



# **A CRITICAL EVALUATION OF THE INTEGRATION OF A BLENDED LEARNING APPROACH INTO A MULTIMEDIA APPLICATIONS MODULE**

*by*

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## **DECLARATION OF ORIGINALITY**

I declare that the content of this research is all my own original work.

# ABSTRACT

The concept of blended learning is not new. While research articles have outlined blending learning approaches across a number of disciplines, research studies on how blended learning design principles are implemented into existing modules in the discipline of multimedia studies are limited. This research aims to address that gap by critically evaluating the integration of a blended learning approach into a multimedia applications module at Galway-Mayo Institute of Technology (GMIT). The blended approach adopted is a pedagogical one which integrates synchronous online lectures with face-to-face learning in computer laboratories. Objectives of the study include: a critical review of the existing literature relating to blended learning, the application of an educational design research (EDR) framework and an evaluation of student experiences of blended learning in higher education (HE). A responsive case study is conducted to evaluate the effectiveness of integrating a blended learning approach into a multimedia applications module within GMIT and to evaluate the student learning experience. The methodology adopted for this study combines constructivism and pragmatism as a basis for a mixed methods design using a single responsive case study. This research builds on the work of previous scholars including McKenney & Reeves (2012), Graham et al. (2014), Tseng & Walsh (2016) and Wang et al. (2017). The key areas examined in this thesis include a critical analysis of literature in the field, an account of the research methodological framework and the methods employed, an analysis of findings and general conclusions from the study. Specific methods for data gathering include a questionnaire, focus group and personal interviews. Overall research findings indicate positive perceptions of the blend adopted in the areas of pedagogical, social and technical design. The results are also positive in relation to perceived differences in modes of delivery and student preference in modes of delivery. Findings suggest that the optimum blend has been reached in that theory is delivered synchronously online and students also have face-to-face practical classes in laboratories. Results in relation to whether students learn more in the synchronous online lecture than if it was delivered face-to-face and their preference for face-to-face discussions rather than online discussions are inconclusive. Further research is recommended in these areas.

**KEYWORDS:** *synchronous online learning, student perceptions, blended learning, multimedia applications.*

## **DEDICATION**

To Sean, David and Kathryn. Thanks for all the love, support and cups of tea!

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# CHAPTER ONE: INTRODUCTION

## 1.1 CONTEXT

This research represents the journey of a lecturer and one group of students through the process of integrating a blended learning approach into a multimedia applications module. Throughout the thesis, it was decided not to use the passive voice as author, but to own the research throughout by employing the active voice. As a staff member in GMIT, I have multiple roles, including lecturer and researcher. I work in the School of Business and teach on a number of modules including one entitled “Multimedia Applications”. As a pragmatist, I am very much involved in my teaching practice. Presenting this research using the active voice is appropriate as it provides a clear sequence of events and I am actively involved in the process.

Blended learning has become popular in Higher Education (Dang et al. 2016, p. 119). It emerges from an understanding of the relative strengths of face-to-face and online learning (Garrison and Vaughan, 2008, p. 6). McGee and Reis (2012, p. 8) suggest that while there is not absolute agreement within HE as to the exact make-up of a blended course, Institutions generally use the term “blended learning” to refer to some combination of on-campus class and online activities. Graham, Henrie, and Gibbons (2014, p. 13) also agree that models using this definition are the most prominent in the research. In an Irish context, Quality and Qualifications Ireland (QQI) suggest that “blended learning will always involve face-to-face learning. Providers engaged in blended learning will typically also deliver the face-to-face component” (QQI, 2017, p. 6). For the purposes of this research, a blended learning approach shall be defined as a pedagogical approach which integrates online lectures with face-to-face learning on campus. This is investigated in this research in the context of a module entitled “Multimedia Applications” in Galway-Mayo Institute of Technology (GMIT), combining synchronous online lectures with practical computer laboratory based classroom activities.

Many research articles have outlined blending learning approaches across a number of disciplines, including a detailed thematic analysis of the most highly cited scholarship by Halverson et al. (2014). However, very few of the top-cited publications

on blended learning have looked closely at the design process (Halverson et al., 2014, p. 23). Those that do, define the design process as a systematic structure to guide designers and instructors to make informed decisions about the design and implementation of blended learning. McGee and Reis (2012, p. 10) state that the process of blended learning design is often highlighted as one of re-design of a course, involving a change from traditional classroom methods to thinking about the options and appropriateness of choices using a blended learning approach. Research studies on how blended learning design principles are implemented into existing modules in the discipline of multimedia studies are limited. Having researched the area of blended learning design to inform my own teaching practice, I found many frameworks and theorists but none specifically related to the implementation of a blended learning approach within the Irish HE system in the area of multimedia applications. This research study addresses that gap. Chapter 2 explores this in greater detail in the literature analysis.

McKenney and Reeves (2012, p. 10) have identified the need for increased understanding to inform the robust design of educational courses. Design principles or frameworks for blended learning courses are produced from Educational Design Research (EDR). EDR develops theoretical insights and practical solutions simultaneously in an applied, real world context. Theoretical insights are often referred to as design principles, as they recommend how to address a specific class of issues in a range of settings. While small scale or single studies may not lead to theories, they contribute to the building blocks of theory (McKenney & Reeves, 2012, p. 31). Such theorists include Tseng and Walsh (2016), Wang et al. (2017) and Chmiel et al. (2017).

