher may find it difficult to detach themselves from the research. Bell states that "Interviewers are human beings, not machines", and therefore may influence unwittingly the outcome of any research that they are involved in. (Bell, 1992, p. 139)

3.7.2 Experiments

Experiments are concerned with seeking to find out the reasons behind any change in human behaviour. It usually follows the following format:

- make an observation
- establish a hypothesis
- carry out an experiment
- evaluate the results
- draw conclusions
A major advantage of experiments is that they are repeatable and precise (Denscome, 2003). Denscome describes experiments as,

"...... an empirical investigation under controlled conditions designed to examine the properties of and relationship between specific factors." (Denscome, 2003, p. 56)

One of the difficulties with experiments is the need to get accurate data often contributes to artificial settings, which in itself could make the results unrepresentative. This method of collecting data, particularly on large groups, may be appropriate in this case. By using eight teachers and up to two hundred students, a lot of data will be generated, which will hopefully counteract the artificial setting problem mentioned above.

3.7.3 Case Study

Case studies focus on a few instances of a selected event with a view to providing an in-depth analysis of what actually happened before during and after the event. (Denscome, 2003) The instance of the event that has been studied is referred to as the case. The case study has advantages in that it can reach greater depth, than either action research or experiments. Cohen sees the case study as,

".... a rich, vivid and holistic description of portrayal events, contexts and situations". (Cohen, 2005, p. 46).

Denscome points to the strength of the case study approach in that it allows a researcher to use a variety of sources, a variety of data and a variety of research methods. (Denscome, 2003)

3.8 Approach Adopted

The case study approach has been chosen for this piece of research, combined with an experiment because this body of work has to be completed within a specific timescale, and that places time constraints on the researcher. The
management team of the school is also very interested in the research, particularly when the empirical nature of the study was outlined, as it would be seen by them to be more valid and objective. It may be possible at some time in the future, to undertake a more in-depth study of this particular topic, where a combination of research methods would be more appropriate. As the authorities of the school involved, are very interested in this piece of work, the experiment may be enlarged and repeated again.

For the experimental component of this research, students are asked to watch a Personalised Video Tutorial and sit a test. As each class group is taught the particular topic, the teacher will inform them of the availability of a PVT on the school website. Not all students will chose to watch this PVT, and some students will be unable to watch the PVT for technical reasons. This group will become the control group, where no PVT is watched, and give a baseline of results. In the student questionnaire students will indicate if they watched the PVT or not. The students, who had not watched the PVT, could be identified when tabulating the results and thus become the control group. By repeating this experiment with different class groups and different teachers, it is hoped to get an accurate view of the effect of PVT’s on the students.

Students and teachers, who participate in the study, will be also asked to fill out a questionnaire, to investigate their opinion on PVT’s. This will also help in the triangulation of results, i.e. the removal of bias by analyzing data from just one source.

3.9 Research Instruments

In this study, the majority of the data will come from quantitative research; the raw scores from the student testing that will take place before and after the viewing of a PVT. The eight teachers involved in the study will be called to a meeting and shown how to make a PVT. The piece of software to be used is a screen recorder that comes free with the software for the Smart Board. Smart Board is a brand of interactive whiteboard available in the school and in many other schools in the country. Each teacher is to select a PowerPoint presentation
which they would use to teach their class a particular topic. After finishing that topic students will be tested some days later. This will give a set of baseline results for that topic. The teacher will then produce a PVT using the same PowerPoint presentation that they had used in the class, but add on a voice-over, explaining salient points and highlighting areas that needed special attention. This video will then be hosted on the school website, on the appropriate subject page. This will take place prior to a two-week break. The students will be made aware that on their return from their holiday they will sit the same test again, and that a PVT is available on the school website to aid them with their revision. On their return the students will take the same test as they sat before the two-week break, and the teacher will have a second set of results for the same test. These results will be given to the researcher. Each student will also fill in a questionnaire, to investigate if the student looked at the PVT on the website and if so how often. There will also be questions relating to ease of use and value of the PVT’s in general.

The teachers involved in preparing these PVT’s will be asked to fill out a questionnaire, with the general aims of finding out the teachers’ views on the experiment and if teachers would use PVT’s again.

The use of the three instruments outlined above, should increase the validity of the information gained. The process of using several different instruments to look at the same problem is called triangulation. Yin, (Yin, 1994) advocates the use of multiple sources of evidence to mitigate against researcher bias. It has to be acknowledged however that as a teacher involved in this research, personal bias may have an effect on the outcome. Indeed it should also be noted that participating teachers (and maybe students) may unwittingly affect the outcome of this research, simply by their enthusiasm for the technology involved. (Shuttleworth, 2008)

3.10 Ethical Considerations

It is important to ensure the protection of the participants in the research, and also the researcher involved in the study. Cohen, (Cohen, 2005) stipulates that
research should be conducted rigorously, and that readers have a right to expect that the research has been conducted in a fair and honest manner. Winter, (Winter, 1987), outlines a number of key principles that should be noted while undertaking research. He states that the researcher must ensure that all the relevant people in authority must be consulted. People may not wish to participate, and those wishes must be respected. Permission must be obtained before examining other people's work, or documentation which they have produced. Comments on people's work must be made available before being published, and finally the researcher must maintain complete confidentiality.

Permission will be sought from the principal of the school to conduct this research. (Appendix F). A selection of staff will be approached to take part in this study, to get an even spread of subjects, and all staff will be told that they will not be named, and all data generated will not be passed on to any third party. All data collected will be securely stored and all original paperwork will be destroyed. Teachers will be identified alphabetically and students numerically for publication in the appendices of this thesis.

