BLENDED LEARNING: AN ADAPTIVE GENERIC FORMULA

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by

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Abstract

This dissertation focuses on blended learning, and on creating and implementing its optimal application. Furthermore, it investigates the current level of learning blends in Irish companies and in British and Irish third level institutions. It chronicles the birth and current popularity of blended learning by way of exploring classroom and online instruction, two well-established models.

The author has decided to investigate through practical research and study the possibilities and importance of blended learning in the modern learning landscape. The existence of a perfect universal blend has been a source of conjecture among experts for years. The author took it upon himself to find out if this learning enigma exists. From the evidence, it is clear that the perfect blend has not been discovered or implemented and it is through his research and findings that the author will present a recipe for learning in a modern environment.

Several customary methods of data collection were employed, such as the opinions of established authors, document analysis, survey and experimental research.

The key finding of this work suggests that by using an equal educational blend (classroom and online), learning will be at its most effective.

Other key findings included, Irish third level institutions are ahead of its neighbour Britain, as 15% of Irish third level institutions currently offer online courses as compared to 8% in British third level institutions. The research also indicates that Irish companies are more actively involved in providing blended learning solutions.

Keywords: blended learning, learning styles, education, online learning, classroom learning, optimal blend

Declaration of Originality

This work is my own, unaided and was not copied from or written in collaboration with any other person.

Signed:

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Chapter 1: Introduction

Learning as defined by the Wikipedia Encyclopedia (2006) "is the process of acquiring knowledge, skills, attitudes, or values, through study, experience or teaching, that causes a change of behavior that is persistent and measurable".

What is key from this definition is that learning changes lives, this belief is put forward in an article by North (2006), where he writes how the lives of two pensioners are changed dramatically by learning how to send a simple e-mail. From North's article, and as other authors have commented Sierra (2005) and Lackney (2005) among them, learning should no longer be confined to a classroom or any room. If you're a working mother, getting to a college classroom two or three nights a week will not always be possible. If you do manage to find a baby sitter, there is always the cost to consider.

Bikkar (1973) asks the question, will the classroom be the most conducive environment in which to learn? Sierra (2006) adds that when learning is "presented" in a push model, we sometimes switch our minds off. Apart from the way in which the information is presented, there are other factors,that contribute to the learning experience. Physical factors such as temperature, lighting and air quality (McGuffey, 1982), the cleanliness, orderliness and character that a facility exudes (Lackney 1996), the arrangement of furniture and the allocation of spaces within the classroom (Weinstein, 1981) will have a great effect on the effectiveness of learning.

Finnegan states in his 2005 paper, that many learning experts are producing statistics that shows 90 percent of that what is taught in the traditional classroom does not transfer. This would imply that much of the corporate financial investment and third level training is wasted.

Over the last decade e-learning was seen as the solution to many of the issues put forward by McGuffey, Lackney, Weinstein and Simpson (2004) who goes so far to say that e-learning has brought democracy to learning.

Obtaining a certificate, diploma, degree, or even a master's degree is now available to anybody, anywhere and at anytime. You can study for courses in the darkness of the night or first thing in the morning or while sitting on a train heading to or from work. The birth of the internet and in particular online learning has made this possible says Kossen (2004).

Whilst online tuition may seem to be the answer to learning and eliminate some of the pitfalls associated with classroom, there are some problems with online instruction. The University of Iowa (2001) lists some of the following as potential disadvantages. Students with low motivation or bad study habits may fall behind, students may feel isolated from the instructor and classmates, hands-on or lab work is difficult to simulate in a virtual classroom, the instructor may not always be available when students are studying or need help and slow internet connections or aging hardware may make accessing course materials frustrating. However, even with all these proposed disadvantages, the biggest hurdle facing online learning is the "resistance to the idea of online learning" says McGinnis (2005).

According to Francis (2005), considering both forms of education, we can see that neither the classroom nor the online approach completely satisfy the evolving needs of the life-long student. Classroom and online learning are not mutually exclusive says Falkenberg (2006). In many situations, classroom learning may be enhanced by adding an e-learning element; here we see the birth of the blended learning mix.

It is the belief of this author, and that of Douglis (2006), that over the last few years blended learning has emerged as the potential solution to the obstacles associated with the classroom and online learning.

Procter (2002) reports that blended learning represents an effective and proven learning model, which overcomes the weakness associated with technology-based and classroom training. According to Thorne (2005), "the true essence of blended learning is fully integrating traditional print resources with appropriate electronic media such as dedicated CD-ROM and web sites to fully maximise potential".

Blended learning exploits the advantages and benefits of both educational modes. Falkenberg (2006) refers to the case of IBM's hybrid model, which was recently developed for its managers as an example of blended learning improving staff performance. According to Goldberg (2003), blended learning is a continuous process, rather than just an event. Providing blended solutions allows for flexibility, not only of multiple delivery methods, but also for learning to take place over time. Understanding learning styles, models and theories, blended learning can provide educators with valuable insights aiding in the search for the ultimate learning mix.

"What is the optimal mix for learning?" Answering this question requires a more in-depth analysis of learning, learning styles, classroom learning, online learning and in particular blended learning.

The following sections outline the theoretical and methodological structure of my study, as well as detailing the findings that emerged, and their implications for our understanding of blended learning. Chapter two provides a theoretical framework by reviewing key literatures involving blended learning and a conceptual foundation for examining the research guiding this study.

Chapter four paints a methodological landscape by outlining the inductive approach chosen for the study, as well as describing the data collection and analysis methods, both qualitative and quantitative. Chapter Five details the findings while chapter six provides a thorough discussion of the findings and their implications.

Chapter 2: Literature Review

In 2002, *The Chronicle of Higher Education* quoted Graham B. Spanier, president of Pennsylvania State University as saying the marriage of online and traditional classroom instruction to be "the single greatest unrecognized trend in higher education today".

2.1 Structure

The claims and implications of this quote will I hope serve as a backbone to this review. My primary focus will be on classroom and online/e-learning, two well established models. I will then explore the theory of learning its styles and its value. Following on from this my focus will switch to blended learning, the natural successor to the traditional models, having explored the fundamentals of learning styles.

I intend to engage a chronological approach, starting in antiquity with classroom learning, moving through the centuries to the advent of computers and the internet, and on to the time of modern blended learning. I say modern, as we will later see there are those who believe that blended learning is not a modern invention.

I will also investigate the theoretical concept of the universal blend, and search for the optimal mix.

2.2 Introduction

For most of us our school education has left us with similar memories, some would say scars. Teachers, looking down on us from the sanctuary of their desk, dusters giving birth to choking white clouds, you and thirty classmates rigid in rows reading from the blackboard as if in prayer, being fed your daily knowledge.

This classroom model of education "I talk and you listen" stretches back through history over three thousand years. This traditional classroom approach however, has had its critics, "Face-to-face is not the gold standard that it's held up to be," writes Dede (2005) and Farmer in his 2005 article lists quite intricately his criticisms of the classroom approach.

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Other experts such as Gardiner (1998) and Bruner (1990) have researched new models, and many experts, among them Gough (1991) and Norris (1985) now agree that we must endeavour to impart students with skills that enhance the process of cognitive learning, particularly the skill of critical thinking. This approach calls for new models that will change the way that we learn.

In 2005, Kramer writes that for many years, e-learning was seen as the solution to the problems encountered with the classroom approach. Some experts Harris (2006) and Lee (2006) among them believe that computers will never eliminate human instructors and other forms of educational delivery. In theory and through practical research blended learning has evolved as a new approach to learning. "We are, as a species, blended learners" says Elliot Masie (cited in Rossett 2002).

2.3 Traditional Classroom Learning

"The primary form of education i.e. knowledge transfer, over the last
three thousand years has been through the traditional classroom".

<div align="right">Zenger (2002)</div>

Kapp (2002) gives us the definition of I.L.T. (Instructor Led Training) by seeing it as the "face-to-face exchange of information, ideas and concepts between the trainer and students and among the students themselves in the same place, it also allows students to be taught by credible company and industry experts". Kapp believes instructor led training offers many advantages to both the instructor and student, for example, it allows individual questions to be addressed, and encourages impromptu discussions.

Kapp, however, appears to reflect somewhat critically later on however, when he writes there are many reasons as to why this traditional approach is seen as out dated and inadequate. For example, up to 40% of class time is wasted on interruptions, as in the time taken in reprimanding misbehaving students, or students arriving late.

This criticism continues as he writes, "the classroom education is seen as one-size-fits-all approach". Kapp also writes of the lack of instructional consistency, and sees teacher ability and performance as possible potholes to the classroom approach.

Woodall (2004) carries on this criticism by writing "Students are required to attend lectures at strict set times. Classrooms can easily allow the student to assume a passive role and their attention may be lost, discussion and interaction are reduced due to the 'I talk and you listen' approach. In addition, the pace at which instructors conduct the class may only be suit a few of the students, while some are bored, others are left struggling".

Three recent studies have revealed some interesting results

- In higher education, 83% of instructors use the lecture as their predominant teaching strategy - U.S. Department of Education (2001),

- 80% of corporate training is conducted in the classroom – Singh (2001)

- A 2004 survey by the e-learning Guild, cited in Pulichino (2005) showed respondents recognized classroom instruction as the most frequently used part of a blend.

There is some optimism however as Rosenberg (2001) predicts, "Classroom learning will fill a unique role within a learning architecture, but it will be a different role than in the past. Group interactions, business problem solving, performance evaluation, expert observation, culture building, and teamwork are all critical attributes of an overall learning system that, in many cases, are still best suited for classroom experiences".

2.4 Online / E-learning

In 2003, Brennan informed us of a shift in thinking by many corporations who no longer believed classroom based training to be the most appropriate method for training its employees. Woodall (2004) noted how many believed that online learning to be the future. Kapp (2002) writes how e-learning in the past was seen as the way forward in providing interactive, up-to-date training.

Rosenberg (2001) writes how e-learning refers to the use of internet technologies, and how they deliver a wide array of solutions that enhance knowledge and performance. He believes e-learning has become a reality, rather than a passing trend, owed in part to the saturation of technology into our everyday lives. He propounds this by saying that "the technology used for e-learning is as commonplace as the telephone, and almost as easy to use...the transition to e-learning will not require people to buy and learn a special-purpose and complex pieces of equipment".

Few would disagree that e-learning can potentially solve many of the difficulties that classroom training encounters. "It's a tool that could open a lot of doors," says Prof. Patti Abraham of Mississippi State University (cited in Vail 2001). According to Summer (2002), online learning provides many advantages over traditional classroom learning. For example e-learning can be delivered 24/7, allows people to learn at their own pace, and comments on the financial benefits as he writes "e-learning is cost-effective, enabling 30% more learning in 40% less time at 30% less cost". Hughes Miller (2006) says, "the important advantage of online instruction is that students have a far greater range of courses and programs available, regardless of their location".

According to McKeague (2002), in 2000, IBM trained some 200,000 employees via e-learning and cut the training bill by $350 million simply because online courses do not require travel. Some experts believe there is strong evidence that computer-based training requires less time than instructor-led training as is proposed by Umamaheswari (2005) and Falenberg (2006).

However, even with all the positives, there are some negatives associated with online or e-learning. Kapp (2002) says that e-learning lacks the personal touch and Brennan (2003) adds that remote students face the challenge of isolated learning. In 2004, an American news channel reported that online learning proves expensive to develop. According to the report, creating just one customized e-learning course can cost anywhere from $25,000 to $50,000.

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The fact that these courses are expensive to develop is only made worse by the findings of Forrester Research (2000) "70 percent of those who start an e-learning course never complete it".

Furthermore, according to Reid-Young (2002), there appears to be a certain reluctance in some quarters to invest in e-learning. In 2003, the British Government set aside €15,500 for every secondary school to spend solely on e-learning materials (€150 million in total). In a news report by the BBC in 2004 it was reported that of the total money allocated, only half the money had been spent by the schools.

Singh (2003) believes that e-learning is undergoing a period of transition. These changes were badly needed as he feels the first examples of e-learning were nothing more than 'online page turning', and that online learning does not offer any more interactive or engaging experiences than classroom learning. Zenger (2002) points out that no matter what the benefits of e-learning "there will always be a need for some form of *"live"* element in the training mix".

Research evidence presented by McCarthy, Pretty, and Catano (1990) suggests that a low sense of community is a major source of student burnout. This can be enhanced through the isolated nature of e-learning. Other investigations including those by Haythornthwaite, Kazmer, Robins, and Shoemaker (2000) and by Morgan and Tam, (1999).have documented feelings of isolation as possible side effects of e-learning.

Osguthorpe (2003) states that over the last few years, experts have begun to realize that neither the classroom nor the online model completely satisfies, that no single delivery method is ideal for all types of training. This train of thought is backed up by Brennan (2003) who states that for most companies and third level institutions, a single delivery "channel" or 'method' for training, is no longer adequate to satisfy the needs of all students.

Does the introduction of new technologies spell the end of the traditional classroom approach to learning?

It would appear that the "classroom" can no longer survive as a model on its own. It does have a future if it is to be combined with e-learning, drawing on modern technical advances, while at the same time taking note of recent research. To understand the right way in which to adopt a blended approach one must first research and understand the concepts of learning and individual styles of learning. According to Bersin (2003), the world is turning to blended learning which has become the latest obsession to sweep into both high-level institutions and corporations.

2.5 Learning

Learning is defined by the Oxford English Dictionary as the "acquisition of knowledge or skills".

This has in some cases been reduced to a long weekend spent in a hotel in the country, with seminars taking place in function rooms where the wedding held there the day before still lingers in the air, where buffet meals punctuate the day, so that the recreational itinerary, (often better planned than the educational) is kept on schedule. Holley (2004) echoes this cynical opinion as he writes, "Over the past few years, training has become a quick fix for most companies".

Goldberg (2003) believes that learning is not a simple act, rather it is a process that should take place over an extended period of time and not over two or three days. He adds that for any type of learning to be effective, whether it is classroom based, computer based, or mixture, it has to be built on sound pedagogical principles. A large number of pedagogies and methodologies on learning have been published to date, on behaviourism and constructivism in terms of learning theories, to experiential and organisational learning as written on by Smith (2005).

Goldberg (2003) argues further that this acquisition is dependent upon well-established learning theories and on the learning style of the student.

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2.51 Learning Styles

Kocinski (1984) defines learning styles as "the preferred way to learn and the way a person learns best".

When attempting to learn something new, some people prefer to learn by **listening** to a teacher at a lecture. Some people prefer to **read** textbooks, some prefer to **see** a demonstration of a particular skill, and some need to **experience** more than one of the above listed methods to gain a real understanding.

Many theorists have created models as to what encompasses a person's learning style.