EDR has also been strongly influenced by the area of instructional design as it uses theories, methods and tools developed by instructional designers. The discipline of instructional design is concerned with systematic processes for developing instruction to reliably yield desired learning and performance results (McKenney & Reeves, 2012, p. 61). Instructional designers can offer valuable assistance in aspects of course design, whether it be in new blended course learning, among others such as online, face-to-face, or a hybrid combining both. They can offer assistance when redesigning an existing course or planning methodologies and strategies suitable for teaching,

learning and assessment purposes. Instructional designers can, through the implementation of new technologies, enrich the learning experience in a course (Forest, 2018).

An instructional design model can be useful to provide a framework to manage a blended learning course design so that effective evaluation and reflection on the design and delivery of the module can be planned for in a structured manner. The ADDIE (Analysis, Design, Development, Implementation and Evaluation) model of instructional design is one such foundation model used by instructional designers (Soto, 2013, p. 8). Most models begin with an analysis or orientation stage, followed by design and development. All models include a testing stage or evaluation of a particular aspect of the course, in this case, the blended learning aspect. By using a model which includes evaluation, it will inform future course evolution and discipline-specific pedagogical design processes using blended learning.

For the purposes of this study, the research is situated within the generic model for EDR proposed by McKenney and Reeves (2012, p. 77). This model uses core ideas from the fields of instructional design, including systematic problem solving and planned but flexible iterative approaches. It is applied in the context of a multimedia applications module in GMIT and is outlined in Chapter 3 and 4 of this study. This study uses a blended learning approach within a generic model for EDR to evaluate the student learning experience in the areas of: 1) pedagogical design, 2) social design, 3) technical design, 4) perceived differences in modes of delivery and 5) student preference in modes of delivery. These areas are outlined in the aims and objectives which follow.

## **1.2 AIM & OBJECTIVES**

### **1.2.1 AIM**

The aim of this research is to critically evaluate the integration of a blended learning approach into a multimedia applications module in GMIT.

### 1.2.2 OBJECTIVES

The objectives are:

- (1) To critically evaluate existing literature relating to: blended learning, the application of EDR and the student experience of blended learning in HE.
- (2) To conduct a responsive case study to crucially evaluate the effectiveness of integrating a blended learning approach into a multimedia applications module in GMIT, from a student perspective, in the areas of: 1) pedagogical design, 2) social design, 3) technical design, 4) perceived differences in modes of delivery and 5) student preference in modes of delivery.

## 1.3 RESEARCH METHODOLOGY

Deciding on methodologies and selecting the instruments for data collection is a deliberate process in which the crucial point is that they are fit for purpose (Cohen et al. 2018, p. 469). The research methodology used in this study is a responsive case study. A responsive case study is described as a methodology that allows participants to contribute what they perceive as relevant data to assist in the planning of the next offering of a course (Bates, 2008, p. 98). It is suitable for this research study as students can evaluate the integration of a blended learning approach into the Multimedia Applications module from their own perspective and the results can then be incorporated into the next delivery of the module in September 2018.

Constructivism embodies my ontological approach to this research. Its principal concern is with understanding the way in which individuals and social groups create, modify and interpret the world in which they find themselves (Cohen et al., 2018, p. 6). In this study, I use qualitative methods, most notably personal interviews, open-ended questions on questionnaires and a focus group to build up a deep picture of the student experience of the integration of a blended learning approach into the Multimedia Applications module. In terms of epistemology, I have also adopted a pragmatist paradigm using both deductive and inductive approaches. Pragmatism is “practice driven” (Denscombe, 2008, p. 280) with a focus on “what works” (Cohen et al. 2018,

p. 9). It is oriented to the solution of practical problems in the practical world. Tight (2017, p. 24), as a pragmatist himself, suggests that social researchers should be able to use and interpret both qualitative and quantitative methods. While recognising the opposing debate between positivism and interpretivism associated with quantitative and qualitative methods, this research study views the quantitative data (questionnaire results) and qualitative data (questionnaire, focus group and personal interviews) as complementary to the validation or invalidation of findings from this research to address the research questions posed.

Using a constructionist and pragmatist framework, a triangulation approach is used for data collection, including an online questionnaire, a focus group and a series of one to one personal interviews, as mentioned above. Smaller samples can be used in qualitative research as it produces in-depth information about the people, cases or situations being studied (Cohen et al. 2018, p. 204). The sampling procedure used for this study is purposive sampling. In terms of the sample chosen for the questionnaire, complete collection sampling is used while the sampling process chosen for the focus group and personal interviews is through probability systematic random sampling. Sampling is covered in more detail in chapter 3.

Questionnaire data is exported from SurveyMonkey' into Excel to analyse data. All data collected is anonymised and then coded to identify key words and themes. Audio recordings from the personal interviews and the focus group are analysed to help validate or invalidate the questionnaire findings in order to address the research question. Uni-variate analysis includes frequency analysis of the data. Bi-variate analysis identifies relationships between the variables. Demographic data is analysed in relation to gender, age, programme of study and GPA from the previous year. This is outlined in detail in chapter 4.

Ethical approval was sought and received from the Masters in Arts Teaching and Learning (MAT&L) Research Ethics Committee prior to the commencement of data collection and analysis. The ethical application submission included a copy of the participant information leaflet, the informed consent form and the online questionnaire used in this research. These documents are included in appendices 1, 4 and 5.