3.11 Sample Group

It is not possible to survey or test the whole school, and therefore only first year, second year and fifth year students will be selected to take part in the study. Leaving Certificate and Junior Certificate students are omitted from the testing as they will be preparing for their mock exams at that time. The eight groups of students will be selected by the individual teachers participating in the study, and therefore the researcher has no influence. In total this will result in a group of over 200 students, some of whom will be surveyed and tested more than once, as they are taught by more than one of the teachers involved. This group is seen as very representative of second level students both in the school and in the country, and the school itself is also seen as representative of schools in the country by virtue of its size and location.
3.11.1 Limitations of the Sample Group

The main limitation of this study is a relatively small sample group taken from one school. This can be addressed in further studies by selecting various schools in various parts of the country. This would involve greater manpower and resources beyond the scope of this study. A second limitation that could affect the credibility and reliability of the research is that both the students and teachers know the researcher and may make efforts to tailor their responses to what they believe the researcher wants. Again, by extending the sample group to different schools in different counties this could be eliminated. Finally, because the technology is quite new in the selected school, the novelty effect of listening to your teacher online may increase the student’s use of PVT’s. As the management of the school, and the teachers involved, show great enthusiasm for the project, more teachers may get involved, and the novelty effect will be lessened over time. This may open the way for a further long-term study, which would significantly reduce the novelty effect.

3.12 Reliability and Validity

The teacher’s questionnaire will give an opportunity for the class teachers to share their views on PVT’s, and their effectiveness as a method of revision. It will also give the author an insight into the teacher’s technical competence, and the technical support they need. The student questionnaire will provide an opportunity to investigate the student's perception of PVT’s and also to ascertain how many students actually watched the PVT provided online. This will be crucial as it creates the two groups of students used in the experiment: those who watched the PVT and those who didn't. The most important data comes in the form of the two test scores provided by the selected teachers. The three methods mentioned above when combined will increase to reliability and validity of the results.

"Triangulation may be defined as the use of two or more methods of data collection in the study of some aspect of human behaviour."

(Cohen, 2005, p.112)
“Triangulation is a powerful way of demonstrating concurrent validity, particularly in quantitative research" (Cohen, 2005, p. 112)

3.13 Summary

This chapter outlined the research methodology which will used to conduct this study. It examined the various types of research and indicated the research instruments as; a series of results taken from the experiment, student questionnaires, and teacher questionnaires. It also outlined the procedures involved in each. The setting and the subjects were also described in detail. Reliability and validity were also discussed along with the potential weaknesses of the study.

The following chapter will present the findings of the research. It will examine in detail the results from the testing, and the results of both the teacher and student questionnaires. The results will be presented graphically where possible, and any trends or anomalies will be identified.
4.0 Introduction

In this section the results from the research will be presented. There are three sources of data to be analysed, the teacher’s questionnaire, the student's questionnaire, and the results from the “before and after” testing.

4.1 Teacher's Questionnaire

Eight teachers were involved in the research, from a variety of subject disciplines and have varying levels of IT abilities. Each teacher was asked to fill in a questionnaire, (Appendix A), to be returned at the same time as they were returning their results, (Appendix B), from the student testing. The teacher's questionnaire involved answering 12 questions, with a view to finding out what the teacher's impression of Personalised Video Tutorial was, specifically their opinions on the workload involved versus the overall benefits to students. It also set out to discover the level of competency among the teachers with using IT in general. Appendix D shows the results for all eight teachers and their individual response to each of the twelve questions. The following paragraphs will outline the results to each of those questions individually. Each question was answered on the Likert scale, with values ranging 1 to 5, 1 being the most positive and 5 being the most negative, with the exception of questions F, G and K, which were scored as 1 or 2.

4.1.1 Question A: How long have you been teaching?

Question A was designed to find the age profile of the teaching group. It is divided into five year intervals ranging from less than five years, point 1 to greater than 20 years, point 5. This question gave a broad spread of results, with six people having teaching experience between 5 and 20 years. One person had greater than 20 years and one person had less than five years teaching experience. On averaging out the scores the average working experience was 10 to 15 years.
4.1.2 Question B: How difficult was the process of making your revision video?

Question B was designed to find the level of difficulty the teachers experienced in producing their own video, where point one regarded the process as very difficult and point five regarded the process as easy. The majority of teachers answered this question at number four on the scale. 50% of teachers found the process of making the video not difficult, and nobody found the process quite difficult or very difficult.

4.1.3 Questions C: Did you find process interesting?
Questions C sought to find out the level of interest the teachers had in the whole process of making a Personalised Video Tutorial. 63% of the teachers found the process of making their video very interesting, with the remainder of the group finding the process quite interesting. As all of the teachers were very positive towards the making of their own videos, the researcher had only to play a supporting role. Each teacher made their own video using the researcher’s laptop or in one case loaded the software required onto their own laptop for future use.

4.1.4 Question D: How much help as you get while making your revision video?

On question D, the amount of help required in the making of the video, 38% of the teachers said they required a lot of help in making the video with an equal number saying they required some help. This would be at odds with the researchers experience as he provided the help and support to the staff members as they produced their videos. All staff attended a 45 minute lesson on how to produce PVT’s and some staff members only required a five-minute tutorial on how to move the slides, while recording a voice-over.
4.1.5 Question E: In your opinion, did students find the exercise interesting?

On the teacher's perception of the student’s interest in PVT’s, 50% of the staff surveyed suggested that the students found the process quite interesting. Nobody suggested that the students found the exercise boring or not interesting. This may not have been true, as can be seen further on in this chapter. As the student questionnaire was analysed, a very large percentage of the students did not access their teacher’s tutorial on-line. While some technical difficulties were reported, the level of student interest in the project would have to be called into question, and actual student interest does not reflect the teachers’ perceptions of student interest.
4.1.6 **Question F:** Would you be willing to repeat the process for yourself in the future?