- Honey & Mumford – VARK (1992)
- Sternberg – Triarchic Theory (1985)
- Kolb – Model of Information Processing (1984)
- Gardner – Multiple Intelligences (1983)
- Guilford – Structure of Intellect (1982)
- Dunn & Dunn – Style Model (1978)
- Pask – Conversation Theory (1975)

Rief (1993) writes that by using more than one of our senses, we attack our brain with new information in a multiple of ways on a daily basis, and in doing so we learn and retain more information. He states that students retain 10% of what they read, 20% of what they hear, 30% of what they see, 50% of what they see and hear, 70% of what they say and 90% of what they say and do.

From these figures, we can see that most people retain more when they actually perform a task. Aristotle said, "We learn by doing" and Einstein who said, "What we have to learn to do, we learn by doing", backs up these beliefs.

According to Kapp (2002), as knowledge is becoming more abundant and its shelf life becomes shorter, people will be required to constantly update their knowledge on a more regular basis, hence, the term 'lifelong learning'. This reminds us that when we are thinking of learning and of blended models we must not just think of students in school uniforms, modern learning touches people of all ages, in all walks of life. Kapp is in good company when we read a quote by Wicks (2000) "Lifelong learning means creating a culture that allows people to learn what they want, when and where they want and how they want. A culture where everyone knows the value of learning and expects to learn throughout life".

2.52 The value of learning

There is no expert and certainly no parent or social commentator, who does not believe in or value the importance and benefit of education, and of companies training its employees. Bersin (2003) writes that "in training, there are three critical issues, which managers face: effectiveness, efficiency, and compliance".

McKeague (2002) has written that over the last decade, education has emerged as the only real source capable of increasing organisational effectiveness. He further goes on to predict that those organizations who invest heavily in staff training will make greater profits.

Brennan (2003) writes that as well as the lure of higher profit margins, providing adequate training will enable the company to increase its efficiency. Van Adelsberg (1999) argues, "offering training that improves employees' skills isn't good enough. The training provided must contribute visibly and substantially to the fulfilment of the business strategy".

McKeague (2002) relates that in some states, governments are now prosecuting companies for failure to provide adequate training in compliance with certain laws. This was illustrated by the case in New York, where a nutritional supplement manufacturer was fined over $145,000 for failing to provide proper training to employees in the use of fire extinguishers (US Dept. of Labour 2001)

Brennan (2003) believes that "a successful marketing effort does not end at promotion. Those learning should be made to feel empowered". Woodall (2005) says, "Many companies are telling their employees that they must take responsibility for their own learning; however, most of these companies fail to help employees identify their learning needs and fail to provide the necessary learning resources".

2.6 Blended Learning

Over the last few years many definitions have been put forward as to what is blended learning. Vaughan Frazee (2006) defines blended learning as "integrating seemingly opposite approaches". Driscoll (2002) terms blended learning "as a combination or mixing of at least four different methodologies". Masie (2001) says, "Blended learning is the use of two or more distinct methods of training."

Oliver (2005) says that while blended learning may have become the latest trend to infest corporations and high-level institutions, unlike traditional classroom and e-learning it cannot truly be defined. For example, those lecturers or teachers who have begun their teaching careers since the advent of the Internet, web-based learning is part of their teaching tradition.

According to Sheninger (2004), the main purpose of blended learning is to maximize impact and minimize costs by implementing delivery mechanisms according to their strengths. The delivery mechanism for each component should be based on the students needs not on the readily availability of the component or the interest of the instructor.

2.61 A True Renaissance?

Clarke (2005) writes how the ancient and medieval classroom practised oral and written tasks. With the invention of printing, the student could blend his or her learning experience by reading at his or her own pace and in his or her own time.

Singh (2003) notes that in recent times blended learning has been comprised of various classroom elements, such as lectures, handouts, laboratory experiments and textbooks.

Blended learning it is argued by Cross (2004) is not a new concept, it has been around for centuries. Its sudden growth and awareness can be attributed to a series of technical innovations, such as web-based options for learning. "Blending is only a revelation for those who have been trying to do everything with just one tool, the computer, and ending up with less than ideal results" DeLacey and Leonard, (2002).

Laster (2004) says that blended learning is just like the other forms of learning in that it has advantages and disadvantages. Developing blended programs is complicated and can be expensive. On the other hand, the instructions can be tailored to needs of a specific job role. All employees get the general guidelines/instructions and then receive specific instructions for their specific job through e-learning. This approach maximizes the trainee and trainer time and reduces the development costs.

Nagura (2003) argues that by the model of blended learning, core knowledge can be passed on via e-learning in advance, thus saving valuable classroom time for productive dialogue. The model of 'I talk and you listen' is being replaced by "we talk and we listen". Kapp (2002) adds that this approach also means that face-to-face learning becomes more effective as the mundane aspects of basic instruction are moved to an e-learning environment, which can be designed to be more engaging and interactive for the student.

Niedringhaus (2003) puts forward that blended learning is not just effective for reaching a dispersed audience, but that it also saves on training costs, provides for self-paced learning, knowledge sharing, resulting in high levels of student satisfaction. It can be flexible to tackle and conquer complex needs.

The CISCO Corporation believes that classrooms still have a role to play in our education system in conjunction with other models. To quote its Web site "At Cisco, we think of e-learning not as the latest technology to replace all traditional classroom experiences, but as a new set of tools that can enrich any learning experience".

2.62 Components and Criteria

When course designers begin to create the blended programs they must consider the components and criteria involved. Clarke (2003) defines components as the "elements that can be pieced together and integrated into a blended solution. He further defines criteria as the "principles and policies, which shape the choice of components in a blended solution".

According to his white paper, Clarke names six off-line component groups:

- workplace learning (projects, shadowing, placements)
- face-to-face tutoring
- classroom (lectures, workshops, seminars) which has seen a new push for less chalk & talk, less didactic and more interactive
- distributable print media, magazine, newspapers, textbooks
- distributable electronic storage media e.g. audio cassettes/CD, videotape, CD-ROM, DVD
- broadcast media e.g. TV, radio, interactive TV

As well as the offline components, Clarke lists six online component groups:
- online learning content e.g. simple learning resources
- e-tutoring, e-coaching, or e-mentoring
- online collaborative learning, e.g. e-mail

- online knowledge management, e.g. searching knowledge bases, data mining
- web, e.g. search engines
- mobile learning, e.g. laptops, P.D.A.'s, mobile phones

Clarke (2003) further states that when considering the learning criteria a corporation must ask some of the following questions; Does my new approach improve learning outcomes? Is the blend appropriate for my audience? Does the blend fit into the culture of my organisation? Do we have the resources to cope? Can our infrastructure support online components? In addition, is the blend scalable?

Bersin & Associates (2003) offer a list of ingredients or components they feel should be considered when designing a blended learning solution. For example, audience, time, scale, resources, content and business applications.

Singh in his 2003 paper provides a list of factors that experts have successfully used to implement blended learning models. These factors include the conditions in which an initiative is undertaken, the resources available for a particular training need, the target audience and the characteristics of the content.

2.63 Blended Models

According to Singh (2003) a blended learning model "combines various delivery modes". These are several delivery models that have been developed in the last couple of years.

Igneri (2005) has developed the following model:
- online: prepare (align the student), assess knowledge (pre-test), plan
- classroom: seminar
- online: measure (post-test), identify & close knowledge gaps

Balance Learning (2006) have developed the following model:

- online: survey, pre-test, post course test to qualify for the skills dimension
- classroom: workshop, skills assessment
- online: post-test

Rossett (2006) has developed the following models:

- Anchor Blend starts with a defining and substantive classroom event, followed by independent experiences that include interaction with online resources, structured workplace learning activities, online learning and reference, diagnostics, and assessments.
- Book-end Blend is characterised by a three-part experience, something introductory, an essential, substantive and meaty learning experience, online or face to face, and then something that concludes and extends the learning into practice at work

Hibernia college in a third level institution that provides international online programmes at undergraduate and graduate level. Hibernia College provides all of its courses online, using state of the art technology for both synchronous and asynchronous course delivery. The following table appears on the Hibernia College website (www.hiberniacollege.ie) and gives an idea of how they imagine a student would spend their day using a blended learning approach to learning.

TIME	TASK	TECHNOLOGY	CONTACT
07:50	Check e-mail and discussion forum – read bulk e-mail from Hibernia admin and catch up on forum posts in subject specific forum	Discussion Forum e-mail client	
12:15	Logon to HELMS and download assignment document. Print.	HELMS (My Documents)	
12:30	Seek help from fellow students in the discussion forum regarding nature of the assignment.	HELMS Discussion Forum	Fellow students
16:30	E-mail tutor seeking clarification of requirements for the assignment	HELMS (My Contacts) E-mail client	Course tutor
16:50	Log query in the helpdesk regarding difficulty with viewing macromedia flash files	HELMS Helpdesk	Hibernia Support Staff
17:05	Login to HELMS and study lesson in preparation for the live tutorial	HELMS (My Courses) Interactive Content	
18:15	Visit the library to access recommended reading for the assignment	Library	
19:00	Attend live online tutorial by clicking on link in calendar	Interwise HELMS (My Calendar)	Course Tutor
20:30	Load lesson plans to personal secure digital drop box	HELMS (My Documents)	

Figure 1

2.64 What is the optimal mix within a blend?

Knowing the components and criteria available, the next task is finding out what is the optimal mix within a blended model. Morrison (2003) says that some people are wondering if there is a standard blend that lecturers can apply to all courses e.g. 20% online and 80% classroom or "here's a solution we prepared earlier".

Carman (2003) asks, "Is there an "optimum blend," a "sweet spot" to blended learning". Finding the right blend Osguthorpe (2003) argues is all about a balance between online access and face-to-face interaction, with the aim of increasing their knowledge.

According to the *Guru Learning Solutions website* (www.gurukulonline.co .in/WhitePapers/Blended%20Learning.pdf),, to find the right blend, blended learning focuses on the learning objectives "by applying the "right" learning technologies to transfer the "right" skills to the "right" person at the "right" time". As Bersin & Associates (2003) discovered, companies embarking on blended learning were all asking the same question. "What combination of tools and media will make the biggest impact for the lowest investment?"

However, Morrison (2003) contradicts these theorists by saying "the idea that there can be a formulaic approach to channel selection - a set of rules to cover every situation is simplistic and adrift".

2.65 The Future for Blended Learning

Blended learning as a concept and in practice is growing in popularity as proven by the fact that more and more Universities are introducing Virtual Learning Environments and Learning Management Systems. This growth is indebted to experts continually promoting active learning and the use of instructional and educational technology as cited by the Rochester Institute of Technology (2004). However, some including Bersin (2003) say that blended learning is still in its infancy and that there is no simple answer in terms of technology or infrastructure. Recent studies of blended learning designs show that they can be as effective and efficient in terms of learning (University of Calgary 2002).

This question is not whether to blend, but how we blend our learning and what is the right mix. How we blend face-to-face instruction with computer-aided instruction will be the question that continues to dominate the learning community.

Chapter 3: Hypothesis

A generic recipe for blended learning has eluded the teaching profession until now as is illustrated by the existence of numerous models presented by authors to date, which are cited in section 2.63 of the literary review.

My proposal is that a generic blended model for learning does indeed exist. It exists through the combination of four elements, the course introduction, course content, practice work and the assessment as shown in Table 1. This combination can be flexibly adapted to any learning environment.

For example in Table 1, we take two completely different subjects, from the perspective that History is theory based whilst Cookery is more a hands on approach when learning. Since History is theory based, the course content can be made available on the Internet prior to scheduled classroom session. Thus, when the students attend the classroom, they use this time to discuss and perform higher order learning what they have read.

As the Cookery course is more hands on in terms of learning, the students are presented with the course content in the classroom (as they can replicate what the teacher is doing on their own computer) and any practice that needs to be completed can be done so online or with the aid of online.

In both scenarios, the course introduction will be presented online and course assessment will be take place in the classroom but may be conducted online, depending on the preference of the teacher.

The importance of this blend is mirrored by the improvements made in learning. This, the author intents to illustrate.

Course Element	Module 1 History	Module 2 Cookery
Course Introduction (always presented online prior to course commencement)	Online	Online
Course Content - Syllabus (presented online OR in the classroom)	Online	Classroom
Course Practice Exercises e.g. homework, mock exams (presented online OR in the classroom)	Classroom	Online
Course Assessment (always conducted in the classroom but maybe done so by means of using online technology)	Classroom	Classroom

Table 1

Chapter 4: Methodology

4.1 Introduction

The author will investigate the following topics in relation to blended learning to support his hypothesis:

1) The phenomenon that blended learning is embedding itself into the modern learning landscape

2) The continual search for the optimal/universal blend?

4.2 Research Design

To carry out this investigation the author used three primary data gathering tools, the questionnaire, online document analysis and experimental research. Listed in the following paragraphs are the advantages, disadvantages and reasons why the author chose these methods.

4.21 Questionnaire/Survey

A structured questionnaire/survey was a fundamental element of this study. According to Key (1997) "a questionnaire is most frequently a very concise, pre-planned set of questions designed to yield specific information to meet a particular need for research information about a pertinent topic".

The use of questionnaires have advantages over some other methods in that they are cheap, anonymous, familiar, non-instrusive, reduce bias, and do not require as much effort as compared to other methods, from the questioner (Statpac 2006), and often have standardised answers which make it simple to compile data and straightforward to analyse (Evalued 2006). According to Menorca (2004) while questonniares only provide a limited insight into a particualar problem, the questionnaire can reach a large population of people quickly and cheaply.

The author chose the questionnaire as a primary data gathering tool due to its simplicity, the data can be easily analysed and developed quickly.

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4.22 Online Document Analysis

A further fundamental component of my research was document analysis. The Flatirons Solutions Corp (2001) defines document analysis "as the practice of examining a set of documents that are used to support specific business goals and objectives".

In a paper published by the University of Austin (2006), it is contested that "document analysis is best suited to instructional assessment and evaluation when the purpose is to gain insight into an instructional activity or approach."

The University of Texas (2005) offers many limitations in using document analysis such as documents may be incomplete or missing, based on only what pre-exists and not evaluate participant/student opinions, needs, or satisfaction. However, in the same paper, they suggest several occasions when the use of document analysis is recommended, for example, gaining insight into an instructional activity and examining trends, patterns, and consistency in instructional documents.

The author carried out document analysis as it allowed the for the rapid gathering of information regarding the current level of learning blend in over 600 third level institutions.

Table 2 shows the methods of data collection that the author employed to investigate the phenomenon that blended learning is embedding itself into the modern learning landscape.