## 1.4 SCOPE & LIMITATIONS

This research seeks to critically evaluate the integration of a blended learning approach into a multimedia applications module. The focus is on the design and delivery of a module using a blended learning approach, which involves synchronous delivery of a number of online lectures over the course of one semester. For the purposes of this study, the generic model for educational design research put forward by McKenney and Reeves (2012, p. 77) has been chosen as a framework for the evaluation. The blended learning approach used for the module is evaluated by students at the end of semester 3. Students must have attended a minimum of four synchronous online lectures in order to participate in the evaluation to ensure that they have enough knowledge to answer the questions comprehensively.

This research is limited to one module in GMIT entitled “Multimedia Applications” and one cohort of students on the Bachelor of Science (BSc) in Business Information Systems (BIS). Evers and Wu (2006, p. 524) suggest that while it is possible to generalise from single cases, this is not an easy or straightforward task. “Whether the findings can be applied to other cases may be beyond the scope of the study, and is at least partly the business of other researchers to determine” (Tight, 2017, p. 32). This is a responsive case study bound by the confines of this discipline, cohort and module in GMIT. The purpose of this study is not to generalise findings but rather to demonstrate a framework for other lecturers to follow. Lecturers can determine whether a synchronous blended learning pedagogy is relevant to their own discipline and teaching practice by accessing this research once published.

Students are eligible to participate in the study if they have attended a minimum of four online lectures. Otherwise, the relationship between blended learning activities and class attendance is not being pursued in this study. It has been examined in the past by López-Perez et al. (2011, p. 821).

The concept of a “flipped classroom” is not being pursued in this study in that students are not required to view the synchronised material which is subsequently uploaded online in advance of the next subsequent lecture or computer laboratory. This research does not incorporate grades achieved by students at the end of the module. Student grades have been examined in the past by McLaughlin et al. (2014, p. 236).



The blended learning intervention alone is being evaluated in this research due to the thesis submission date occurring before end of semester exam board results. However, GPA from the previous year is collected from participants in the questionnaires and is used for qualitative comparison.

## **1.5 THESIS STRUCTURE**

The thesis is set out in six chapters to address the research questions. Following this introduction chapter, the second chapter reviews the literature in relation to integrating a blended learning approach into modules in the HE sector across many disciplines. The review begins with the search strategy used. Following this, three key areas are identified for evaluation, namely the concept of blended learning, EDR and student perceptions of blended learning. The chapter concludes with a summary of the key findings.

Chapter three outlines the philosophical framework and the methodological choices adopted to critically evaluate the integration of a blending learning approach into a multimedia applications module. Data collection, using a triangulation approach including a questionnaire, a focus group and personal interviews, is positioned and justified. Sampling methods are included as well as a discussion around the questionnaire design and questions which have been included. Data analysis methods are identified and ethical considerations in data collection are examined. The chapter concludes with a summary of key findings in relation to methodology and methods.

Chapter four presents data findings and analysis from the questionnaire, focus group and personal interviews. Data is collected and anonymised. Findings are coded and key words and themes identified. This chapter analyses the findings and links back to the research aims and objectives. It is also cross referenced to the literature. The chapter concludes with a summary of the key findings in relation to the data being analysed.

Chapter five summarises the key research findings and analysis from the questionnaire, focus group and personal interviews. The most significant conclusions

are aligned with the aims and objectives of the study. Recommendations are outlined arising out of the research.

To begin this study, the next chapter now reviews the literature in relation to integrating a blended learning approach into modules in the HE sector across a number of disciplines.

## **CHAPTER TWO: LITERATURE ANALYSIS**

### **2.1 INTRODUCTION**

Chapter two reviews the literature in relation to integrating a blended learning approach into modules in the HE sector across a number of disciplines. The review begins with the search strategy used. Following this, three key areas are discussed. The concept of blended is reviewed, including a rationale for the definition used in the evaluation of integrating a blended learning approach into the Multimedia Applications module. A range of blended learning frameworks within the context of educational design research (EDR) are then critically evaluated with a rationale for the framework chosen for evaluation of integrating a blended learning approach into the Multimedia Applications module. Following this, student perceptions of blended learning are examined. The chapter concludes with a summary of key findings. Initially, the literature search strategy employed for this study is identified.

### **2.2 LITERATURE SEARCH STRATEGY**

To identify appropriate studies, several databases are consulted, including Science Direct, Elton B. Stephens Co. (EBSCO), Springer and Taylor and Francis, Google Scholar, ResearchGate and Institute of Electrical and Electronics Engineers (IEEE). The initial search for the literature review was based on the keywords “blended learning” which proved too wide in scope and lacked focus. A lot of the articles were published in the Computers and Education Journal and the Internet and HE Journal. Many of the original articles were more than five years old and so were not necessarily current. The keywords were refined and the second search used the following phrase “student perceptions of blended learning”. While there are many studies on student perceptions of blended learning, they do not address the integration of a blended learning approach in a multimedia applications module. Further searches highlighted instructional design within blended learning as a suitable foundation for research within the area of EDR. The thesis develops this area including approaches to blended learning and student perceptions of blended learning by building on the work of many

scholars including Graham et al. (2014), McKenney & Reeves (2012) and Tseng and Walsh (2016).

## **2.3 BLENDED LEARNING CONCEPT**

Horn and Staker (2012, p. 3) define blended learning as “any time a student learns at least in part in a supervised brick-and-mortar location away from home and at least in part through online delivery with some element of student control over time, place, path and/or pace”. Advancements in information and communications technologies has contributed to its development. Numerous research articles have been written in the area of blended learning across many disciplines. Halverson et al. conducted a detailed thematic analysis of the most cited scholarships in 2014 and suggested that very few of them examined the design process (Halverson et al., 2014, p. 23). In the same year, Dickfos et al (2014, p.191) argued that the area of blended learning is under-studied and this presents challenges in defining it due to the range of teaching and learning strategies involved. Research on blended synchronous learning approaches is also somewhat sparse (Bower et al., 2015, p. 2). This research aims to address that gap.