When asked if they would repeat the process again for themselves, 100% of the teachers responded positively and said that they would.

4.1.7 **Question G:** Did you look at your revision video on the web?

When the teachers were asked if they had watched their own video as hosted on the School website, 87% of the teachers had done so. This question was asked to try and gauge the level of interest by the staff in this project, as they all would have seen their video several times before it went online.
4.1.8  **Question H:**  How long did it take you to make your revision video?

When asked how long it took to make the revision video 50% of the staff replied between 10 and 20 minutes. 25% of teachers said between 20 and 30 minutes, and only 13% spent between 30 and 40 minutes making their video.

<table>
<thead>
<tr>
<th>Time Range</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>less than 10 minutes</td>
<td>25%</td>
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<td>between 10 and 20 minutes</td>
<td>50%</td>
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<td>between 20 and 30 minutes</td>
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<td>longer than 40 minutes</td>
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![Chart 6: How long did it take to make your revision video?](image)

4.1.9  **Question I:**  Would you attend a one hour in-service on how to make further revision videos?

When asked if they would be interested in participating in an in-service on making revision videos, 100% of the staff said they would be willing to attend.

4.1.10 **Question J:**  How often do you use a PowerPoint presentation in class?

Question J sought to determine the level of IT competency among the group of teachers. This question would be cross-referenced with the student questionnaire which asked "How often does your teacher use a PowerPoint presentation?" Question J showed that 63% of the staff used a PowerPoint presentation more than once a day during their teaching. A further 25% of the staff used a
PowerPoint presentation at least once a day, with only 13% using a PowerPoint presentation once a week.

### Chart 7

**How often do you use powerpoint in class?**

- **More than once a day**: 62%
- **Once a day**: 25%
- **Once a week**: 13%
- **Less than once a month**: 0%
- **Once a month**: 0%

### Chart 8

**Have you a fixed data projector in your room?**

- **Yes**: 25%
- **No**: 75%

**4.1.11 Question K: Have you a fixed data projector in your room?**

Question K wanted to determine the level of technology provided to each of the teachers involved in the survey. All staff in the School are provided with laptops, and all classrooms have whiteboards. Only one teacher in the group did not have a fixed data projector in the room. (The same teacher who only uses PowerPoint presentations once a week)
4.1.12 Question L: Where did you get most of your PowerPoint presentations?

Question L tried to determine how the teachers collected their digital resources. 50% of the teachers made their own PowerPoint presentations and 25% got their PowerPoint presentations from their Subject Teachers Organization. One teacher found his PowerPoint presentations by searching the internet.

![Chart 9: Where did you get most of your powerpoint presentations?](chart9.png)

4.2 Students’ Results:

Each of the teachers involved in the study taught different subjects to different year groups and each teachers’ results, and their student’s survey results are going to be examined below. Each teacher will be identified by a two letter code and each student by a single letter. Each teacher involved in the study returned three things to the researcher:

1. Teacher questionnaire (Appendix A)
2. List of student names with two sets of results (Appendix B)
3. Complete set of questionnaires filled out by each student in their group. (Appendix C)
The two sets of results were generated as follows: teachers were asked to teach a particular topic of their choosing. They would then test the students in their normal way, and note the results. This happened before Easter break and the students were advised that they would sit the same exam again on their return. They were also told that a personalised video tutorial was available on the school website, under student resources. When the students returned after their two week break, they were tested again by their teachers, and this gave the researcher two sets of results, before and after. This data was then loaded into Excel, (Appendix E), so that it could be analysed. Each sheet corresponds to one class group with a list of student names, both sets of results, their changed exam score, and the students’ replies to each of the six questions on the questionnaire. Printouts of the raw results (excluding the students’ names) can be seen in Appendix E. The results for each teacher were plotted graphically, and each one appears below. All the class groups were larger than indicated below, but students had to be removed from each class group because they may have only completed one test, or may not have submitted a questionnaire. Only students who completed both tests and completed a questionnaire have been included, so as not to distort results. The blue line indicates the number of times each student watched a movie online. To share the same vertical axis line, the number of times a student watched the video is increased 10 fold.

4.2.1 Teacher RO

Teacher RO had 23 students in his group, and the subject was Second Year Technical Graphics. The average score for the first test was 37% and the average score for the second test was 51%, an increase of 14%. 39% of the 23 students watched the video on line. 43% of the students found the subject difficult sometimes, the second highest point on the Likert scale. 61% of the students said the teacher used a PowerPoint presentation every day. 36% of students said that their favourite part of the teacher's movie was that they could watch the movie more than once. 91% of students said that more teachers should produce revision videos. Chart 13 below shows a correlation between watching the movie (blue line) and increase scores (red line). If a student watched the video twice, this is
indicated on the chart as 20. Also on the vertical axis is the percentage gain or loss of each student between the two test results. Student A had an increase of score of 5%, having watched the online video tutorial twice. Student K did not watch the movie online and his score fell by 20%.

![Teacher RO Chart](image)

Chart 10

### 4.2.2 Teacher UR

Teacher UR had 14 students in her group, teaching fifth year Irish. The average score for the first test was 67% and the average score for the second test was 75%, an increase of 9%. 100% of the students watched her video online, and 60% watching the video more than once. 43% of the students said they found the subject difficult sometimes, and 64% of the students said there are teacher used a PowerPoint presentation once a week. 50% of the students indicated that the ability to pause the movie anywhere was the most important thing for them. 93% of the students thought that more teachers should produce revision videos. Chart 11 below shows a correlation between watching the movie and increase scores in
this class group. Student E watched the movie twice, but his score decreased by 10%, showing that not everybody’s score increased.