Topic 1:	
Survey: Irish Companies (Appendix C)	To identify the current level of learning blend in Irish companies. For example, the use of learning technologies for course delivery.
Online Document Analysis (Appendix A & B)	To measure the number of British and Irish third level institutions offering online courses, and furthermore to assess the implementation of the blended approach to the curse module and internal blended structure.

Table 2

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4.23 Experimental Research

The final component of the study is the use of experimental research in an attempt to create an optimal blend to learning. Colorado State University (2006) defines experimental research as "a author working within this methodology creates an environment in which to observe and interpret the results of a research question". They do however cite several advantages and disadvantages associated with experimental research. The fact that the author has control over the variables used in the study and determining interaction and relationships between variables is seen as an advantage. Whereas the fact the author may bring bias and thereby pollute the data is brought to light as a disadvantage.

The author chose experimental research as a data collection tool as it allowed for first hand experience while developing and delivering a PowerPoint course using three blended learning solutions. It enabled the author to perform qualitative and quantitative analysis.

In the following table, the author presents the methods of data collection used to investigate the continual search for the optimal/universal blend?

Topic 2:	
Assess MS Word Results (Appendix G)	To investigate how the students performed in a MS Word course presented either online or in a traditional classroom environment.
Pre-test survey (Appendix D)	To gain and insight into the students feelings and attitudes regarding a classroom or online course on Microsoft Word, they completed prior to taking part in my research.
Deliver course content (MS PowerPoint)	To observe the students behaviours and reactions during the delivery of a blended learning solution on a basic Microsoft PowerPoint course.
Assessment (Appendix E)	To measure the results of the blended learning models.
Post-test survey (Appendix F)	To gain and insight into the students opinions and attitudes regarding the PowerPoint course they just completed through a blended learning model.

Table 3

4.3 Sampling

As previously stated in section 4.22 and 4.23 the author will carry out research on three separate population samples based on the guidelines proposed by Landreneau (2005) for statistical sampling.

The first sample the author will collect on with be on third level institutions colleges and universities in both Britain and Ireland. The purpose of this is to assess the extent of blending in third level institutions. The author selected 518 third level institutions in Britain and 40 in Ireland.

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To study the current level of blended training in Irish companies, the author made a questionnaire available online and encouraged anybody currently working for an Irish company to complete it. This second sample may have contained duplicate entries, as the author did not have total control over who completed the questionnaire. However, in an attempt avoid duplication the author sent the questionnaire to the particular e-mail of potential candidates. Overall, 30 questionnaires were completed.

The final sample used by the author was a group of 18 people took who part in the experimental research to find out which of three various blended models yielded the best results. They were chosen because they had previously undertaken courses at the Adult Education Centre. Of the 18, 12 had completed a ten-week classroom based course in Microsoft Word, while the other 6 candidates had completed the same Microsoft Word course but did so using an online model.

4.4 Data Collection

As previously stated in methodology, three data gathering methods were used and three different samples were researched to support the author's hypothesis. Over the next few pages the author will describe how he performed these data gathering methods on the three various samples. The structure will follow that as used in section 4.1 where the author split the research into two main topic areas.

Covered in sub-sections 4.41 and 4.42 are the methods used to obtain the data regarding the phenomenon that blended learning is embedding itself into the modern learning landscape. Section 4.43 will focus on the methods used to obtain the data regarding the continual search for the optimal blend.

4.41 Survey Irish Companies

Once the questionnaire had been created, it was then presented on the Internet via www.surveymonkey.com.

Before presenting it however, a pilot questionnaire was developed, which was given to some of my colleague and friends in order to gain initial feedback. The majority of their comments concerned on the length of the questionnaire, which in the pilot version consisted of fourteen questions over three pages. This they felt was too long and took quite some time to complete. Thus, based on their feedback, the number of questions was reduced from fourteen to six for the published version.

This questionnaire served as a means to learn more about the current state of blended learning in Irish companies. By using the software tool, surveymonkey.com, the results from the completed questionnaires were stored in the program and some preliminary analysis was done on the entered data.

30 completed questionnaires were entered into the system and all 6 questions were answered in 29 cases. The remaining questionnaire had one question omitted.

4.42 Document Analysis: Third Level Institutions

To study the current level of blended learning in third level institutions in both Britain and Ireland the author logged on to each of the 573 institutions and spent a minimum of fifteen minutes on each site investigating what blend if any they offered. Focus was concentrated on:

- the number of online courses the institution currently offers
- the teaching blend specified at course level
- the level of teaching blend at a module level

4.43 Experimental Research

To carry out the experimental part of the research the author carried out four primary activities as was stated in section 4.1. These activities included a pre-test survey; course delivery, assessment and a post-test survey

4.431 Assessment MS Word

The 18 students who took part in the PowerPoint course had previously completed a MS Word course online or in the classroom. The author will investigate the results of both of these groups.

4.432 Pre-test survey

The author used a survey to gather the student's feelings on their previous course experiences within the Adult Education. 12 students completed a MS Word course in a traditional classroom environment over a ten-week period and 6 completed the same MS Word course online also in 10 weeks.

4.433 Delivering course content

Course delivery in each of the three blended solutions was through various presentation methods. Three different blended solutions of different percentages were developed and adopted by the author as shown in the following table:

Course 1 Online: 25% Classroom: 75%	Course 2 Online: 50% Classroom: 50%	Course 3 Online: 75% Classroom: 25%
Online - Introduction	Online - Introduction - Exercise	Online - Introduction - Course Content - Exercise
Classroom - Course Content - Assessment - Exercise	Classroom - Course Content - Assessment	Classroom - Assessment

Table 4

Table 4 acts as the foundation for the author's hypothesis (table 1). The author takes the subject matter or PowerPoint and applies the three blended solutions. The solution that offered a equal blend of traditional and online delivery proved the most effective.

4.434 Course Assessment

To measure the performance of the students in the three blended courses, the author will use a multiple-choice test as way of assessing the student's performance. This assessment is included in Appendix E.

4.435 Post-test survey

At the conclusion of the course, the author gave all 18 participants the same post-test survey. The survey was a method to gauge the attitudes and feelings of the students regarding the blended course they completed.

4.5 Data Management

Huberman and Miles (1994) emphasize, "A good storage and retrieval system is critical for keeping track of what data is available". Given their recommendation, I utilized three data management programs. First, I used Microsoft Excel as a result management system to keep track of all third level institution names, number of online courses offered, and names of online courses. The other data management system I used was Microsoft Access. Through Access, I was able to keep record of the students who attended my blended courses and their results upon course completion. Finally, I used Microsoft Word to store any other information I gathered pertaining to my project e.g. minutes of meetings with my supervisor.

4.6 Data Analysis

Heffner (2003) points out that as with most fields of research, research in education uses two fundamental types of reasoning: inductive reasoning and deductive reasoning. University College Dublin (2006) defines deductive reasoning as 'taking a known idea or theory and applying it to a situation'. To analyse the source data and the data I collected from my own practical research, I followed the scientific method proposed by Dewey (1938). His proposal was that we should use deductive reasoning to develop a theory followed by inductive reasoning to support this theory. This is the analysis method that I will be employ throughout this paper.

For the author's hypothesis, he proposes that by offering a blended approach of equal proportions, the result would be that the effectiveness of learning increases. Previous research, for example, Bersin (2003) says blended learning is now becoming the *de facto* standard in education. Carman (2003) asks with this emerging standard, what is its optimal blend.

After formulating the hypothesis, the author then carried out experimental research to test his theory. To analyse the data generated from the research and online surveys, many quantifiable analysing techniques were applied. Prior to applying these measures, the author performed some clean up operations as suggested by Routio (2005). For example, he removed the data, which was obviously erroneous or irrelevant and normalised the data to eliminate unwanted factors. After performing these clean up operations, the author carried out many calculations on the data, for example the mean.

As well as analysing in a quantitative fashion, the author collected data experimentally and used inductive reasoning to search for similarities within the results. University College Dublin (2006) defines inductive reasoning as 'using observation to formulate an idea or theory'. Thorne (2000) reports that inductive reasoning is most closely associated with qualitative analysis rather than quantitative analysis. The qualitative data collected was assembled through various data collection methods during both the review of current literature and from my own practical research. These methods included observations in the classroom, pre-test and post-test questionnaire. They also considered the document analysis that the author carried out on the Internet, in libraries and from the personal notes and logs of the author.

As the author collected the qualitative data, it was inductively analyzed via the naturalistic inquiry method as proposed by Lincoln & Guba (1985) and through the grounded theory approach formulated by Glaser & Strauss (1967). Both these analytical approaches provided a thorough strategy for the collection and analyzing the qualitative data, which the author collected as part out the research.

The grounded theory approach proposed by Glaser & Strauss, sets up a clear blueprint for analyzing the qualitative collected data. This approach starts out by noting the key issues associated with the data. With the key issues identified, they are then analysed to identify categories and sub categories to which the issues can be grouped. This grouping is called coding and as you perform this coding, you may write down your own thoughts and Glaser & Strauss call this process 'memoing'. After you have identified the key issues, grouped them and added your own thoughts you can then look for relationships amongst the data.

4.7 Analysis Procedures

After identifying and defining the problem, the author commenced the review on the current literature on the subject of. blended learning. This current literature consisted of journals, web sites, books, interviews, reports and magazine articles.

As guided by the readings of Glaser & Strauss (1967) I began by collecting data from all sources of literature. Upon an initial review of a source document, if there was some material that I felt could be of use to my thesis I would store a copy of this document. This storage would be in various formats e.g. Adobe Acrobat, PowerPoint document. Each document would be stored numerically.

After this initial literary review, the then read each stored document a second time; this time however, highlighted a sentence or passage, which identified a key issue in blended learning. Each passage is highlighted, assigned its file name and copied into a master file. This master file contained all passages retrieved from all the reviewed literature.

After studying all the current literature available, the author had a large master file containing hundreds of sentences and passages relating to blended learning.

The author then began to group sentences and passages together in categories suggested by Strauss & Corbin (1990). As each sentence and passage had its file name, it could be easily determined the source of the sentence or passage.

Following the categorisation of concepts, the author then sought to look for relationships between individual categories as further suggested by Strauss & Corbin.

After completing the literary review, the hypothesis was generated. A hypothesis, which proposes that by institutions offering a blended approach in equal proportions, it will increase the volume of learning.

Upon generating the hypothesis, the author started to collect and analyse the data as suggested by Dewey (1938) in his scientific method to research. From the data collected, the results were analysed using qualitative and quantitative techniques as cited previously.

Chapter 5: Findings

My findings are a result of my explorations:

5.1 Investigating the current level of blended learning courses in Irish and British third level institutions

5.2 Determining the extent of blended learning activity in the Irish business sector

5.3 Through practical, experimental and literary research, formulating and presenting my recipe for a generic blended model

The results of the study (hopefully) provide a clear insight into the current state of blended learning in Irish and British third level institutions, in Irish companies and a proposal from the author as to what is the optimal blend.

5.1 An investigation into the current level of blended learning courses in British and Irish third level institutions.

This section of my study was conducted on 518 British and 40 Irish third level institutions.

My investigations took place, between the 3rd February and the 2nd March 2006. Information was gathered from the course prospectus of each institution and from details available from their respective web sites.

Great Britain

Of the 518 institutions researched in Britain, only 42 offer online courses of any description, a mere 8%. The number of online courses offered by each of these 42 British institutions is illustrated in figure 2.
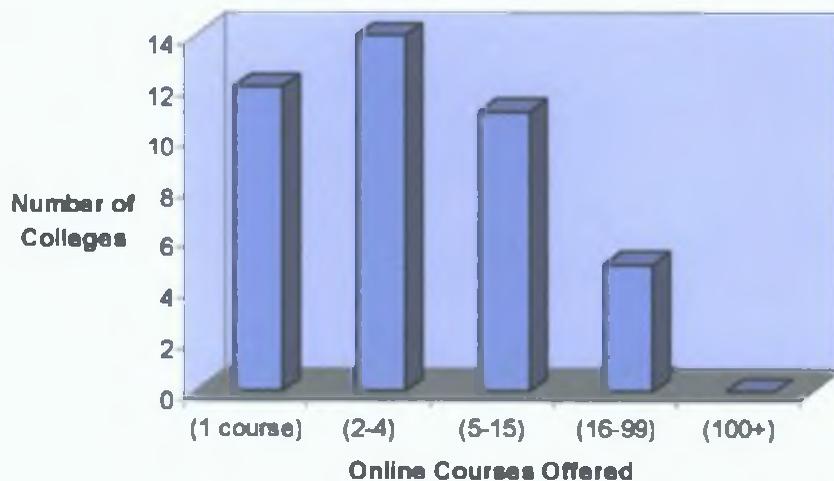
Figure 2

As we can see from figure 2, only 5 colleges surveyed in Britain offer more than 15 online courses.

Ireland

Of the 40 third level institutions researched in Ireland, 6 (15%) institutions offer online line courses of any description. Of the 6 colleges only 1 (University College Dublin) offers more than 1 online course as illustrated in the following graph.
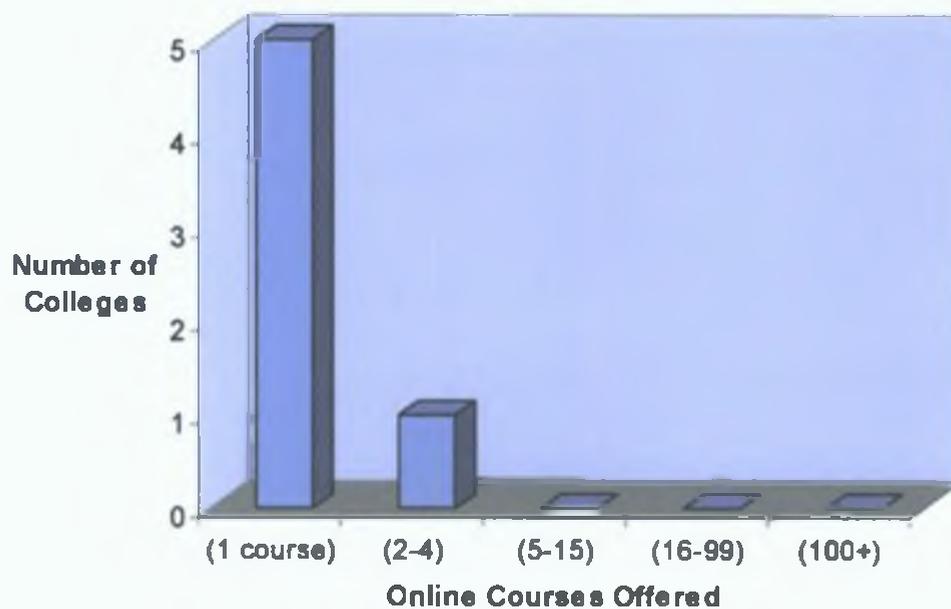
5.2 A quantitative analysis into current level of blended learning activities in the Irish business sector via a structured questionnaire.