There are many definitions of blended learning in the literature. Owston (2013, p. 38) describes it as “an instructional approach that substitutes online learning for a portion of the traditional face-to-face instructional time”. It eliminates the inflexibility of traditional education towards a more open education in which students are more involved (Scott, 2015, p. 12). The ‘right blend’ varies across different content areas, with different proportions of online and face-to-face learning being appropriate for different subjects (Waha and Davis, 2014, p. 179; Shantakumari and Sajith, 2015, p. 327).

McGee and Reis (2012, p. 8) suggest that while there is not absolute agreement within HE on the exact make-up of a blended course, institutions generally use “blended” to refer to some combination of on-campus class and online activities. Graham, Henrie, and Gibbons (2014, p. 13) also agree that models using this definition are the most prominent in the research. “face-to-face learning and online learning can also be implemented in a concurrent way, where a lesson is delivered to both classroom and

online students simultaneously” (Wang et al., 2017., p. 100). They refer to this as “blended synchronous learning”. Blended synchronous learning can provide students with greater educational access, allowing those who cannot physically attend classes to participate (Cunningham, 2014, p. 44). It also results in more active learning (Bower et al., 2015, p. 14). In 2017, QQI published their interpretation of blended learning. They suggest that those providing blended learning will typically always also deliver the face-to-face component (QQI, 2017, p. 6). For the purpose of this study, a blended approach is defined as a pedagogical approach which integrates synchronous online lectures with face-to-face learning in computer laboratories.

McGee and Reis (2012, p. 10) suggest that in blended learning, the process of design is often highlighted as one of re-design. This involves a change from traditional classroom methods to thinking about what can be done using a blended approach. In this context, the ‘blend’ is not just about the use of traditional and technology-assisted teaching practices, but also about the mix of synchronous and asynchronous learning experiences (Waha and Davis, 2014, p. 174). They argue that learning design is more complex where online and face-to-face cohorts are taught simultaneously. A particular set of pedagogies should be in place to help online teachers teach (Hung and Chou, 2015, p 316). I think these findings are convincing because teaching face-to-face where students can identify your facial expression and gestures is not the same as delivering it via Skype for Business where students may only see slides and listen to audio if the video is switched off. Encouraging students to participate in the conversations window may also be more complex for the lecturer as they cannot assess student facial expression to questions or issues raised in the lecture. Tseng and Walsh (2016, p. 50) advise that instructors need to make sure course components (learning objectives, activities, and assessments, etc.) are well structured and are meaningfully connected with each other in the blended learning environment. This view is supported by Hung and Chou (2015, p. 323).

Research studies on how blended learning design principles are implemented into existing modules such as multimedia applications are limited. Some project summaries of course redesign exemplars are maintained by the National Centre for Academic Transformation (NCAT) in New York but there are none in relation to multimedia applications. This research aims to address that gap.

## 2.4 EDUCATIONAL DESIGN RESEARCH

EDR develops theoretical insights and practical solutions simultaneously, in a real world context. These insights advocate how to tackle a particular group of issues in a range of situations and are often described as design principles as they recommend how to address a specific class of issues in a range of settings. While theories are not developed from single studies, the current study can produce evidence about how the process of integrating a blended learning approach into a multimedia applications module works and what happens when it is delivered in a blended format of synchronous online lectures and face-to-face lab practicals. Therefore, it contributes to the building blocks of theory.

EDR is based on iterative cycles of intervention. The term “intervention” is used to encompass the different kinds of solutions that are designed. Brown (1992, p. 153) suggested that theory informs design and vice versa. Research on learning must be situated in the contexts where that learning actually takes place. McKenney and Reeves (2012, pg. 12) argue that this form of inquiry is one way to improve both the robustness and the relevance of educational research. High quality EDR yields usable knowledge and interventions, both of which are built upon sound reasoning and robust evidence. EDR strives to bring about transformation through the design and use of solutions to real problems. It has been strongly influenced by the area of instructional design as it uses theories, methods and tools developed by instructional designers. The centrality of students in the instructional process has become integral in the HE sector (Zumor et al. 2013, p. 105). I think that students are a crucial part of the evaluation of integrating a blended learning approach into the Multimedia Applications module as their feedback can enhance and improve the next iteration of the module delivery.

An instructional design model can be useful for providing a framework for managing course design so that evaluation and reflection on the design and delivery of the module can happen. “It ensures that the impact of the blended learning approach is considered during its design rather than as an afterthought after implementation” (Wong et al, 2014, p. 247). The evaluation process and the reporting of the results

can be demanding in time and personal resources (Chmiel et al. 2017, p. 177). Evaluation tools are often focused on single aspects of the blended learning introduction, like students' experience or instructional design (Halverson et al, 2014, p. 2). I think that both aspects should be included in the evaluation of integrating a blended learning approach into the Multimedia Applications module. Both aspects are incorporated in the design methods which are discussed in chapter 3.

There are many helpful models used by instructional designers to guide the online learning design process. Gilly Salmon (2004, p. 29) developed a five-stage model which offers essential support and development to students as they build up expertise in learning online. It involves a series of steps to enable students to develop from novices to independent online learners and focuses on the role of the e-moderator in facilitating the students and on the technical issues involved. The model is illustrated in figure 1.