**Chart 11**

4.2.3 Teacher LA

Teacher LA had 14 students in her group teaching business studies to fifth years. The average score for the first test was 73% and the average score for the second test was 70%, a decrease of 3%. 93% of the 14 students watched the video online, but 70% of the students watched the video only once. 29% of the students said their favourite part of the online tutorial was that could pause the movie anywhere they liked. 65% of the students in this class thought that more teachers should produce revision videos. Student C having watched the movie once had a decreased score of almost 70%.
4.2.4 Teacher AI

Teacher AI had nine students studying Home Economics at fifth year level. The average score in the first test was 58% and the average score for the second test was 64%, an increase of 6%. 44% of the students watched her video online and 44% of the students said their favourite part of the teacher's movie was that they could choose when to look at the movie. 77% of that student group said that more teachers should produce revision videos. 55% of the students said they found the subject difficult sometimes, which was the second point on the scale. Student B watched the movie three times, more than anybody else in the group and had the greatest increase in score, up by 37%.
4.2.5  Teacher CI
Teacher CI had 27 students in the group and the subject matter was Maths at second year level. The average score for the first test was 85% and the average score for the second test was 79%, a decrease of 6%. A lot of red peaks below the zero line are evident giving an average decrease of 6%. 30% of the students watched a video online and 50% of that group said that their favourite part of the movie was that they could hear the teacher explaining a salient point. 74% of the group said that more teachers should produce revision videos.

![Chart 14](image)

4.2.6  Teacher TM
Teacher TM had 10 students in his group and the subject matter was History at third year level. The average score for the first test was 66% and the average score for the second test was 77%, an increase of 11%. 54% of the students watched the video online, and of that group 50% said the best part of the movie was being able to hear the teacher explaining. 38% of the students said they rarely found the subject difficult. 69% of the students said that their teacher only used a PowerPoint presentation once a month. 54% of the students watched the
movie only once. 69% of this class group thought that more teachers should produce revision videos.

Chart 15

4.2.7 Teacher VI

Teacher VI had 20 students in her group and the subject was second-year Science. The average score of the first test was 67% and the average score for the second test was 63%, a decrease of 4%. Only 20% of the students watched the video online. 60% of the students found the subject difficult sometimes. 100% of the students said the teacher used PowerPoint every day, and 45% of those students found PowerPoint presentations very helpful. Of the group of students who watched the video online, 50% said the best part of the movie was that they could pause it at any time. 85% of the students were in favour of more teachers making video tutorials.
4.2.8 Teacher TY

Teacher TY had 12 students in his group of second-year woodwork. The average score in his first test was 63%, and the average score in his second test was 69%, an increase of 6%. 75% of students watched the video online, and 25% watch the video more than once. 58% said that the teacher used a PowerPoint once a week and 91% of the students thought that more teachers through produce on my video tutorials. Student C, who did not watch the movie, had a decreased score of 30%, one of the highest in the whole study.
4.3  Student Questionnaire

4.3.1  Question A: Subject Difficulty

Students were asked do they find the subject difficult, and the largest percentage found the subject difficult sometimes, and only 27% indicated they rarely or never had difficulties.

![Chart 18]

4.3.2  Question B: Teacher use of Power Point

When students were asked how often does your teacher use a PowerPoint presentation 58% responded once-a-day and 82% see their teachers are using a visual aid more than once a week. Less than 20% of the students indicated that it teacher uses a PowerPoint less than once a month.
4.3.3  Question C: Are Power Point Presentations Helpful?
When the students were asked if they found a PowerPoint presentation helpful almost 80% said they were helpful or very helpful. Only 2% of the group found that the visual stimulus was not helpful or they did not like them.

4.3.4  Question D: Did You Watch the Tutorial?
When asked how many times did you watch the tutorial, 47% of the students did not watch the movie at all. Some students reported technical difficulties, as the movie had to be downloaded before it could be watched. This however gave a reasonably even spread between those students who watched the movie and those
who didn't. Therefore the control group was 47% of the students surveyed the people who did not watch the movie at all. 31% of the students watched a movie only once, and 22% of the students watched the movie more than once.

![Did you watch the tutorial?](chart21)

**Chart 21**

### 4.3.5 Question E: Best part of tutorial

When the students were asked what was the best part of the teacher's tutorial, 29% indicated they could pause the movie wherever they liked. 23% indicated that they could watch the movie more than once, which is consistent with question D, where a total of 22% of the students watched the movie more than once. 21% of the students said that hearing their teacher explaining was the best part of the teacher’s movie. 15% said that using the computer to revise was the best part, and 12% said their ability to choose when to look at the movie was the most important part them.
4.3.6 Question F: More teachers produce tutorials

When asked should more teachers produce revision tutorials, 90% of the students surveyed said yes, which shows the overall popularity of using video as a means of revision. This conflicts greatly with question D, above where 47% of the students did not watch the movie. All of these discrepancies cannot be accounted for by technical issues.
4.4 Foreign Nationals

From the list of over 200 students, 19 students were foreign nationals i.e. English was not their first language. Some students had moved to Ireland recently and some students had been born here to parents who had immigrated to Ireland. All the students reported having varying levels of difficulty with the English language. Student B did not watch the video and had the same score in both test 1 and test 2. Student A watched the video once and increased their score by 20%. The average score of the students who watched the video was 4.2% and the average score for those students who did not watch the video was -4.4%.