The total number of participants for this section of the study was 30. All participants live and work in various Irish corporations. The questions and a graphing of the participants answers now follow.

Question 1: Does your current employer provide in-house or external training?

All of the 30 participants answered this question with no void answers.
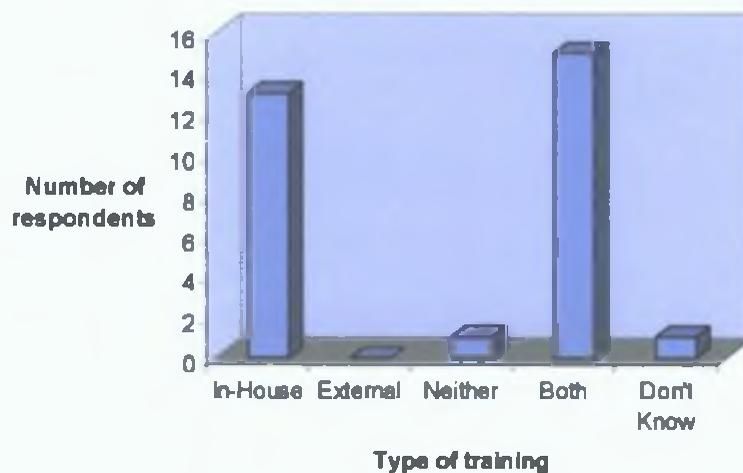
Figure 3

As we can see from the graph, 13 (43%) participants said that their employer offers in-house training while 15 (50%) replied with both forms of training. Furthermore, 1 (3%) did not know what type of training was offered their employer and 1 reported that their employer offered no training.

Question 2: Of the training course(s) you completed, what type of courses were they?
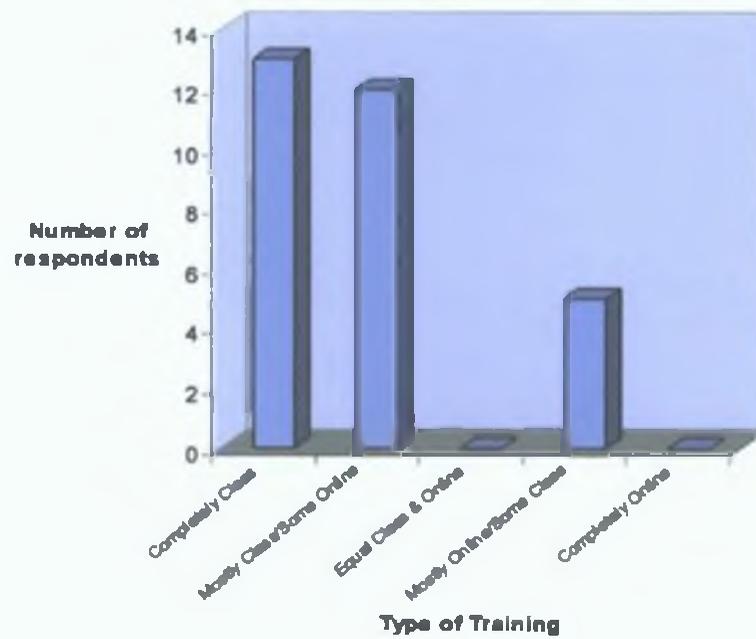
Figure 4

From the graph we can see that of the 30 participants, 25 (84%) said that the classroom was the predominant method of training used while 5 (17%) reported the use of online training.

Question 3: Which of the following simple tools did you come upon while engaged in company training?

Deciding on which tools to include was determined on my own personal experience and that of other authors for example Rossett (2006) and Jones (2005).
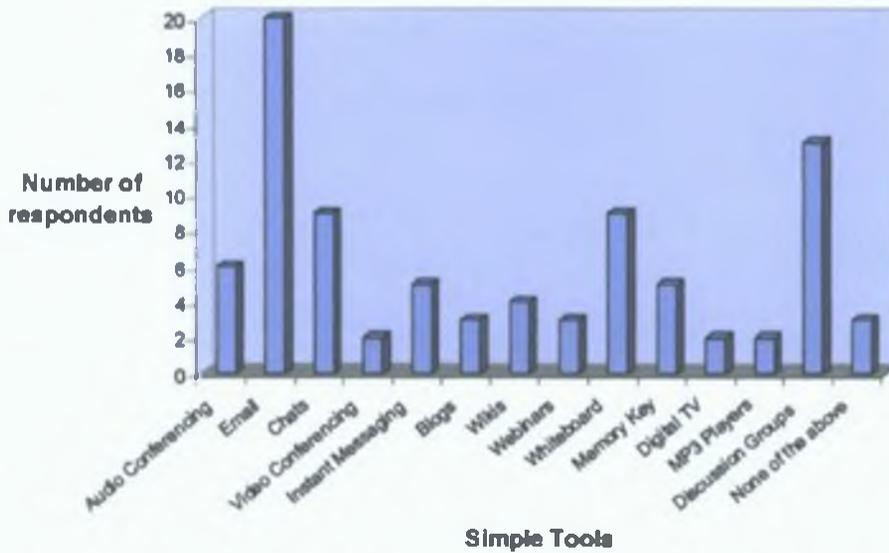
Figure 5

From this data, it is clear the e-mail is the dominant tool used in company training as proven by 20 (69%) participants. Other tools that appear popular are discussion groups (45%), whiteboard (31%) and online chats (31%).

Question 4: Which of these latest technologies have you encountered while you participated in company training?

Similar to deciding on which tools to include as the simple technologies in question 3, the tools I choose as the latest technologies were again determined on my own personal experience and that of other authors for example Rossett (2006) and Jones (2005). One can argue that these tools can be simple and be of the latest technologies to infest training.
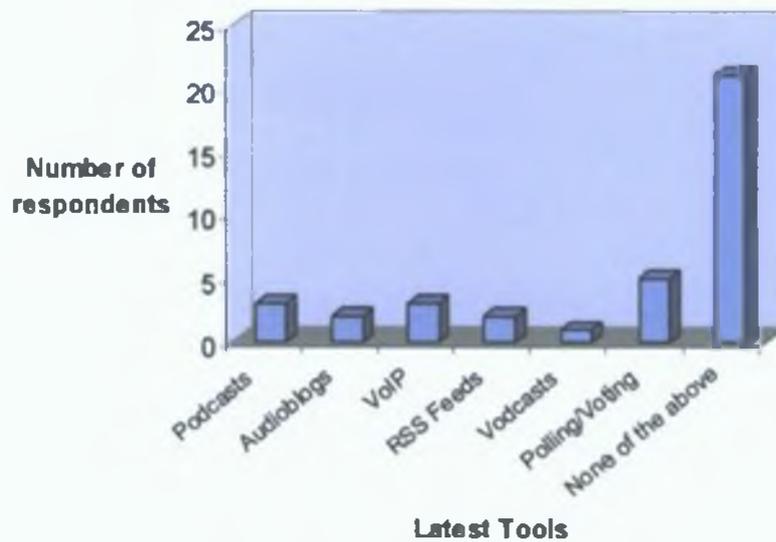
Figure 6

From the graph, we can see that 20 (70%) participants recorded no experience of new technologies and of the 17% that experienced these technologies; polling/voting proved to be the most popular.

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Question 5: Which of the following Learning Management Systems have you encountered in company training?

As with the previous questions 3 and 4, the options given as answer was based on the authors experiences in reading current literature on Learning Management Systems. There are an infinite number of Learning Management Systems that are not offered as a possible answer for this question. However, the author chose the most currently used Learning Management Systems but also gave the option of 'other' to allow the respondant to enter in any that they may have come across in their work.
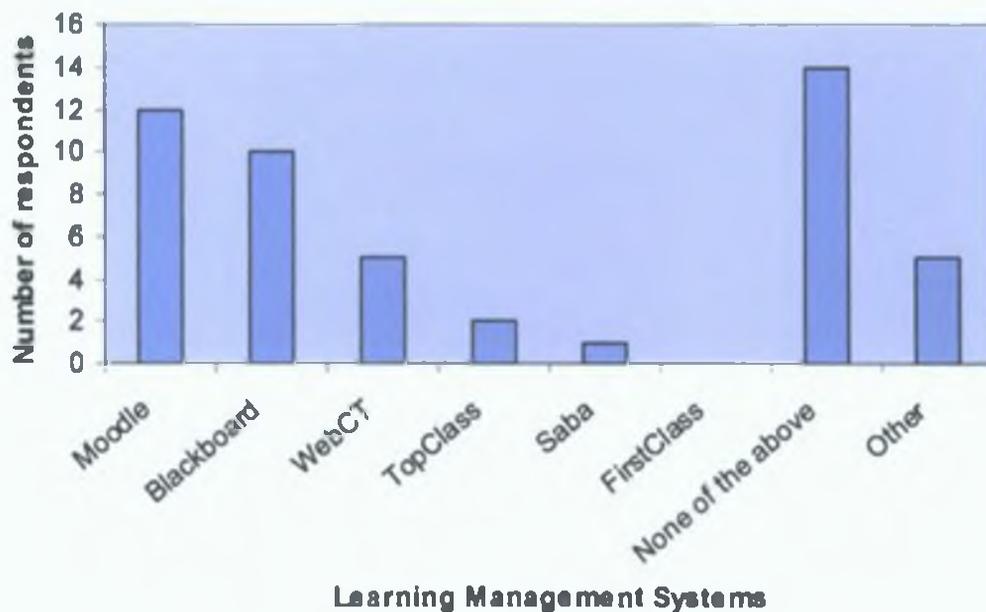
Figure 7

From the data generated, Moodle and Blackboard are the two dominant Learning Management Systems with 74% of participants saying they came across them during their training. However, 14 (46%) of participants replied as to not coming across any of the learning management systems listed, while 5 (17%) said that they used other LMS's not listed. These include Intel Custom LCMS, Lectora, Skillport and Aspen & Docent (SumTotal Systems)

Question 6: Which of the following presentation formats have you encountered while engaged in training?

Similarly to the previous question the author gave the list of presentation formats that he found to be the most current at the time. Furthermore, he also gave the option of 'other' to allow the respondant to enter in any that they may have come across in their work
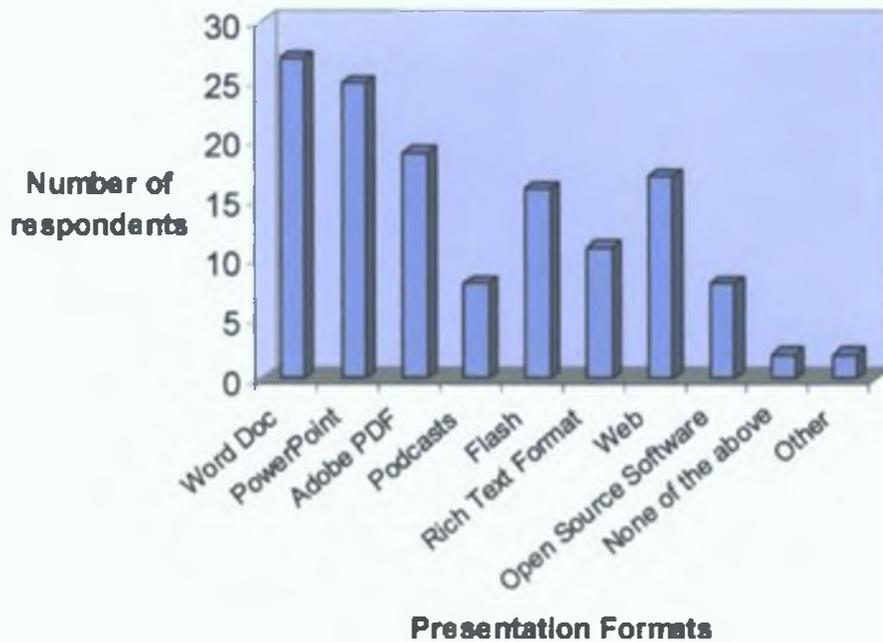
Figure 8

Here we can clearly see that, replied that Word and PowerPoint 90% and 84% respectively, were the main presentation formats used during training. Adobe PDF (64%) and the Web (57%) were also popular methods used. Podcasts proved the lowest however, being still relatively new on the market 8 (27%) reported as having come across them whilst in training.

5.3 Through practical, experimental and literary research, the author has devised and presented a generic blended learning model

In creating my recipe for a standard model, I carried out four primary tasks:

5.31 I analysed results from two MS Word courses taught in the classroom and online in 2004 and 2006 respectively.

5.32 I designed and developed a structured survey to investigate whether the students participating on the MS Word courses enjoyed them, based on the first level of Kirkpatrick's model (2004), for measuring the effectiveness of training

5.33 I designed 3 separate beginner PowerPoint courses using a different blend for each course and then delivered each course over 2 x $1^{\frac{1}{2}}$ hour sessions.

5.34 After each of the 3 blended PowerPoint beginner courses were taught, a further questionnaire was presented to the student to attain feedback on the courses.

5.31 Analysis of the results from two MS Word courses taught in the classroom and online in 2004 and 2006 respectively.

Classroom 2004

In the winter of 2004, I developed an MS Word course for a classroom environment and then provided training on set courses to two groups of 6 people over a ten-week period. Upon completing the course, each student took the assessment that I also designed.

Here are the results from the two groups of six students.
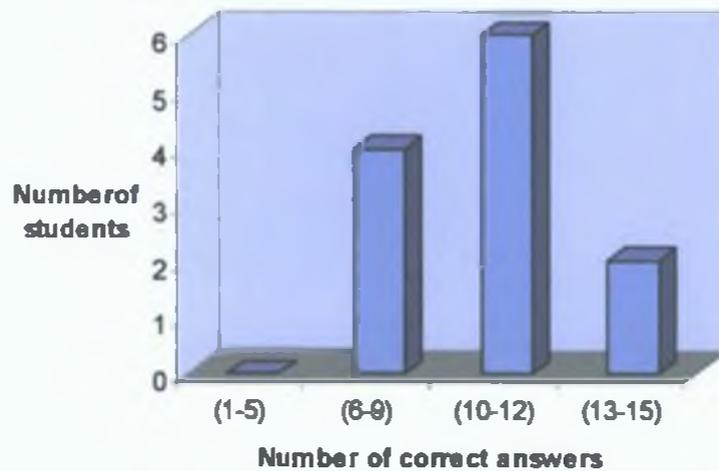
Figure 9

Pass Mark (required): 9/15 (60%)

Test Scores: 7, 7, 8, 9, 10, 11, 11, 12, 12, 12, 13, 14

Mean Score: 10.5

Online 2006

In 2006, a colleague of mine used a CD-ROM as the source for the MS Word course for beginners. He had a group of 6 students, which he got to install the program on their home PC. Upon completing the course, each student took the assessment that I designed.