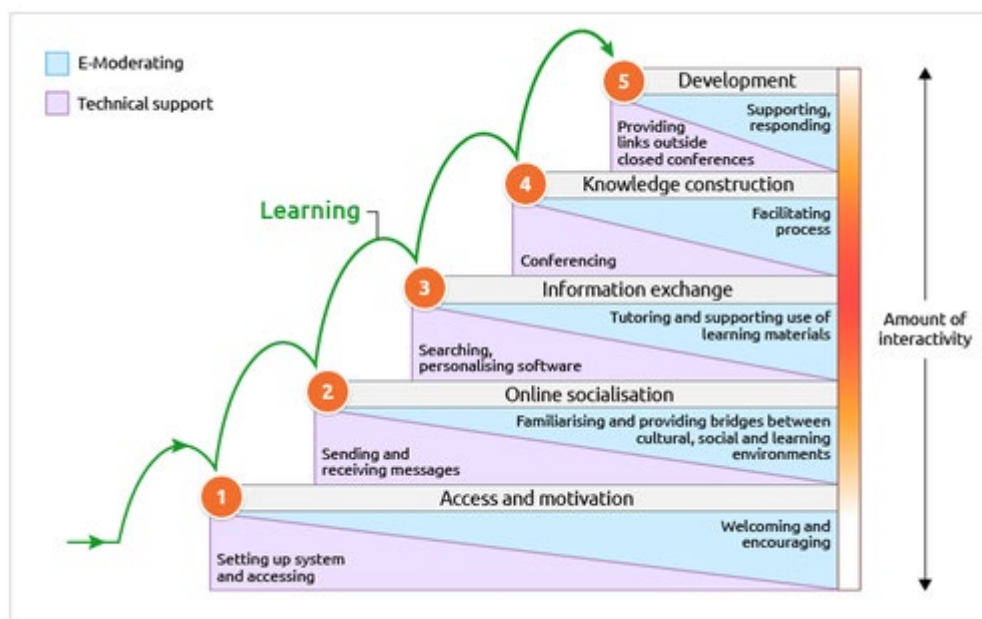


Figure 1. The Salmon Five Stage Model (Salmon, 2004, p. 29).

The combination of face-to-face with synchronous and asynchronous online learning is the blend used for the Multimedia Applications module. The Salmon model e-tivity lesson plan focuses on asynchronous online learning and does not allow for an integrated approach which includes face-to-face learning. Furthermore, the model

does not include an expressly stated evaluation stage which I consider to be a crucial part of any intervention, therefore, it is not a suitable framework for this study which focuses on combining synchronous lectures with face-to-face laboratories and evaluation of the blend by students at the end of the semester which is a critical factor for future iterations. Moule (2007, p. 39) expresses concern that the Salmon model is seen as a template for the design of all online teaching and learning environments regardless of the context. I think the context in which blended learning operates is fundamental to its success. What works for one module, may not be a suitable blend for another. In the context of integrating a blended learning approach to the Multimedia Applications module, evaluation of the blend by students is critical so that delivery can be refined for the following semester. An alternative model proposed by Pam Moule in 2007 is the e-learning ladder is shown in figure 2.