This is a greater discrepancy that seen in the other results. This is displayed in chart 24 below

![Chart 24](image-url)
4.5 Conclusion

All the results from the eight teachers were compiled together. Each of the teachers students were separated into two groups, those who had watched the video tutorial online, and those who had not watched the video tutorial. For both sets of students a new set of figures emerged. Chart 25 shows the differences in each class group, and the averages for both groups.

![Chart 25](image)

The average improvement over both tests in teacher RO’s class was 14%. However after separating the students, those who watched the video had a 27% increase but those who had not watched the video had a 4.2% increase. Teacher VI had an average drop of 4% between test one and tests two. After separation, those who watched a video they had a drop of -2.3% while those who did not watched a video had a drop of -5.3%.

On average those students who watched the online tutorial gained eight percentage points, while those students who did not watch the online tutorial improved by one percentage point. Chart 25 shows the average result for each
teacher, the blue line indicating the results of those students who watched the video and the red line indicating the results for those students who did not watch the tutorial. The blue horizontal line is the average improvement for all those students who watched the tutorial, about 8%. The horizontal red line represents the improvement for all those students who did not watch the tutorial, a 1% increase.

The next chapter will discuss these findings in greater detail.
Chapter 5   Discussions

5.1    Introduction

Over the last number of years, video as a medium of communication has expanded exponentially, with the advent of You Tube and similar video hosting sites. The vast majority of our students are comfortable with video as a medium, and it has shown to be an effectual method of education. (Willis, 2009), (Horst, 1989), (Pavio, 1986). The medium stimulates both the visual and the auditory channels, which allows students with particularly strengths in this area to benefit. (Mayer, 1997). The following chapter will discuss the findings of the previous chapter and relate them back to issues raised by the Literature Review.

5.2    Effect of Personalised Video Tutorials on Student Results

One of the advantages of Personalised Video Tutorials is that they can facilitate a blending of technology and pedagogy that suits a particular objective. The teacher can add to the visual presentations as much supplementary information as is deemed appropriate for the particular class.

From the students perspective the personalised video tutorial has all the advantages of being in the classroom with the added advantage of being able to replay and pause the video clip. This gives the student control over their learning, and the ability to revisit this information for revision purposes. According to Pavio the use of video taps the learners audio and visual channels in the brain and enhances the students learning effectiveness (Pavio, 1986). Mayer’s view of multimedia learning supports this view and suggests the existence of both auditory and visual methods for allowing information to be coded and processed in the brain. (Mayer R. E., Multimedia Learning, 2001)
While many people support the use of video in education there is very little empirical data to support this assertion. In one of the few pieces of research into personalised multimedia Mandernach hypothesized that personalizing a multimedia presentation would increase student engagement and scores, over commercially produced multimedia supplements. (Mandernach, 2009). Furthermore, with the addition of more and more instructor supplements students will report increased success. Mandernach reported surprisingly little difference between the four groups, but still concluded,

".... it is necessary to assist universities in developing policies surrounding course design expectations as well is to guide budget decisions concerning the investment of resources in the multimedia component of online course development." (Mandernach, 2008)

In this study, using a sample group of eight teachers and over 200 students, the difference between those who watched the video tutorials and those who did not watch the video tutorials was significant. On average all students increased their score but those students who watched the PVT’s gained an increase of 8%, while those students who did not watch the PVT’s gained only 1%. Not all teachers’ results showed an increase however. Teacher LA and teacher AI both had a decrease in average score. This does not suggest the failure of the experiment with these two members of staff as it could be argued that the difference in scores would be even greater if the students had not watched the PVT’s. The greatest difference between those who watched the video tutorial and those who did not occurred with teacher RO. This does not suggest that teacher RO unfairly affected the overall results. Almost 50% of his students did not watch the video at all, but those who did watch the video, improved significantly. This may be due to teacher RO having greater experience in using the medium of PVT’s. It could be also argued that this greater discrepancy could be attributed to the Hawthorne effect, i.e. the students wanting to please the teacher, may have distorted the results.

This study does not claim to provide conclusive evidence that PVT’s have a positive effect on student learning. However, the results from the empirical
testing were very positive. A larger study spread over various school types and locations with a larger spread of subjects would appear to be very worthwhile.

5.3 Teacher Perceptions of Personalised Video Tutorials

In the Literature Review, it was found that teachers are very supportive of new technologies. They are willing to engage, learn new skills and build up new resources suitable for these new technologies. Apart from the obvious problem of time management teachers embrace new technologies and perceive them to be a teaching aid that has great benefits for their students. A study conducted by Kay et al. on Web-Based Learning Tools (WBLT’s) found that teachers perceived these educational aids improved their students learning. Significantly it was also found that the teacher's perception of the effectiveness of these teaching aids had a large effect on the actual effect of the teaching aids. (Robin Kay, 2009)

The teachers involved in this case study were very supportive of video tutorials. When asked if they would be interested in participating in an in-service on making revision videos, 100% of the staff surveyed said they would be willing to attend. When the teachers were asked if they had watched their own video on the School website all of the teachers except one had done so. The teacher in question was not able to view the video online as she lives in a part of the countryside, where broadband speeds are not sufficient to download the video. When the teachers were asked how long it took to make their video all except one said it took less than 30 minutes, which is very positive as none of them had ever done this before. Having gone through the process the staff responded very positively towards the making of their own videos in the future, which would suggest a very positive view towards Personalised Video Tutorial.