Here are the results from his group of six students.
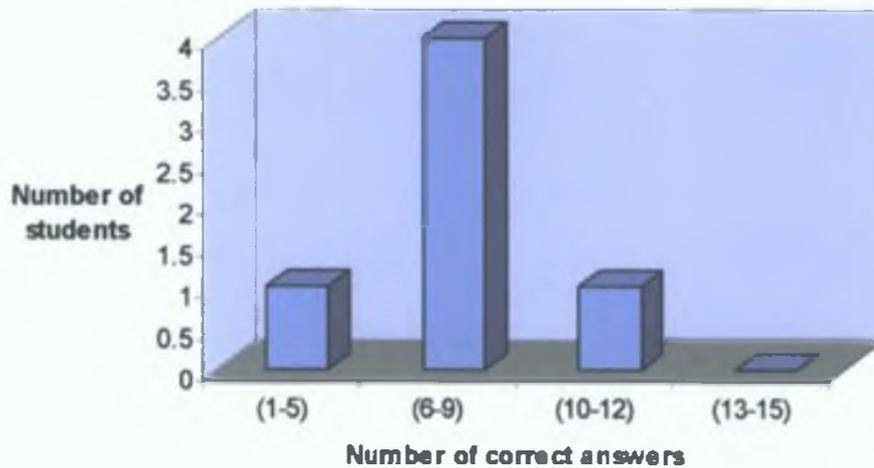
Figure 10

Pass Mark (required): 9/15 (60%)

Test Scores: 4, 7, 8, 8, 9, 12

Mean Score: 8

5.32 A quantitative analysis into student's opinions regarding the MS Word course they completed in a classroom or online via a structured questionnaire

The total number of participants for this section of the study was 18. Of the 18 surveyed 12 completed the MS Word course in the classroom and the remaining 6 completed the course online as established through question 1 on the questionnaire.

Question 2: Were you satisfied with the course materials used by the teacher?

All of the 18 participants answered this question with no void answers.
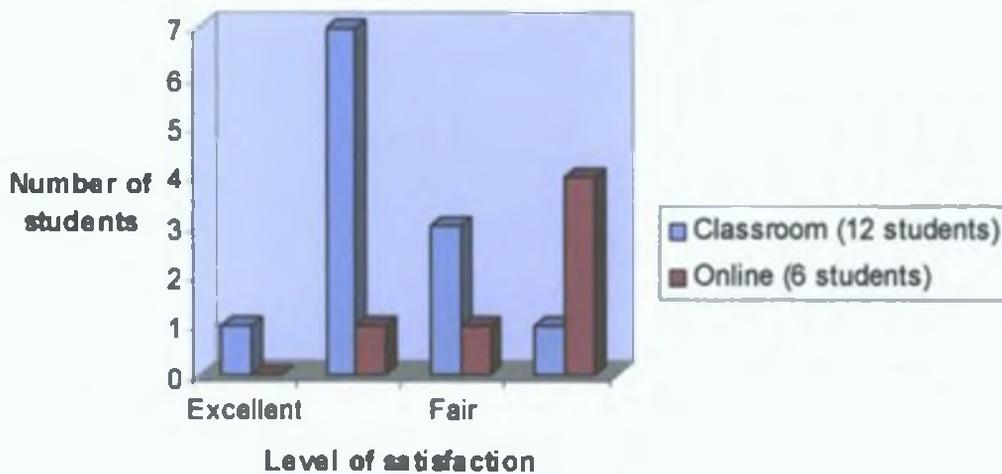
Figure 11

From the data we can see that compared to the classroom, the use of materials in the online learning was very poor as reported by 4 (67%) of online learners. Classroom learning faired a lot better in that 67% of the classroom learners said that the course materials were good or better.

Question 3: Was the material covered in the course, relevant to your every day work?
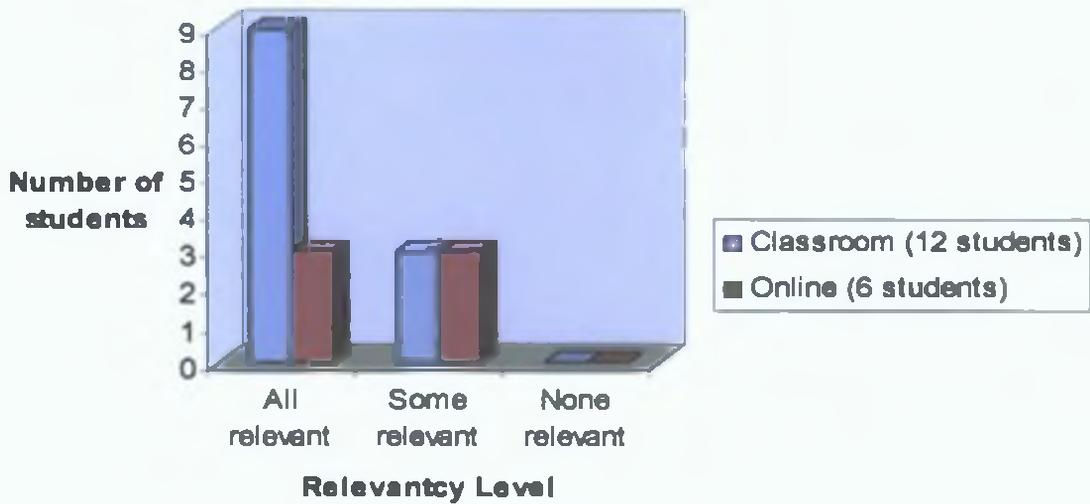
Figure 12

As we can see from the graph, 9 (75%) of classroom learners felt that the course material covered was relevant to their work where as only 3/6 (50%) felt the same way in the online course.

Question 4: Were you satisfied with the various media used by the teacher to present the course?

All of the 18 participants answered this question with no void answers.
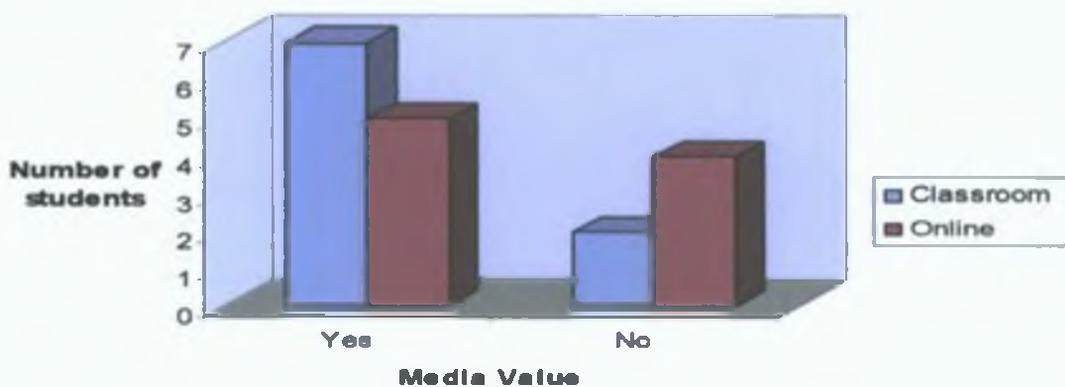
Figure 13

From the graph we can see that the media used in both classes was not that well received as only 7/12 (59%) of the classroom and 2/6 (33%) of the online learners were satisfied with the presentation media.

Question 5: Did you like the training style of the trainer?

This question was answered by 12 out of 18 participants therefore six void answers was recorded as the question was not applicable to those studying online
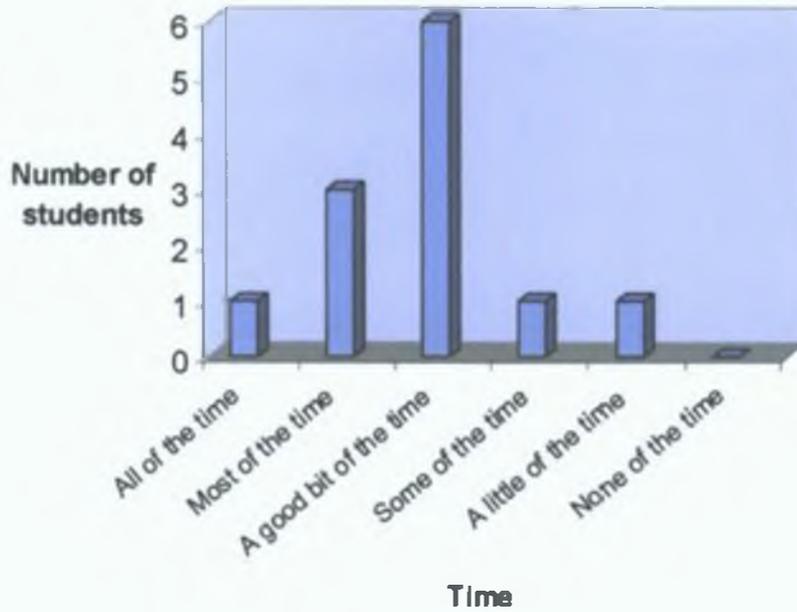
Figure 14

From the data we can see that 10 (84%) of the classroom learners overall enjoyed the learning style of the teacher.

Question 6: Were you happy with the classroom facilities?

As with question five, this question was only answered by 12 out of 18 participants therefore six void answers was recorded, as the question was not applicable to those studying online.
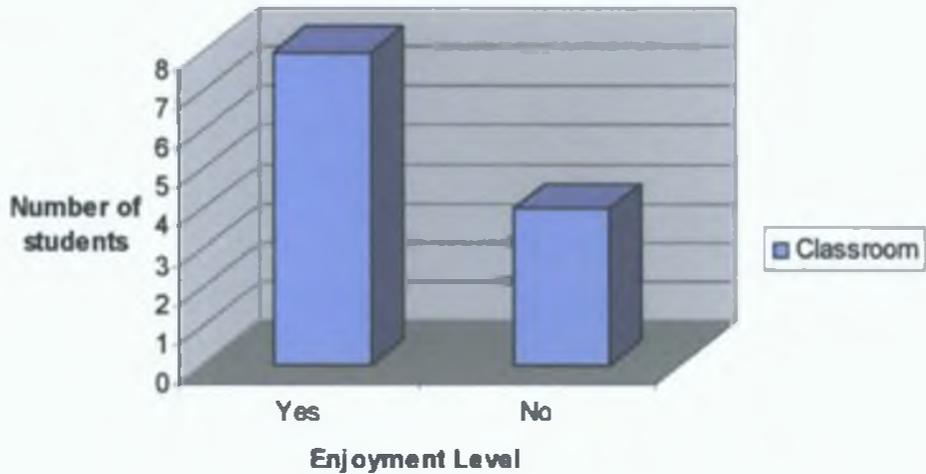
Of the 12 who did answer the question, 8 (66%) said that they were happy with the classroom facilities

Question 7: Overall, did you enjoy the course?

All of the 18 participants answered this question with no void answers.
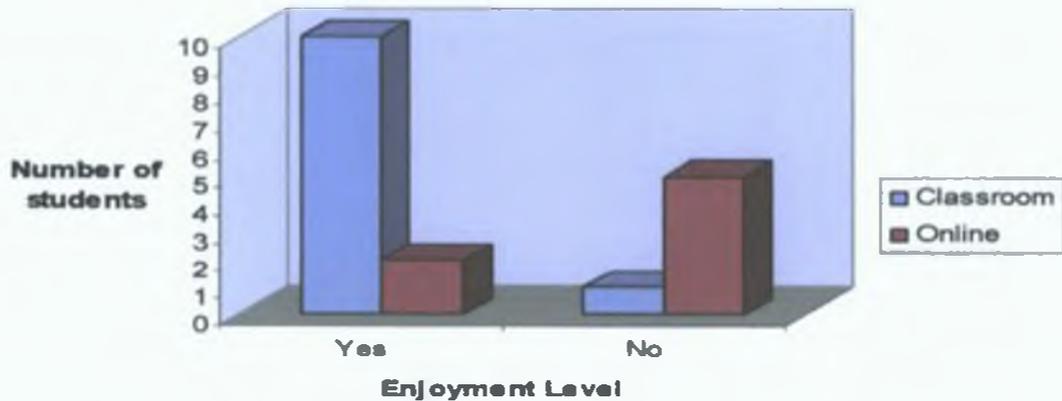
Figure 15

As we can see from the data, 10 (84%) of the classroom students said they enjoyed the course while only 1 (17%) said the same from the online students.

5.53 I designed three separate beginner PowerPoint courses using a different blend for each course and then delivered each course over 2 x 1½ sessions

In the table below are the results from the three beginner PowerPoint courses. In each course there were 6 students. Each course was thought with a varying degree of blend as described in section 4.432.

Test	25% Classroom 75% Online	50% Classroom 50% Online	75% Classroom 25% Online
Score (out of 15)	5, 7, 9, 9, 11, 12	9, 10, 12, 12, 14, 14	6, 8, 8, 9, 11, 13
Mean	8.8	11.8	9.1

Table 5

As we can see from table 5, those students who completed the PowerPoint course with the equal blend of both online and classroom performed best overall. The students averaged 11.8 out 15 compared to the averages of the other two blended courses 8.8 and 9.1 respectively.

5.54 After each of the three-blended beginner PowerPoint courses were taught, a further questionnaire was presented to the 18 students to attain initial feedback on the courses. The author wanted to gauge how the students emotions and feelings towards the blended PowerPoint compared to those attitudes regarding the MS Word course they previously completed either entirely online or in a classroom

The students were asked to put 1-5 in each of the following boxes, where 1 represents poor, 2 – fair, 3 – good, 4 – very good, 5 – excellent.

The following table depicts the average for each question for each of the three applied PowerPoint blended solutions as defined in Table 4. The list of questions is included in Appendix F of this paper.

Criterion (1-5)	25% Classroom 75% Online	50% Classroom 50% Online	75% Classroom 25% Online
Clear objectives	3.4	4.3	4.1
Content level appropriate	3.1	3.3	3.8
Content relevant to objectives	3.3	4.4	4.4
Well organized	4.4	4.3	4.2
Clear direction	4.2	4.5	3.8
Enjoyed look & feel	3.2	4.1	4.0
Content engaging	3.1	4.6	4.2
Quizzed well organized	3.9	4.1	3.9
Length of course	4.3	4.4	4.3

Table 6

From the table above we can see that the course with the equal blend of online and classroom receives the best overall average for the questions asked. What is also apparent from reading the table data, is the criteria that it does not fair the best in, the blend where the classroom is 75% dominant does. Thus, we can conclude that students in these tests prefer to have a personal contact. For example, content level appropriate and content relevant to objectives.