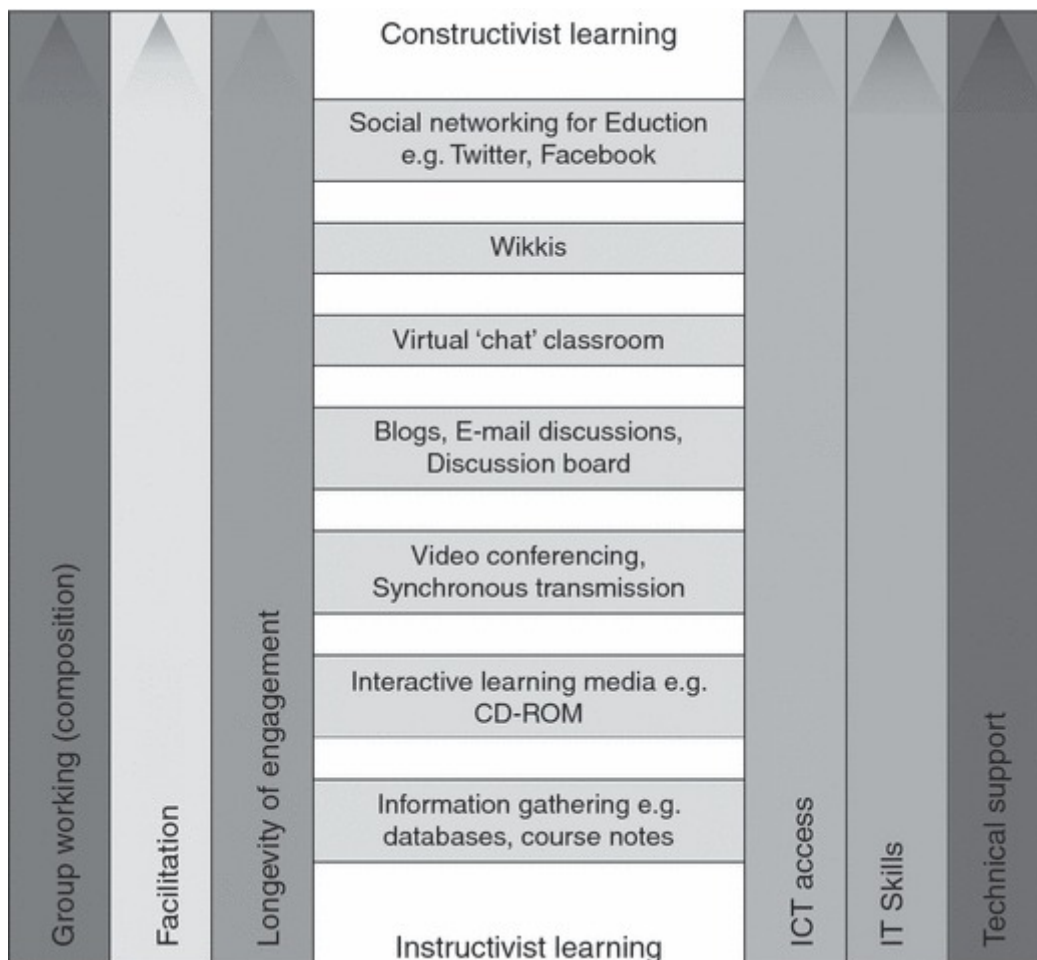


Figure 2. Moule's e-learning Ladder (2007, p. 42).



This model acknowledges a range of learning approaches, “starting at the bottom ‘rung’ that might be termed as instructivist, and moving through the ‘rungs’ ending with constructivist, or interactive learning approaches” (Moule, 2007, p. 42). Access and technical issues are ongoing and new skills may be required at any stage (Moule 2007), for example, introducing the virtual classroom on rung 3. The higher “rungs” support a social constructivist approach to learning based on the theories of Vygotsky (1978), where learning is constructed through social interaction. While this model does fit with my social constructivist approach to teaching and it involves synchronous transmission of learning materials, similar to Salmon’s model, there is no evaluation stage.

Another framework developed by Puentedura (2006) is the SAMR model. The basic idea behind SAMR is to help a lecturer analyse the role of technology in their teaching. The model, which has four stages, is outlined in figure 3.

<b>Redefinition</b>	•Technology allows for the creation of new tasks
<b>Modification</b>	•Technology allows for significant task re-design
<b>Augmentation</b>	•Technology acts as a direct tool substitute with functional improvement
<b>Substitution</b>	•Technology acts as a direct tool substitute with no functional change

Figure 3. SAMR Framework (Adapted from Puentedura, 2006)

In the first two stages, identified as substitution and augmentation, technology acts as a direct substitute for the original tool, with either no or little functional change or improvement. In the third and fourth stages, identified as modification and redefinition, technology allows for modification of the task through to complete redefinition – the technology allows for a completely new learning experience. Therefore, it has a higher

level of technology usage than at stages 1 and 2. While the stages of this model are applicable to the current study, it is focused more on outputs rather than process.

In the area of instructional design outputs, Gagne's Theory of Instruction is a useful framework to consider (Gagne et al., 1992, p. 243). The foundation of Gagne's theory, Conditions of Learning, is the belief that there are several levels of learning and that the lecture/content being taught needs to apply each of these types of learning reflecting Universal Design for Learning (UDL): verbal information, intellectual skills, cognitive strategies, motor skills and attitudes. He suggests that learning can be organised in a hierarchy according to complexity and he structures a lesson plan on nine steps of learning which are outlined in figure 4.



Figure 4. Gagne's Theory of Instruction (1992, p. 243).

While there are elements of the nine steps of learning involved in the integration of a blended approach into the Multimedia Applications module, Gagne's model is more a behaviourist approach than social constructivist which is my ontological approach adopted in this study. Furthermore, the primary emphasis of Gagne's theory is instructional design output whereas the primary emphasis of the current research study is on the instructional design process itself.

Examining further frameworks, Gustafson and Branch (2002, p. 2-3) surveyed instructional design models for blended learning and concluded that nearly all were shaped around the five core elements of the ADDIE model (Soto, 2013, p. 8). This model is outlined in figure 5.

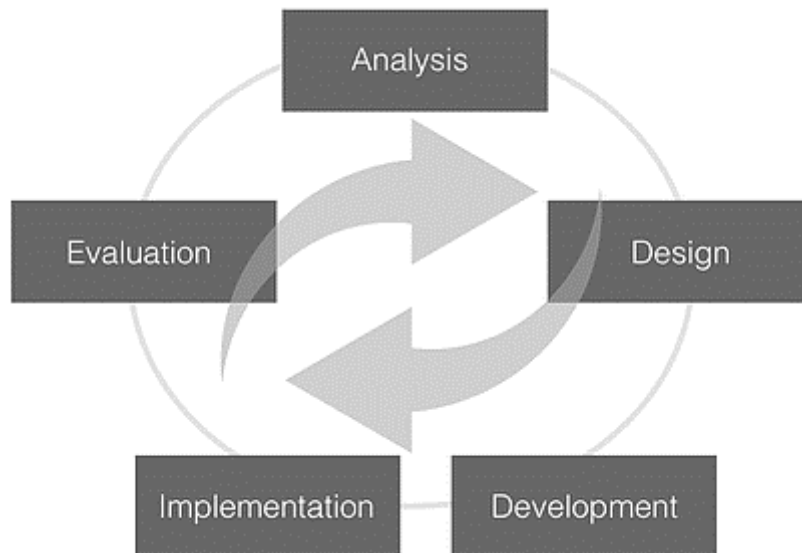


Figure 5. ADDIE model (Watson, 1981)