5.4 Student Perceptions of Personalised Video Tutorials

In the Literature Review there are many examples of students supporting ICT in the classroom. One such study was conducted around students taking a
psychology course online, where different groups were given different levels of support material from their tutor. When it came to analysing the results however, there was surprisingly little difference between the four groups. This was quite surprising as the level of extra support material given to the fourth group was significantly higher than that of the control group. The one thing to come out of the study was the level of student support for PVT’s. Students perceived the exercise to be very worthwhile, and one commented that it would affect his decision about his choice of course for the following term. (Mandernack, 2009)

In the case study the students also responded very positively towards the PVT’s. 90% of the students said more teachers should produce PVT’s. This has to be counterbalanced by the fact that 47% of the students did not watch the tutorial at all. The reasons for not watching the tutorial were not investigated in this piece of research, but anecdotally the researcher discovered that there were some technical issues with watching the tutorial on line. When the students were asked if they found Power Point presentations helpful more than 80% responded positively, suggesting they favoured both the auditory and visual stimulation. This ability to be able to control the auditory and visual content of their education would appear to endorse the views of Mayer (Mayer R. E., Multimedia Learning, 2001) and Pavio. (Pavio, 1986)

Even though there was overwhelming support from the students for more teachers to produce PVT’s, and of the teachers use of Power Point in general, almost 50% of the students did not watch the tutorial at all. Only 22% of the students surveyed watched the tutorial more than once. This is a very low percentage of the sample, especially considering the average length of the tutorial was only five minutes. Considering the effort required in making the tutorial, and hosting the tutorial online, teachers may not be so enthusiastic to pursue this project in the future.

5.5 Teacher Training

There is a large body of work concerning teachers and technology, and their willingness to learn new skills and integrate ICT into their teaching. (Kurubacak
S. A., 1999), (Cox, 1999), (Department of Education and Science, 2008). The majority of teachers are willing participants in updating their skills and introducing new technologies and pedagogies, particularly if they are seen to be working for the benefit of the students.

In this study teachers also responded very positively to the introduction of a new technology. All the staff were willing to participate in further in-service training to perfect their production of PVT’s, and all the staff when asked about their interest in the process rated it as "very interesting" or "interesting". As teachers view revision as a very important component in learning, this level of support is not surprising. In certain instances teachers underestimated the amount of time that they had contributed to making their first PVT. This would indicate that if the study was to be expanded, the teachers would be willing to participate. It would appear to the author that all the teachers, with varying levels of experience of the job, who were involved in this study were willing participants, positive in their approach, and highly curious as to the outcome of the research.

It has to be acknowledged that this group of staff were all very computer literate. They all took part in a forty five minute training session, (appendix G) and from that each teacher produced their own PVT. This apparently low level of training required may not replicate itself nationwide.

5.6 Technical issues affecting the hosting of Personalised Video Tutorials

For the benefit of this study it was necessary that some students would not have access to the online PVT’s, in order to set up a control group. It was expected that some students would not take the time to do the revision over their Easter break. Several students and a few teachers pointed out some difficulties around viewing the tutorials posted on the school website. One of the primary aims of ICT in education has to be increasing student engagement, but it will have exactly the opposite effect if the technology does not work. Some of these issues are outlined below and would need to be addressed before more studies in this area are undertaken.
5.6.1 Broadband Speed

While the majority of students live in Dublin suburbs where broadband speeds are quite high, there were still some issues around the downloading of the video tutorials. Some teachers reported not being able to see their own video online while they were at home and did not have the benefit of the school broadband. Some students also reported the same difficulties i.e. the video was "freezing". The method of hosting the video on the school website required the user to download the video before viewing. This process could take several seconds and in some cases over a minute. Before video tutorials can be properly employed in any school this issue would have to be addressed by both the school authorities and the parents.

5.6.2 Streaming Versus Downloading

The popularity of You Tube can in part be attributed to the fact that the data is streamed rather than downloaded. Streaming allows data to be fed to the computer on a continuous basis and the computer can start to play the video clip before the full clip is downloaded. Downloading the video clip is a longer process and while the video can be stored for later use, it cannot be viewed while it is being downloaded. Students who commonly use You Tube for entertainment are used to streaming. The school website, where the PVT’s were hosted, does not have this facility and therefore all tutorials had to be downloaded before being viewed. This small discrepancy accounted for a great number of students not being able to see the video tutorials online. When the decision was made to host the video material on the school website, it was deemed more appropriate than hosting the material on You Tube or some other video hosting network. It was felt by the school authorities and the author that directing students to a third party website, (You Tube or Face book), would not be good educational practice, as there were too many distractions and students might get drawn to other videos or discussions.
As all the video tutorials were relatively short, downloading from the school website seemed the most appropriate at that time. If in the future this experiment is to be repeated in the school, a dedicated server will be used along with streaming software to make the whole process more streamlined.

**5.7 Language Barrier**

As the school involved in the study has quite a lot of foreign nationals a small group within the overall sample could be identified. Of this group 85% of the students involved in the study indicated that the best part of the teacher’s movie was that they could watch the movie more than once or they could pause the movie anywhere they liked. Also, 100% of the students indicated that teachers should produce more revision videos. The average scores of these students were also different, with an 8.5% difference between those students who watched the video tutorials online and those who did not. This would concur with Vanessa Parson who also commented on the difficulty encountered by teachers and students in relation to accents, and understanding the spoken word.

“This material is also of benefit in terms of the many different nationalities and accents we currently have in academia. There are many different accents spoken by both staff and students, so having extra time and resources spent aiding this barrier to learning will increase understanding for all students” (Parson, 2009)

**5.8 Conclusion**

There has been much research into the positive effects of combining audio and visual stimuli for the education benefit of students as seen in Chapter 2. There has also been some research into Podcasts, (McGarr, 2009) and Vodecasts, (Mandernack, 2009) which report varying levels of success. This study has had several strong indicators as to the positive effects of Personalised Video Tutorial on student learning. Equally there have been several pointers to indicate that the experiment was not 100% successful. It would appear to the author that much
more investigation will have to be undertaken, preferably on a nationwide scale, before a full rollout of PVT’s should be undertaken. Teachers and students alike respond very positively to the idea, but if only half the student body participates it will not have the desired effect. Before undertaking a new study in this area the technical issues outlined in this chapter would have to be addressed. There would also have to be some motivational factors considered to increase the student take up of PVT’s.