Chapter 6: Discussion

6.1 Introduction

This chapter provides an examination of my findings and provides an insight into the study's primary question, "Is there an optimal blend of technology in the classroom for learning and what is it". This examination begins with a discussion of the key patterns and relationships, with specific attention being given to experimental research where the author taught the same course but used three different blends of varying degrees. A discussion of the study's limitations and its implications for future research conclude the chapter and provide the appropriate bridge for follow-up studies.

6.2 Summary of Findings

The author's primary goal was to develop a generic model for blended learning. A model can be applied to any course. Whether it be based on theory, for example a history course or a course with a more practical approach e.g. cookery. Before developing this model the author wanted to investigate what is the current level of blended learning in British and Irish third level institutions and in Irish companies. This investigation focused primarily on educational tools used to create a learning blend. After carrying out this investigation, the author developed his own generic model for blended learning based on his own experimental research.

On investigating the current volume of online courses in third level institutions in Britain and in Ireland, the findings show that Ireland seems to be ahead of its neighbour. After researching 518 British third level institutions, 8% offered online courses whereas in Ireland of the 40 institutions researched, 15% offered online tuition. Of the 42 British institutions offering online courses, 4% offered more than 50 online courses. Similarly in Ireland, of the 6 Irish institutions offering online education none offered more than 50 online courses.

The author's results differ dramatically from the findings of Paulsen who performed comparable studies in Scandinavia in 2000 and 2003 respectively. In his 2000 paper, Paulsen researched 20 Nordic third level institutions, 60% of the third level institutions he investigated offered more than 50 online courses. In his 2003 paper, 30 of the 89 institutions or 34% offered more than 50 online courses. Fritsch (2000) adds that in Germany, of 12 institutions surveyed, 7 offered more than 50 online courses.

Diaz (2000) agrees with the argument that both Britain and Ireland are well behind the other countries. He reported that in an investigation into the number of online courses offered by third level institutions in Southern Europe, of 20 surveyed 25% offer more than 50 online courses.

Similarities were observed in the blended structure of online courses offered in Britain and Ireland. The primary method for which the blend was structured was through the course content. Of those third level institutions researched, course materials were primarily presented on web pages or sent to the student by way of e-mail. Online assessments was the second most popular way to create a blend, with 45% of assessments being conducted online, but did however; require the student to complete assessments under supervision on campus.

Internal studies have shown that while third level institutions in Britain and Ireland do not offer as many online course as some of its European neighbours, they are beginning to realise the potential of a learning blend in the classroom. This the author has considered when designing his blended model for learning. \

Having completed the research into British and Irish third level institutions we now change focus, and from now on shall concentrate on the blend in Irish companies.

The author discovered that there is more widespread use of modern learning technologies in Irish companies than in third level institutions, for example the use of Podcasts, instant messaging and video conferencing.

Although, only thirty corporations were surveyed, it is clear that there is a greater acceptance of learning technologies in the modern learning landscape.

There are many reasons for this, for example, corporations have more financial stability, a greater desire exists among its employees to learn to obtain a competitive advantage. This competitive advantage, usually translates into a greater market share, large profits for its workers and stakeholders.

Now we shall discuss the results of the author's practical research. Prior to carrying out experimental research to find which of the three different blended courses yield the best the results, the author analysed two similar studies carried out in 2004 and 2006 respectively. These studies yielded some interesting results as displayed in Figures 10 and 11. The Microsoft Word course taught in the classroom produced overall better results than the course carried out online, for example, the classroom results were higher and produced a higher average. Although twice as many students completed the classroom course their results were dramatically higher, with 8 out 12 achieving a 66% or higher, while of the 6 who studied the online course only 2 achieved a score of 66% or higher.

From talking to students completing the online course, some noted feelings of isolation and boredom, owning to the lack of interactivity while completing online courses. This initial feedback was supported by the results of an additional survey. Of the 12 students who completed the classroom course 10 said they enjoyed it while only 1 of the 6 said the same of the online course. These figures were given further weight as those who completed the surveys cited several reasons as to why they did not enjoy the online course, for example, inadequate course tools, relevancy of course content and presentation media used to present the course.

As previously reported in the methodology, the author designed three beginner PowerPoint courses each with a varying blend of online and classroom based learning. The results for these courses varied greatly in terms of student performance and the student attitudes and emotions regarding the three courses. The course, which had the equal blend of both learning styles, proved most effective. This effectiveness was demonstrated by the performance levels as shown in Table 7. These performance levels are indicated by the student test scores, who were graded on 15 multiple choice questions.

Test	25% Classroom 75% Online	50% Classroom 50% Online	75% Classroom 25% Online
Student Test Scores (mark out of 15)	5, 7, 9, 9, 11, 12	9, 10, 12, 12, 14, 14	6, 8, 8, 9, 11, 13
Mean	8.8	11.8	9.1

Table 7

From this post-course survey, we can see that of the three blended courses, the two courses that had a blend of at least 50% and 75% classroom yielded the best results, averages of 11.8 and 9.1 respectively. It is clear from the results that students still prefer the personal touch, which is achieved through the classroom and as Kapp (2002) writes, this touch is lacking in an online learning environment. After speaking to some of the students after courses completion, many cited the advantage of having the teacher available in person as a key factor.

If we take an overall view of these results, it shows that companies are more inclined to adopt many new learning technologies. Ultimately, the motive behind this adoption is to increase their profit margins; however, by showing a willingness to use these tools, they show that they are aware that the employee should be at the heart of their company.

6.3 Conclusion

From this study, two approaches to teaching stand out. The theoretical and hands on approach. If theory based in nature, then he agrees that the classroom is a place where high-level level discussions take place after the student had pre-read the course material made available on the internet. However, if the approach is hands-on then the author believes that classroom should be place where the course content is presented in a more practical way with the internet used to provide practice exercise.

The author further concludes that if a course is theory or hands-on based the introduction should be made available on-line while the assessment should always take place under direct supervision. This approach supports the author's model of a 50/50 approach to learning. Through this 50%/50% model, the author proved that there was an increase in the student's performance, through higher results and through student feedback.

Furthermore, from the research the author concludes that third level institutions and companies are seeking out and implementing ways to adapt to the ever-changing learning needs of the student. They are turning to the use of blended learning. Third level institutions in Britain and Ireland are now offering online courses. However, they are still well behind some of their European counterparts in terms of the number of these online courses they provide. At a deeper level, these institutions are starting to offer a learning mix in classroom courses they offer.

Whist these third level institutions are starting to see the benefits of such blending, Irish companies are well past the beginner stage in offering a blended approach to learning. The author concludes that companies are more willing to invest and experiment with blended learning than third level institutions.

What we must finally accept is that the students of today are the teachers of tomorrow, and there will be a greater shift in the use of learning technologies in the classroom. With this shift we will see an increase in blended learning, predicts the author.

These teachers of tomorrow will teach students with having the experience of blended learning themselves unlike the teachers of today who have just the theory behind blended learning.

Having experienced blended learning first hand the teachers of tomorrow will be more comfortable in a blended environment and adopting such an approach in their teaching. The author's blended model, takes advantage of this approach by offering the educators of tomorrow a flexible adaptive method in which to deliver their course.

References

Balance 2004. Why the Blended Learning Approach? Retrieved March 25, 2006, from, www.balancelearning.co.uk/index.html

Bersin, Josh 2003. What Works in Blended Learning. Retrieved February 20, 2006 from www.learningcircuits.org/2003/jul2003/bersin.htm

Bersin, Josh 2003. E-Learning Analytics. . Retrieved February 20, 2006 from www.learningcircuits.org/2003/jun2003/bersin.htm

Beyth-Marom, R.; Novik, R.; and Sloan, M. "Enhancing Children's Thinking Skills: An Instructional Model for Decision-Making Under Certainty." INSTRUCTIONAL SCIENCE 16/3 (1987): 215-231.

Blended Learning; fad, fantasy or future? 2002. Inside Learning Technologies. Retrieved February 03, 2006 from http://www.corollis.com/article_blended.htm

Brennan, Michael 2003. Blended Learning and Business Change Key Findings. White paper Retrieved February 20, 2006 from www.thomson.com/cms/assets/pdfs/learning/IDC-Blended_Learning-Key_Findings.pdf

Brennan, Michael 2004. Blended Learning and Business Change. Retrieved February 27, 2006 from www.clomedia.com/content/templates/clo_article.asp?articleid=349&zoneid=13

Bikkar S. Randha, J, O. Michayluk 2005. Perceptions of learning Environment in Rural and Urban Classrooms. Retrieved March 02, 2006 from www.ssta.sk.ca/research/school_improvement/rp25.htm

Carman, M, Jared 2002. Blended Learning Design: Five Key Ingredients. Retrieved March 06, 2006 http://knowledgenet.com/pdf/Blended%20Learning%20Design_1028.PDF

Clarke, Donald, 2000. Updated November 4, 2000ISD - Development. Retrieved March 06, 2006 www.nwlink.com/~donclark/hrd/learning/development.html

Clarke, Donald 2003. Blended Learning. Whitepaper. Retrieved March 06, 2006. Retrieved March 12, 2006 www.epic.co.uk/content/resources/white_papers/Epic_Whtp_blended.pdf

Colorado State University's 2006. Retrieved February 20, 2006, from http://writing.colostate.edu/writers.cfm

Cross, J. 2004. An informal history of e-Learning. On the Horizon. Volume 12, Number 3, Pages. 103-110

Cross, K.P., & Steadman, M.H. (1996) Classroom Research: Implementing the Scholarship of Teaching.

Douglis, Felicia, 2003. Blended Learning: Choosing the Right Blend, Encyclopedia of Educational Technology.

Evalued 2006. An evaluation toolkit or e-library developments Retrieved February 20, 2006, from http://www.evalued.uce.ac.uk/

Falkenberg, Ryan 2005. on-line vs. Classroom learning. Retrieved March 25, 2006 from www.itweb.co.za/office/hpl/0409250058.htm

Farmer Muhammad 2005. e-Learning the traditional with the innovative. Retrieved March 25, 2006. http://www.elearningap.com/papers/Mrmuhammud/ELTI_Updated.pdf

Finnegan, M, Denis 2005. Keeping 'Learning' in E-Learning. Retrieved February 27, 2006, from
www.clomedia.com/content/templates/clo_article.asp?articleid=853&zoneid=77

Forrester J. P et al, 2000. *The Forrester Report*, "Online Training Needs A New Course Methodology for cost-benefit analysis of Web-based tele learning:Case Study of the Bell Online Institute".

Francis, Richard, John Raftery 2005. Blended Learning Landscapes Volume 1, Issue 3 Pages 1-5

Gardiner, L. (1998). Why we must change: The research evidence. *Thought and Action*, *14*(1), 71 – 88.

Gough, D. 1991.Thinking about thinking. Alexandria, VA: National Association of Elementary School Principals, 1991. (ED 327 980)

GurukulOnline Learning Solutions 2005.Blended Learning. Retrieved February 03, 2006 from http://www.gurukulonline.co.in/WhitePapers/Blended%20Learning.pdf

Harris, Michael 2006. Elearning vs Traditional Classroom Instruction Retrieved March 25, 2006, from, www.bestwebtraining.com/about_us.htm

Haythornthwaite, C., Kazmer, M., Robins, J., and Shoemaker, S. (2000). *Making connections: Community among computer-supported distance learners*. Paper presented at the Association for Library and Information Science Education 2000 conference, San Antonio, TX. Retrieved July 3, 2003, from:

IOWA State University (2001) "Advantages and Disadvantages of E-Learning," retrieved September 27, 2005, from www.dso.iastate.edu/asc/academic/elearner/advantage.html

Igneri 2005. Blended Learning in Practice: How to Effectively Measure Training Results. Retrieved March 25, 2006 from www.amanet.org/blended/pdf/blendedWebcast.pdf

Kapp M. Karl 2002. Blended Learning for Compliance Training Success Retrieved February 15, 2006 from www.astd.org/NR/rdonlyres/456DB5F7-D0FE-49B8-AE38-78167D308C7B/0/blendedlearning.pdf

Key P,James, 1997. Research Design in Occupational Education. Retrieved February 20, 2006, from www.okstate.edu/ag/agedcm4h/academic/aged5980a/5980/index.htm

Kirkley S.E & Kirkley J.R. 2005 Creating next generation blended learning environments using mixed reality, video games and simulations. TechTrends: Linking Research & Practice to Improve Learning. ; 49(3):42-89.

Kossen, S, Jeremy 2006. When e-learning becomes m-learning. Retrieved February 27, 2006, from www.palmpowerenterprise.com/issues/issue200106/elearning001.html

Lackney, A, Jeffery 2005. Teachers as Placemakers Investigating Teachers' Use of the Physical Learning Environment in Instructional Design. Retrieved February 15, 2006 from www.edi.msstate.edu/articlesTeachers.html

Landreneau J Kandace, 2005. Sampling Strategies. Retrieved February 20, 2006, from www.natco1.org/research/files/SamplingStrategies.pdf

Laster, Stephen 2003. Model-Driven Design: Systematically Building Integrated Blended Learning Experiences. Retrieved February 03, 2006 from http://www.sloan-c.org/publications/books/vol5summary.pdf

Learning 2006. Retrieved February 12, 2006, from http://en.wikipedia.org/wiki/Learning

Lee, Alison, 2006. Web-based Learning vs. Traditional Classroom Education. Retrieved March 16, 2006, from, www.silktide.com/articles/our-articles/web-based-learning-vs-traditional-classroom-education

Miller E Gary, 2004. Pennsylvania state university. Using all in a blended environment: implications for institutional planning

Morrison, Don 2003 / Holy Recipe 04.Doc / 1-16. Retrieved February 03, 2006 from www.morrisonco.com/downloads/blended_learning_holy_recipe.pdf

Morgan, C. K., and Tam, M. (1999). Unraveling the complexities of distance education student attrition. *Distance Education, 20*(1), 96 – 108.

McCarthy, M. E., Pretty, G. M. H., and Catano, V. (1990, May). Psychological sense of community and student burnout. *Journal of College Student Development, 31*, 211 – 216.