Its primary emphasis is on shaping the process of instructional design. It is a cyclical process and can be used for both traditional and online instruction. The practical process of scheduling and coordinating a blended learning module is an important factor for its success (Chmiel et al., 2017, p. 176). This model has a logical sequence of events and includes an evaluation stage which previously discussed frameworks by Salmon and Moule do not. Most models which have the ADDIE components begin with an analysis or orientation stage, followed by design/development and all models include some type of testing or evaluation. A model based on the core ADDIE elements is suitable for the current study as its emphasis is on the instructional design process, it can be used in a blended environment, it has a logical sequence and it includes an evaluation stage. It can act as a foundation model and point of reference for the instructional design process. However, it may be over simplistic in that it does not highlight the outputs of the process as well as the process itself. A model is needed

which reflects the design process involved in integrating a blended learning approach into the Multimedia Applications module and the practical outcomes of such an intervention. It also needs to reflect my ontology of social constructivism and pragmatism. With this in mind, I am situating the research study within the generic model for design research in education proposed by McKenney and Reeves (2012, p. 77) as outlined in figure 6.

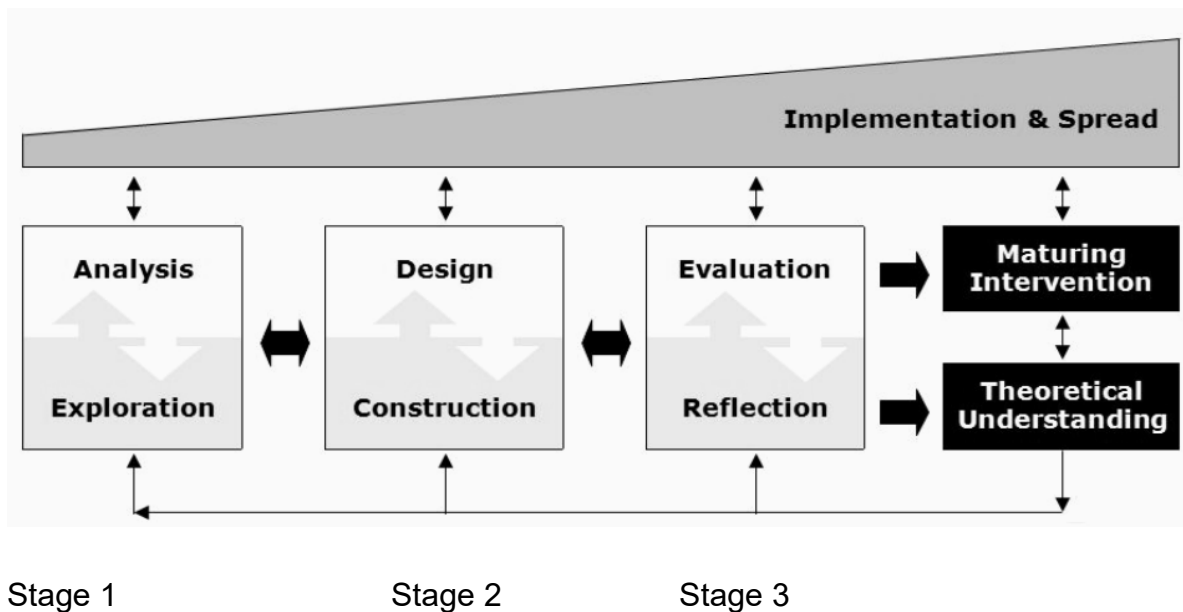


Figure 6. Generic Model for Conducting Design Research in Education (Adapted from McKenney & Reeves, 2012, p. 77).

Building on previous models for educational design research, McKenney and Reeves devised a model portraying the overall process from a researcher perspective. It includes the following features: 1) three core stages of analysis, design and evaluation, 2) a dual focus on theory and practice, and 3) indications of being use-inspired through implementation and spread, and interaction with practice. Each feature of the framework is represented by a different shape. The squares represent the three core stages (analysis, design, evaluation) which run chronologically. However, the arrows between the different elements indicate that the process is flexible and iterative. The dual focus on theory and practice is made explicit through the black rectangles (theoretical understanding, maturing intervention), which represent the scientific and practical outputs, respectively. The final part of the model is implementation and

spread, illustrating that interaction is present from the start of the process and that the scope increases over time.

In comparison to other frameworks, this one is fit for purpose for the Multimedia Applications module as it is appropriate in structure and process. It has an evaluation stage built in and is suitable for synchronous and asynchronous learning. The generic model is also suitable for this research as it represents interaction with practice, integrating a blended approach into the Multimedia Applications module within a classroom setting. The generic model shows that educational design research progresses through three main stages, each of which involves interaction with practice and contributes to the production of theoretical understanding and the development of an intervention, which matures over time. Within the overall model, a number of cycles can be identified. Each time one of the three main stages is undertaken, one micro-cycle takes place. This is because each phase is made up of its own cycle of action. Often, several micro-cycles of activity are combined, e.g. in reporting or before major decisions are made, thus creating a meso-cycle as outlined in figure 7.