"You can lead a horse to water, but you cannot make him drink."

(Old Irish proverb).
Chapter 6  Conclusion

6.1 Introduction

The Department of Education and Science over the last number of years has contributed over €200 million towards the purchase of ICT equipment in second level schools. Many teachers have participated in in-service training on the use of ICT in the classroom. In the present economic climate funding in this area will be limited and therefore any innovation with regard to the use of the present ICT equipment should be encouraged. This research sought to investigate the use of PVT’s in second level schools, a process that could increase student engagement and student results with minimal investment. This chapter will seek to draw conclusions based on the literature reviewed in Chapter 2, the findings yielded in Chapter 4 and the implications discussed in Chapter 5. This chapter will conclude with recommendations and suggestions for further research.

6.2 Review of Investigation

The purpose of this investigation was to examine the benefits of PVT’s as a study aid to students working in the home environment. As part of this research, the following questions were addressed:

- What is the effect, if any, on student results through using Personalised Video Tutorials at home?
- How do teachers react to producing Personalised Video Tutorials?
- How much training would be required to make teachers competent in using Personalised Video Tutorial technology?
- What technical factors might inhibit the use of Personalised Video Tutorials?
6.3 Research outcomes and recommendations

In the following paragraphs conclusions are drawn from both the Literature review and the results from the case study. Each of the research questions will be addressed separately.

6.3.1 The effect of Personalised Video Tutorials on student results

In the case study there was an average increase of 8% in student results when students watched PVT's. In the author's opinion, any technology that improves student's results requires further investigation, and 8% has to be considered as significant improvement. While a study of 200 students and eight teachers may not be sufficient to extrapolate nationwide, it should be of sufficient interest to management to investigate the idea further.

Both students and teachers reported high use of visual stimuli and classroom situations with 58% of students and 62% of staff indicating the use of Power Point presentations more than once a day. Students acknowledged the positive effect of visual stimuli as almost 80% of the survey group said they were helpful or very helpful. The question of the quality of visual aids has not been addressed in this study and it could be argued that a teacher who does anything more than read text from a book would be seen in a positive light by students. A lot of work has been done in the area of visual presentations (Mayer R. E., 2001) and similar studies may have to take place in the future regarding PVT. In conclusion PVT’s had a significantly positive effect on student results, and this research recommends further investigation.

Students are, by virtue of the fact of their age, inquisitive. They embrace technology and new technology in particular. This was evident particularly in the student survey where they overwhelmingly endorsed the use of PVTs. The fact that over forty five percent of students did not, or could not, view the PVTs online gives cause for concern, as teachers and management will hesitate to invest the time and the money required if they perceive student engagement to be too low.
The author believes that students will engage with PVTs and suggests that an alternative to hosting the tutorials online could be to issue each student with the appropriate PVTs, thus bypassing one of the technical issues, broadband speed.

The author would recommend that a larger study, involving several schools, perhaps within a VEC system, where technical support could be provided for all the schools simultaneously, should be undertaken. This would give sufficient numbers to increase the validity of the research and provide technical support for some of the technical issues encountered within this study.

6.3.2 Teacher reactions to producing Personalised Video Tutorials

Teachers responded very positively towards the idea of PVTs, and towards getting involved in the study. Both the research and the author's experience would suggest that teachers will get involved in implementing new technologies and methodologies if they can see it will have a positive effect on student learning. Anecdotial evidence would also support this conclusion as the author was regularly questioned about the progress of the study and the final conclusions.

The author would suggest that further research into the area of PVTs be undertaken as soon as possible, to build on the momentum of ICT integration that has happened over the last decade.

6.3.3 Teacher training

It would appear from this research that very little training would be required to support staff willing to undertake the use of PVTs. The staff involved in this study only required a forty-five minute training session before being asked to produce their own PVTs. This training was sufficient to allow each teacher produce a five-minute video using their own Power Point presentation. The staff's willingness to participate in in-service training has to be viewed very positively. In light of our present economic climate it is unlikely that funding would be
available for any major in-service programme. However it may be possible for local education centres to provide some in-service for teachers on a voluntary basis, and allow this technology to be disseminated, albeit on an informal basis.

The author would suggest that local education centres have contributed greatly to the implementation of ICT in schools at large. Their technical expertise has been invaluable to date, and there would be an ideal vehicle for the introduction of PVTs.

To counteract the lack of technical advice in schools the introduction of a teachers forum, specifically to address the areas of ICT implementation and associated pedagogy should also be considered.

6.4 Technical Issues

Two technical issues arose during the course of the study. They both have an adverse effect on the student's ability to access the PVTs. Broadband speed and the issue of downloading versus streaming both contributed negatively to the outcomes of this study.

6.4.1 Broadband

The issue of broadband in schools has been on the agenda for many years now and while significant progress has been made in the area there are still many schools and many homes in the country where broadband speeds in some areas are not sufficient to support PVT's. While the author cannot guarantee an 8% improvement in student results it has to be considered to be a significant leap in the right direction. Along with the myriad of other reasons to improve the national broadband, education has to be to the forefront of any government's agenda.
6.4.2 Downloading versus streaming

Many schools have static websites i.e. they display static information in relation to timetables, contact details and other information that does not have to be reviewed or updated on a regular basis. For an effective roll out of video hosting, some investigative work would have to be done on the area of school servers and some in-service training and support given to staff involved in the maintenance of websites and servers. Some schools may have redundant servers already as the requirements for video hosting lean more towards storage and less towards powerful processors. The software involved would also have to be investigated with a view to harmonisation throughout the second level system.