McGinnis, Michael 2005. Building a Successful Blended Learning Strategy. Retrieved March 06, 2006
www.ltimagazine.com/ltimagazine/article/articleDetail.jsp?id=167425

McKeown, P. 2004 Questionnaire Design. Retrieved February 22, 2006, from
www.epiet.org/course/Presentations/2005/09-%20Questionnaire%20Design/09-%20Questionnaire%20Design.ppt

Nagura, Hiroaki. (2003) Effectiveness of blended learning in management skill training. Retrieved February 03, 2006 from
http://www.nri.co.jp/english/opinion/papers/2003/pdf/np200369.pdf

Niedringhaus, E. Elizabeth 2003. Balancing Instructor-Led and Net-Based Learning Can Be Key to Training Success. Retrieved February 15, 2006 from
www.sselearn.com/assets/pdfs/whitepaperBlendedLearning.pdf

Norris, S. P. "Synthesis of Research on Critical Thinking." EDUCATIONAL LEADERSHIP 42/8 (1985): 40-45.

North, Rachel 2006. Learning Changing Lives. Retrieved February 15, 2006 from
www.surreycc.gov.uk/sccwebsite/sccwspages.nsf/LookupWebPagesByTITLE_RTF/Learning+Changing+Lives?opendocument

Oliver, Martin, K, Trigwell 2005. Can 'Blended Learning' Be Redeemed? E–Learning, Volume 2, Number 1, Pages 17-24.

Osguthorpe, Russell T.; Graham, Charles R.. Quarterly Review of Distance Education, Fall2003, Vol. 4 Issue 3, p227-233, 7p, 1 chart, 2 diagrams; *(AN 11164018)*

Procter, Chris 2002. Blended Learning in Practice. Retrieved March 24, 2006, from, www.edu.salford.ac.uk/he /proceedings/papers/cp_03.rtf.

Reed, Chris, H, Singh 2001. Achieving Success with Blended Learning. Retrieved March 06, 2006 from www.centra.com/download/whitepapers/blendedlearning.pdf

Rochester Institute of Technology 2005. Blended learning pilot project. Retrieved February 03, 2006 from http://online.rit.edu/

Rossett, Allison, Rebecca V Frazee 2006. Blended learning opportunities. Retrieved March 06, 2006 www.amanet.org/blended/pdf/WhitePaper_BlendLearn.pdf

Rossett, Allison, F, Douglis, R Frazee 2003. Strategies for Building Blended Learning. Retrieved March 11, 2006 www.learningcircuits.org/2003/jul2003/rossett.htm

Sierra, Kathy 2005. Most classroom learning sucks. Retrieved February 15, 2006 from http://www.typepad.c m/t/trackback/1710823

Sierra, Kathy 2006. Crash course in learning theory. Retrieved February 15, 2006 from http://headrush.typepad.com/creating_passionate_users/2006/01/crash_course_in.html

Simpson, Ormond 2004. e-learning, democracy ,and social exclusion: Retrieved February 27, 2006, from www.sagepub.com/5.%20E-Lear i g %20Democracy %20a d%20Social%v20Exclusio _7413.pdf.

Singh, Harvey 2003. Building Effective Blended Learning Programs November - December 2003 Issue of *Educational Technology*, Volume 43, Number 6, Pages 51-54.

Smith, A, Karl. 2005 Pedagogies of Engagement: Classroom-Based Practices. Retrieved March 24, 2006 from, www.asee.org/about/publications/jee/upload/SamplePages_87-101.pdf

StatPac 2006. Online Surveys & Paper Questionnaires Retrieved February 27, 2006, from www.statpac.com

Thorne, Sally, 2000. Data analysis in qualitative research. Evidence-Based nursing Volume 3 Pages 68-70

University of Calgary 2002. Blended Approaches to Teaching and Learning. Retrieved February 20, 2006 from http://commons.ucalgary.ca/documents/Blended%20Learning%20Position%20Paper.pdf

UCD 2006. Teaching and learning research methologies. Retrieved February 20, 2006, from www.ucd.ie/teaching/res/res.htm

Wicks, Malcolm 2000. Lifelong learning needs lifelong. Retrieved March 27, 2006, from motivation http://ioewebserver.ioe.ac.uk/ioe/cms/get.asp?cid=1397&1397_1=1723

Woodall, Dorman, 2004. Blended Learning Strategies Selecting the Best Instructional Method. Retrieved February 03, 2006 from http://forbes.bitpipe.com/detail/RES/1135013188_52.html

Woodall, Dorman, 2005 The Eight Key Steps of Blended Learning Method. Retrieved February 13, 2006 from http://www.developers.net/skillsoftshowcase/view/1280

Young, J. R. (2002, March 22). Hybrid teaching seeks to end the divide between traditional and online instruction. *The Chronicle of Higher Education*, A33

Young, Kevin 2002. Is e-learning delivering ROI? Industrial and Commercial Training; Volume34   Issue 2

Young R. Jeffrey 2002. 'Hybrid' Teaching Seeks to End the Divide Between Traditional and Online Instruction. The Chronicle of Higher Education Page 33

Zenger, J., Uehlein, C. (2001), "Why blended will win", *Training and Development*, No.August, pp.55-60.

Appendix A: British Third Level Institutions

	Online Courses	Course (518)
Aberdeen University	0	
Aberdeen College	20	Access, Driving licence, business
Robert Gordon University	0	
Banff & Buchan College	0	
Angus College	0	
Greenmount College	0	
North Down Ards Institute	0	
Armagh College	0	
Kilmarnock College (Ayrshire)	8	Business& Web Development, Technical Microsoft, ECDL
Ayre College	0	
North East Institute, Ballymena	0	
Southgate College	0	
Barnsley College	0	
Northern College (Barnsley)	0	
Bath Academy	0	
Bath Spa University	0	
University of Bath	0	
City of Bath University	0	
Norton Radstock College	0	
Bedford College	0	
Ilex Tutorial College Kempston	0	
Cranfield College	0	
Dunstable College	0	
Belfast Institute Further Education	1	ECDL
Union College Befast	0	
Queens Belfast	> 50	Business, English....Blended Courses
Bracknell & Wokingham College	0	
East Berkshire College	0	
Newbury College	4	Web design, Emotional Intelligence, Equality
Reading College (Thames Valley)	>50	Business, IT, Literacy & Numeracy, Communications
Reading University	0	
Rose Bruford College	0	
Bexley College	>10	Management, Computers, Literacy, Self-development
Aston University	0	
Birmingham University	1	Braille
University of Central England	0	
City College Birmingham	0	
City Technology College	1	Science
Birmingham College of Food	0	
Queen Alexander College	0	
Matthew Boulton College	0	
Newman College Higher Education	0	
South Birmingham College	0	
Sutton Coldfield College	0	
University of Bolton	0	
Arts Institute Bournemouth	0	
Bournemouth University	0	

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Bradford University	0	
Bradford College	0	
Keighley College	0	
Shipley College	0	
Bellerbys College Hove	0	
Brighton International Business	0	
Varndean College	0	
University of Brighton	0	
University of Sussex	0	
Bristol Baptist College	0	
University of Bristol	0	
Trinity College Bristol	0	
University of West England	0	
Orpington College	0	
Ravensbourne College	0	
Aylesbury College	0	
University of Buckingham	0	
Amersham & Wycombe College	0	
Buckinghamshire Chilterns College	0	
Bury College	0	
Holy Cross College	0	
Ystrad Mynach College	0	
Calderdale College	0	
Anglia Ruskin University	0	
University of Cambridge	0	
Cambridge Management College	0	
Cambridge Regional College	0	
Huntingtonshire College	0	
Peterborough Regional College	0	
Isle College	0	
Academy of Professional Studies	0	
Cavendish College	5	Customer care, ECDL, Business, Marketing
Birkbeck University of London	0	
University of London University	1	Excel
University of London	0	
Malvern House	0	
University of London Oriental/African Studies	2	PC skills
The Working Men's College	0	
Cardiff University	0	
University of Wales Institute	0	
Trinity College Carmarthen	0	
Castlereagh College of Further Education	0	
Guernsey College of Further Education	1	ECDL
Highlands College	0	
University of Chester	0	
West Cheshire College	0	
South Cheshire College	0	
Macclesfield College	0	
Reaseheath College	0	
Mid-Chesire College	0	
Sir John Deane's College	0	

Warrington College	0	
Priestley College	0	
Halton College	0	
Causeway Institute	33	ECDL, Dreamweaver, Stress Mgmt, Leadership
University of Ulster	3	Photoshop, Dreamweaver, Flash
Coleg Llandrillo	1	ECDL
University College Falmouth	0	
Cornwall College	0	
Truro College	0	
Henley College	0	
City College Coventry	0	
University of Warick	0	
Coventry University	0	
Coulson College	0	
Carlisle College	0	
University of Central Lancashire	0	
Furness College	0	
Kendal College	0	
West Cumbria College	0	
Darlington College of Technology	0	
Llysfasi College	0	
Derby Tertiary College	0	
University of Derby	18	Business Studies, Psychology, Commercial Law, Strat Mgmt
Chesterfield College	0	
North West Institute of Further Education	1	ECDL
North Devon College	0	
University of Exeter	0	
Exeter College	0	
Plymouth College	0	
University of Plymouth	0	
University College of St.Mark & St.John	0	
East Devon College	0	
South Devon College	0	
Doncaster College	0	
Kingston Mourward College	0	
Dudley College of Technology	0	
Dumfries & Galloway College	0	
Clydebank College	0	
University of Abertay	0	
University of Dundee	0	
Dundee College	0	
East Tyrone College of Further Education	0	
Derwentside College	0	
New College Durham	0	
Durham University	0	
Boston College of London	0	
Thames Valley University	0	
Edinburgh University	0	
Edinburgh's Telford College	0	
Napier University	0	
Queen Margaret University	7	Research & Critical Appraisal, Electronic Skills

College	Count	Courses
Stevenson College Edinburgh	0	
Enfield College	0	
Capel Manor College	0	
New Basildon College	0	
Braintree College	0	
Peniel College of Higher Education	0	
Chelmsford College	0	
University of Essex	0	
Colchester Institute	0	
Epping Forest College of Further Education	0	
South East Essex College of Arts/Technology	0	
Falkirk College of Further & Higher Education	0	
Lauder College	0	
Elmwood College	0	
Glenrothes College	0	
Deeside College	0	
St.Andrews University	0	
Gateshead College	0	
Barry College	0	
Anniesland College	0	
Glasgow Caledonian University	0	
Central College of Commerce	0	
Cardonald College	0	
Glasgow University	0	
John Wheatley College	0	
Langside College	0	
North Glasgow College	0	
South Lanarkshire College	0	
Stow College	0	
The University of Strathclyde	0	
University of Gloucestershire	1	Disability course
Cirencester Tertiary College	0	
Royal Forest of Dean College	0	
Gloucestershire College of Arts and Technology	5	Work skills, ECDL, Technical IT, Web development, Graphics
Hartpury College	0	
Stroud College of Further Education	0	
Filton College	0	
Greenwich Community College	12	Life skills,Sport Psychology,Maths,Biology,Physics,Travel
University of Greenwich	0	
Greenwich School of Management	0	
University of Wales Bangor	0	
Coleg Meirion Dwyfor	0	
Coleg Harlech	0	
Central College	0	
Active Learning	0	
Ealing, Hammersmith and West London College	0	
Holborn College Law School	0	
Basingstoke College of Technology	0	
Queen Mary's College	0	
Brockenhurst College	0	
Cricklade College	0	

Eastleigh College	0	
Farnborough College of Technology	0	
Fareham College	0	
St.Vincent College	0	
Havant College	0	
The University of Winchester	0	
Sparsholt College	0	
College of North East London	0	
5E College of London	0	
Middlesex University	0	
Mountview Conservatoire for the Performing Arts	0	
Harrow College	0	
Stanmore College	0	
Hartlepool College of Further Education	0	
Havering College of Further Education	0	
Holme Lacy College	0	
Barnet College	0	
Ashridge	0	
Oaklands College	0	
North Hertfordshire College	0	
Hertford Regional College	0	
West Hertfordshire College	0	
Inverness College	0	
UHI Millennium Institute	0	
North Highland College	0	
Brunel University	0	
Uxbridge College	0	
James Watt College	0	
Isle of Man International Business School	0	
Isle of Man College	0	
City University	0	
Boston University	0	
Frances King School of English	4	Communications
Kensington College of Business	0	
Kensington and Chelsea College	0	
University of London Heythrop College	0	
London Study Centre	0	
Queen's Business and Secretarial College	0	
Victoria School of English	0	
University of London Imperial College at Wye	0	
Hilderstone Collge	0	
Thanet College	0	
Canterbury College	0	
Canterbury Christ Church University	0	
University of Kent	0	
Mid Kent College	0	
North West Kent College of Technology	0	
South Kent College	0	
Regent Margate	0	
Hadlow College	0	

West Kent College	0	
Cicero Languages International	0	
Hull College	0	
University of Hull	0	
Kingston College	0	
Kingston University	0	
Greenhead College	0	
Huddersfield University	0	
Huddersfield New College	0	
Huddersfield Technical College	0	
Dewsbury College	0	
Knowsley Community College	0	
Accrington & Rossendale College	0	
Blackburn College	0	
Blackpool & The Fylde College	0	
Burnley College	0	
Lancaster University	0	
University College of St.Martin	0	
Nelson & Colne College	1	Typing
Edge Hill University College	0	
Cardinal Newman College	0	
University of Central Lancashire	0	
Preston College	0	
Myerscough College	0	
Runshaw College	0	
Skelmersdale and Ormskirk Colleges	0	
Leeds College of Art and Design	0	
Leeds College of Building	0	
University of Leeds	0	
Leeds Metropolitan University	0	
Trinity and All Saints University College	0	
Thomas Danby College	0	
Leicester College	0	
Regent College	0	
University of Leicester	0	
Stephenson College	0	
Loughborough College	0	
Loughborough University	0	
South Leicestershire College	0	
Crossways College	0	
University of London Goldsmiths College	0	
Maritime Greenwich College	0	
Lewisham College	0	
Limavady College of Further Education	0	
Boston College	0	
Grantham College	0	
Lincoln College	0	
Bishop Grosseteste College	0	
University of Lincolnshire and Humberside	0	
Stamford College	0	
North Lindsey College	0	

Grimsby Institute of Further and Higher Education	0	
Franklin College	0	
Lisburn Institute of Further and Higher Education	30	ECDL,Marketing,Performance appraisal,Economics, Finance
Liverpool Hope University	0	
Liverpool Community College	0	
Liverpool Institute for the Performing Arts	0	
Liverpool University	3	Business, Science & Technology, Science Systems
The City College	0	
City and Islington College	0	
Guildhall Schoool of Music and Drama	0	
London Metropolitan University	0	
Woodhouse College	0	
Oatridge College	0	
Jewel & Esk Valley College	0	
Institute for System Level Integration	1	Analog and Mixed Signal Integrated Circuit Design
Barnfield College	0	
University of Luton	0	
Abbey College Manchester	0	
Manchester College of Arts and Technology	2	Photoshop, Illustrator
City College Manchester	1	Spanish
Loreto College	0	
Manchester Business School	0	
Manchester Metropolitan University	0	
University of Manchester Institute of Science	7	ECDL
North Trafford College of Further Education	0	
Xaverian College	0	
Merton College Morden	0	
Wimbledon School of Art	0	
Milner School of English	0	
Wimbledon College	0	
Wimbledon School of English	0	
Cleveland College of Art and Design	4	Flash, Sound Max, Photomax, Software
Middlesbrough College	0	
St. Mary's Roman Catholic College	0	
University of Teesside	0	
Milton Keynes College	0	
Gwent Tertiary College	0	
Findhorn Foundation College	0	
Neath Port Talbot College	0	
Newcastle College	4	Life coaching, performance mgment, impact coaching,
Newcastle University	0	
University of Northumbria	0	
British Institute of Technology & E-commerce	0	
Newham College of Further Education	0	
University of East London	0	
University of Wales College Newport	0	
Newry and Kilkeel College of Further Education	0	
East Antrim Institute of Further Education	0	
College of West Anglia	0	
Paston College	0	

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City College	0	
Easton College	0	
University of East Anglia	0	
Norwich School of Art and Design	0	
Daventry Tertiary College	0	
Tresham Institute	0	
Bosworth Independent College	0	
Moulton College	0	
The University of Northampton	0	
West Nottinghamshire College	0	
Newark & Sherwood College	0	
Bilborough College	0	
Broxtowe College	0	
New College	0	
Nottingham University	0	
The People's College	0	
South Nottingham College	0	
Nottingham Trent University	3	Digital Writing, Leadership & Management, Journalism
North Nottinghamshire College	0	
Oldham College	0	
Omagh College of Further Education	0	
Stromness Academy	0	
Culham College	0	
Abingdon and Witney College	0	
Henley Management College	0	
Abacus College	0	
Oxford Brookes University	0	
Oxford Institute of Legal Practice	0	
Oxford and Cherwell Valley College	0	
Oxford University	18	Philosophy,History,Archeology,Computer,History,Law,Electronics
Plater College	0	
Regent Oxford	0	
Perth College	0	
Portsmouth College	0	
Highbury College	0	
The University of Portsmouth	2	Computing & Information Systems, E-Commerce
South Downs College	0	
Regent Trebinshun	0	
Coleg Powys	0	
Redbridge College	0	
Redcar & Cleveland Tertiary College	0	
Paisley University	0	
University of Glamorgan	0	
Pontypridd College	0	
West Thames College	0	
Richmond upon Thames College	0	
Hopwood Hall College	0	
Rotherham College of Arts and Technology	0	
Dearne Valley College	0	
Thomas Rotherham College	0	
Eccles College	0	

Salford College	0	
University of Salford	0	
The Borders College	0	
Heriot Watt University	0	
Hugh Baird College,	0	
King George V College	0	
Southport College	0	
Carl Duisberg Language Centre	0	
Sheffield Hallam University	0	
Sheffield College	9	English, Mentoring, Teaching, Trainers
The University of Sheffield	0	
Shetland College of Further Education	0	
Harper Adams University College	0	
Lydbury English Centre	0	
Walford and North Shropshire College	0	
Concord College	0	
Severnvale Academy	0	
Telford College of Art and Technology	0	
New College	0	
Solihull College	0	
Bridgwater College	0	
Strode College	0	
Richard Huish College	0	
Somerset College of Arts & Technology	0	
Yeovil College	0	
Weston College	0	
Southampton City College	0	
Itchen College	0	
Lewis School of English	0	
Southampton Solent University	0	
Tauntons College	0	
Totton College	0	
Camberwell College of Arts	1	Digital Arts
Southwark College	0	
University of London Institute of Psychiatry	0	
London Institute of Technology and Research	0	
London South Bank University	0	
Royal College of Speech and Language Therapists	0	
Burton Upon Trent College	0	
Cannock Chase Technical College	0	
Keele University	0	
Leek College	0	
Newcastle under Lyme College	0	
Stafford College	0	
Rodbaston College	0	
Tamworth and Lichfield College	0	
Carmel College	0	
St.Helens College	0	
Stirling University	0	
Aquinas College	0	

Stockport College of Further Education	0	
North Area College	0	
Stockton Riverside College	0	
University of Durham Stockton Campus	0	
Stoke on Trent College	0	
Staffordshire University	0	
West Suffolk College	0	
Suffolk College	0	
Lowestoft College	0	
Otley College	0	
City of Sunderland College	0	
Sunderland University	0	
Spelthorne College	0	
Strode's College	0	
Nescot College	0	
Esher College	0	
Farnham College	0	
Godalming College	0	
The College of Law	0	
Guildford College	0	
University of Surrey	0	
University of London Royal Holloway	0	
Brooklands Technical College	0	
Woking College	0	
Hastings College of Arts and Technology	0	
Plumpton College	0	
Sussex Downs College	0	
Chichester College of Art	0	
University College Chichester	0	
Northbrook College	0	
Carshalton College	0	
Swansea College	0	
Gorseinon College	0	
University of Wales Swansea	0	
Swansea Institute of Higher Education	0	
New College	0	
Swindon College	0	
Tameside College	0	
Craven College	0	
Yorkshire Coast College of Further Education	0	
University of Hull Scarborough	0	
University of York	0	
Worcester College of Technology	0	
Kidderminster College	0	
Wiltshire College	0	
Salisbury College	0	
The Isle of Wight College	0	
Wigan & Leigh College	0	
City of Westminster College	0	
Warwickshire College	0	
Stratford on Avon College	0	

South Thames College	0	
Waltham Forest College	0	
Walsall College of Arts and Technology	0	
Wakefield College	4	Clait, ECDL, Text Processing
South Tyneside College	0	
University of London King's College	0	
Yale College	0	
Evesham and Malvernhils College	0	
North East Worcestershire College	0	
University of Worcester	0	
Bishop Burton College	0	
Selby College	0	
York St.John College	0	
Wirral Metropolitan College	0	
University of London	0	

Appendix B: Irish Third Level Institutions

	Online Couses	Course
American College Dublin	0	
Atlone	0	
Ballyfermot	0	
Blanchardstown	0	
Burren College of Art	0	
Carlow	0	
Cork RTC	0	
Crumlin College	0	
DCU/Queens	1	Plasma and vacuum technology
DIT	0	
Dublin Business School	0	
Dun Laoighe	0	
Dundalk	0	
Galway/Mayo	0	
Garda College	0	
Griffith	0	
HIS Business College	0	
King's Inns	0	
Letterkenny	0	
Limerick RTC	0	
Maynooth	0	
Milltown Institute	0	
National College of Art & Design	0	
Nation College of Ireland	1	Managing Teams
Portabello	0	
Rathmines	0	
Royal Academy of Music	0	
Royal College of Physicians	0	
Royal College of Surgeons	1	Histology
Shannon College	0	
Sligo	0	
St Nicholas Montessori	0	
Tallaght	0	
Tipperary	0	
Tralee	0	
Trinity	1	Nursing & Midwifery
UCD	2	Business Studies (Management)
University Ulster/Coleraine	0	
Waterford	0	
Queens	0	

Appendix C: Survey (Blended Learning in Irish Companies)

Does your current employer provide in-house training or external training?

- In-house training ☐
- External Training ☐
- Neither ☐
- Both ☐
- Don't know ☐

Of the training course(s) you completed, if any, were they:

- Completely Classroom ☐
- Mostly Classroom/Some Online ☐
- Equal Classroom & Online (approx) ☐
- Mostly Online /Some Classroom ☐
- Completely Online ☐
- None ☐

Which of the following simple tools have you used as part of the company training?

- Audio Conferencing ☐
- Memory Key ☐
- Digital TV ☐
- Discussion Groups ☐
- MP3 Players
- E-mail Chats ☐
- Video Conferencing ☐
- Instant Messaging ☐
- Blogs ☐
- Wikis
- Webinars ☐
- Whiteboard ☐
- None of the above ☐

Which of these latest technologies have you used as part of the company training?

- Podcasts ☐
- Audioblogs ☐
- VoIP (e.g. Skype) ☐
- RSS Feeds ☐
- Vodcasts
- Polling/Voting ☐☐
- None of the above ☐

Which of the following Learning Management Systems have you used?

- Blackboard ☐
- WebCT ☐
- Moodle ☐
- TopClass ☐
- Saba ☐
- FirstClass ☐
- None of the above ☐
- Other (please specify) ☐

Which of the following presentation formats have you encountered while training?

- Word Doc ☐
- PowerPoint ☐
- Adobe PDF ☐
- Podcasts ☐
- Flash Rich ☐
- Text Format ☐
- Web ☐
- Open Source Software ☐
- None of the above ☐
- Other (please specify) ☐

Appendix D: Survey (Evaluation of MS Word Course)

Which of the following MS Word courses did you study?
- Online ☐
- Classroom ☐

How would you evaluate course materials used by the teacher?
- Excellent ☐
- Good ☐
- Fair ☐
- Poor ☐

Was the material covered in the course relevant to your everyday work?
- All relevant ☐
- Some relevant ☐
- None relevant ☐

Were you satisfied with the various media used by the teacher to present the course?
- Yes ☐
- No ☐

Did you like the training style of the trainer?
- All of the time ☐
- Most of the time ☐
- A good bit of the time ☐
- Some of the time ☐
- A little of the time ☐
- None of the time ☐

Were you happy with the classroom facilities e.g. computers
- Yes ☐
- No ☐

Overall, did you enjoy the course?
- Yes ☐
- No ☐

Appendix E: PowerPoint Examination

(Beginner)

Date: Tuesday 28th March 2006
10.00am – 10.25am

Damien Doheny

Time Allowed: 25 minutes

Read all questions

Answer all questions

All questions carry equal marks

ACCESS TO POWERPOINT PROGRAM ONLY, IS PERMITTED

1) Which of the following is NOT true when referring to PowerPoint?
   a) It is a flexible presentation tool ☐
   b) It is a way of displacing a presentation ☐
   c) It is not for creating graphics or for writing novels ☐
   d) It is a presentation made up of a series of slides ☐
   ☐

2) Which of the following is true when referring to PowerPoint?
   a) Put as many images/pictures on a slide as you can ☐
   b) Put as much information as you can on each slide so a listener can follow you ☐
   c) Distribute any handouts you may have prior to your presentation ☐
   d) Use transitions consistently throughout the presentation ☐

3) Before your final presentation, you would like to time how long you spend on each slide and the total duration of your presentation. What is the most appropriate way of doing this?
   a) Ask an attendant to time your presentation with a watch as there is no built-in feature to accomplish this in PowerPoint ☐
   b) This option is available under the Slide Show->Record Narration menu option ☐
   c) This option is available under the Slide Show->Rehearse Timings menu option ☐
   d) This option is available under the Slide Show->Custom Shows menu option ☐

4) How many Notes pages can you have per slide?
   a) 1 ☐
   b) 2
   c) 3 ☐
   d) 4 ☐

5) Which of the following is NOT true about Slide Sorter View?
   a) You can edit slide text ☐
   b) You can assign slide timings ☐
   c) You can reorder your slides
   d) You can pick up and apply slide colour schemes ☐

6) In Slide Sorter View, what would :05 indicate under a slide?
   a) 5 second timing ☐
   b) 5 second hold
   c) 5 second transition ☐
   d) Nothing ☐

7) What is the best way to get a slide show to stop?
   a) Press ESCAPE ☐
   b) Exit PowerPoint ☐
   c) Click F1
   d) None of the above ☐

8) Which of the following "Tell them's" for a presentation, according to the teacher?
   a) Tell them, tell them and tell them again ☐
   b) Tell them once, tell them and tell them again ☐
   c) Tell them what your going to do, tell them and tell them again ☐

9) Which of the following is NOT a PowerPoint view?
   a) Slide Sorter ☐
   b) slide Preview ☐
   c) Notes Page Master ☐
   d) Outline View ☐
   e) Normal View ☐

10) What are the steps involved in applying the design template 'Capsules' to a presentation?
   a) format → slide design → capsules ☐
   b) slide show → slide transition → capsules ☐
   c) format → slide layout → capsules ☐
   d) slide show → set up show → capsules ☐

11) Which of the following happens by pressing F5 while in normal mode?
   a) spell check ☐
   b) program goes into slide show mode ☐
   c) switches from normal to slide sorter view ☐
   d) opens up a new presentation ☐

12) What is the function of the Master Slide?
   a) ensure all your slides have the same background or logo on them ☐
   b) ensure all your slides have a different background or logo on them ☐
   c) allow you delete all you slides at once ☐
   d) allow you create duplicate slides

13) How do you get to the Master Slide?
   a) view → Master → Slide Master ☐
   b) view → Toolbars → Reviewing ☐
   c) tools → Macro → Macro's ☐
   d) view → Master → Handout Master

14) Which of the following tools can you use in PowerPoint?
   a) graphs ☐
   b) tables ☐
   c) clipart ☐
   d) wordart
   e) all of the above

15) What is the maximum number of handouts you can print on a single page?
   a) 2 ☐
   b) 4
   c) 6 ☐
   d) 9 ☐

Appendix F: Survey (Evaluation of MS PowerPoint Course)

On a scale of 1-5 (with 5 being the best), colour the circle to indicate how you found the following criteria during the blended course you complete.

Q1. Did the course have clear objectives from the beginning?

     (1)   (2)   (3)   (4)   (5)

Q2. Do you feel that the content level was appropriate?

     (1)   (2)   (3)   (4)   (5)

Q3. Did you feel the content presented was relevant to course objectives?

     (1)   (2)   (3)   (4)   (5)

Q4. Did you feel the course was well organised?

     (1)   (2)   (3)   (4)   (5)

Q5. Do you get a sense of a clear direction from the course?

     (1)   (2)   (3)   (4)   (5)

Q6. Did you enjoy the look and feel of the course?

     (1)   (2)   (3)   (4)   (5)

Q7. Did you find the content engaging?

     (1)   (2)   (3)   (4)   (5)

Q8. Did you find the practice exercises and assessment to be well organised?

     (1)   (2)   (3)   (4)   (5)

Q9. Overall, how did you find the duration of the course?

     (1)   (2)   (3)   (4)   (5)

Appendix G: MS Word Results

CLASSROOM 2004 RESULTS

Number of Correct Answers	Number of Students
1-5	0
6-9	4
10-12	6
13-15	2

ONLINE 2006 RESULTS

Number of Correct Answers	Number of Students
1-5	1
6-9	4
10-12	1
13-15	0