6.5 Conclusion

While it has to be acknowledged that a study involving eight teachers and two hundred students in one second level school cannot be extrapolated nationwide, it has highlighted some interesting results. A lot of the technology and infrastructure already exists in schools to roll out a similar larger investigation. The students and teachers involved all reacted with great enthusiasm for the project. A significant improvement in student results showed there are benefits to PVTs. The author also views this as a very worthwhile exercise, and will continue to use PVTs in his own subject area.
Bibliography


Mandernach, B. J. (2008). Comparative Impact of Commercially-Produced and Instructor Generated Videos on Student Engagement. 10 (3).


undergraduate attitudes, experiences and understanding of vodcast and podcasts use


Appendix A Teacher Questionnaire

Name   ___________________________
Subject __________________________

Thank you for your help in completing the survey. Please note, no teacher will be named in this report. Also, thank you for your cooperation in producing your video and testing your class before and afterwards. It is much appreciated!!

Finally, can I ask you to take a couple of minutes to fill in this questionnaire?

Please circle one number for each question below.

A. How long have you been teaching?
   1. less than 5 years
   2. 5 to 10 years
   3. 10 to 15 years
   4. 15 to 20 years
   5. longer than 20 years

B. How difficult was the process of making your revision video?
   1. very difficult
   2. quite difficult
   3. okay
   4. not difficult
   5. easy

C. Did you find process interesting?
   1. very interesting
   2. quite interesting
   3. okay
   4. not interesting
   5. boring
D. How much help as you get while making your revision video?
   1. no help
   2. a little help
   3. some help
   4. a lot of help
   5. I did not make my video

E. In your opinion, did students find the exercise interesting?
   1. very interesting
   2. quite interesting
   3. ok
   4. not interesting
   5. boring

F. Would you be willing to repeat the process for yourself in the future?
   1. yes
   2. no

G. Did you look at your revision video on the web?
   1. yes
   2. no

H. How long did it take you to make your revision video?
   1. less than 10 minutes
   2. between 10 and 20 minutes
   3. between 20 and 30 minutes
   4. between 30 and 40 minutes
   5. longer than 40 minutes

I. Would you attend a one hour in-service on how to make further revision videos?
   1. yes
   2. no
J. How often do you use a PowerPoint presentation in class (please select the nearest one)

1. more than once a day
2. once-a-day
3. once a week
4. once a month
5. less than once a month

K. Have you a fixed data projector in your room

1. yes
2. no

L. Where did you get most of your PowerPoint presentations?

1. I made my own
2. from a teacher friend, outside school
3. from my subject teacher's organization
4. from a colleague in school
5. I searched online

Once again, thanks for your help, and if you would like to leave any further comments please do so below:

Robert Boland.

Comments:

________________________________________________________________________
________________________________________________________________________
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# Appendix B  Results Sheets

**Teacher VI  
Science**

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**Mode**: 2 1 1 2 5 1

**Frequency occurring %**: 55 55 33 44 40 77
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## Teacher LA

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Appendix C Student Questionnaire

Name (please print) ________________________________
Age ____________________________
Year Group _______________________
Subject _________________________

There are six questions below.

Read each question carefully.

Please circle one number in each question that best answers that question for you.

A. Do you find this subject difficult?
   1. always
   2. sometimes
   3. occasionally
   4. rarely
   5. never

B. How often does your teacher use a PowerPoint presentation?
   1. every day
   2. once a week
   3. once a month
   4. rarely
   5. never

c. When your teacher uses power point presentations, do you find them helpful?
   1. very helpful
   2. helpful
   3. okay
   4. not helpful
   5. I don't like them
D. How many times did you watch the movie before you sat the test?

1. I didn't watch the movie
2. I watched the movie only once
3. I watched the movie twice
4. I watched the movie three times
5. I watched the movie more than three times

E. Please indicate what you thought was the best part of the teacher's movie

1. I could watch the movie more than once
2. I could pause the movie anywhere I liked
3. I could hear my teacher explaining
4. I could use my computer to revise
5. I could choose when to look at the movie

F. Do you think more teachers should produce revision videos?

1. Yes
2. no

Thank you for your help in filling out this questionnaire.

Mr. Boland
## Appendix D Teacher survey results

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Appendix F Letter to Principal

XXXXX,
XXXXXX,
Co Kildare.
1st March 2011

Dear Mr. XXXXX,

I am writing to ask your permission to conduct a research study within the School. The research study is being submitted in part fulfillment of the requirements for the M. A. in Digital Media in Education qualification at the University of Limerick.

I believe that the study will benefit the school in that it will examine the use of video technology within our teaching and as such can be used in future planning with respect to information technology and the School website.

I intend to involve a small group of teachers and students, mainly second and fifth years to investigate the use of personalised video tutorials to be hosted on our website. The school, the teachers, or the students will not be named in the report, and all details and results will remain confidential.

Thank you for your support,

Robert Boland.
Appendix G
Teacher Training session

Agenda for Preparation of video tutorials

1. Introduction to Web site
2. Introduction to Personalised Video Tutorials
3. How to make a video
4. Selecting a PowerPoint (10-20min)
5. Setting the test
6. Creating your video (I can help!!)
7. Hosting the video
8. Testing and retesting
9. Writing up the results

Thank you for attending, thank you for listening, and contact me with a time that suits you to make your video tutorial.

Robert.