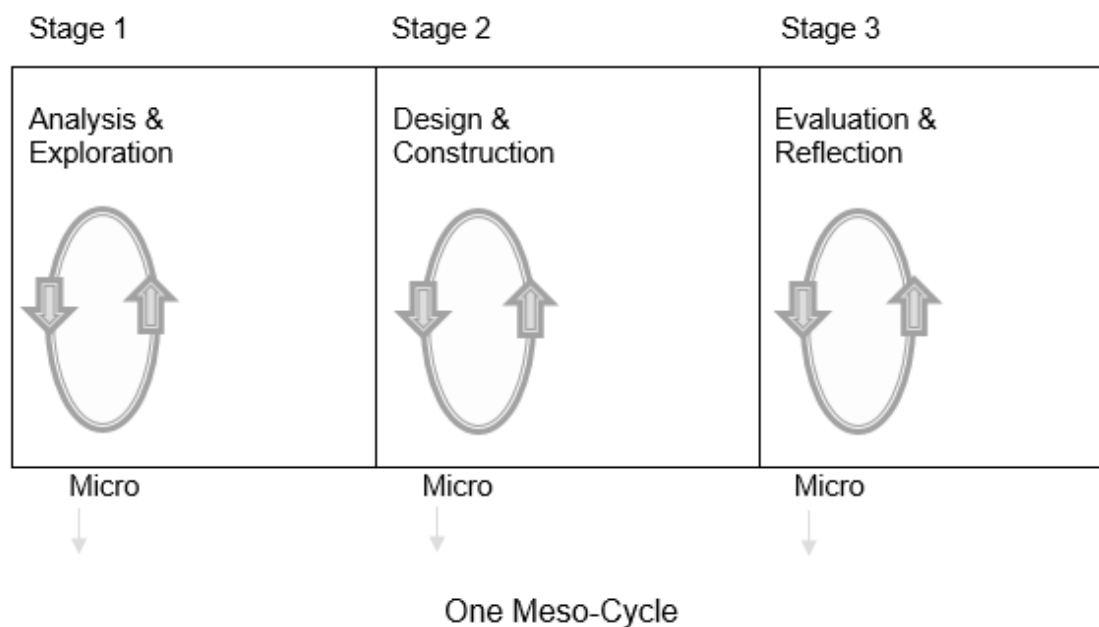


Figure 7. Micro-Cycles and Meso-Cycle identified for Integrating a Synchronous Blended Learning Approach into the Multimedia Applications module (Adapted from McKenney & Reeves, 2012 p. 78).

During the first meso-cycle, an initial design is created and tested. The entire design process, as reflected in the generic model, constitutes a macro-cycle. Most EDR macro-cycles involve many meso-cycles over long periods of time. From the beginning of the educational design process, each of the stages in the meso-cycle is approached with the view of working towards actual use including consideration of the student centred learning, their needs and the learning environment present including attention to Universal Design for Learning (UDL). In order to evaluate the success of educational design based on integrating a blended approach into a multimedia applications module, it is necessary to understand student perceptions of the blend adopted.

## **2.5 STUDENT PERCEPTIONS OF BLENDED LEARNING**

Stage 3 of the meso-cycle is evaluation and reflection. In this stage, feedback from students which is acted upon is essential to ensure an improved implementation of any teaching-learning intervention (Shantakumari and Sajith, 2015, p. 323). The benefits and challenges of blended learning are described in this section.

### **2.5.1 BENEFITS OF BLENDED LEARNING**

Research studies suggest that there are many benefits to the implementation of blended learning. In a study by Shantakumari and Sajith (2015, p. 323), healthcare students perceived blended learning to be less stressful and more effective than traditional in-class delivery. Similarly, a study by Zumor et al. (2013, p. 101) observed that students studying English as a Foreign Language (EFL) perceived improved communication among students and course instructors in the online environment and stated that blended learning was more effective than the traditional face-to-face mode of instruction. Chmiel et al (2017., p. 176) suggest that nursing students also prefer a blended mode because of the added benefit of the interaction with peers and teachers online. The instructors' role as a facilitator for social interaction is therefore critical in creating positive online learning environments (Cho and Cho, 2014, p. 28). Student centred learning is an important part of my teaching and my concept of learning is

based primarily on social constructivism and pragmatism. I think that building strong communication links with students at the commencement of each module delivery is important to them and me from a social interaction perspective, even if it is something as simple as finding out where they are from. This improves communication between the lecturer and students both online and in face-to-face practical lab classes. In addition to the benefits of improved communication, Mann and Henneberry (2014, p. 11) suggest that where undergraduate students selected online over face-to-face courses, their preference also depended on the course topic, design technology and timing when the face-to-face version was offered.

User friendliness is also cited as a critical factor in the blended environment. In a study by Wang et al., (2017), a blended synchronous learning environment (BSLE) was created to support a group of graduate students when they were taking a course. Instruction was delivered to both face-to-face and online students simultaneously. Wang et al. suggest that the learning environment must be easy to use and the students must be trained in advance to reduce possible technical difficulties (Wang et al., 2017, p. 112). Chen and Yao (2016, p. 1670) also support the view that user friendliness is important for student satisfaction. Their course design incorporated both face-to-face lectures and e-learning supports. I think that if the online environment is easy to use, students are more willing and motivated to participate. They can also spend more time learning the module content instead of learning the technology behind its delivery. In their study of Information Technology student perceptions of blended learning, Waha and Davis (2014, p. 174) also support the view that if a tool is thoughtfully designed and facilitated by the teacher, students are more likely to be highly motivated and satisfied to use it. As part of their programme, all students had equal access to all online tools and materials, as well as the option of attending face-to-face activities. Students could mix the activities and tools to suit their needs, reflecting a Universal Design for Learning (UDL). Tseng and Walsh (2016, p. 47) report significantly higher overall learning motivation among students in the blended course which combined both face-to-face and online, than students in the traditional course.

Blended classes can offer benefits of convenience and flexibility. Tseng and Walsh (2016, p. 47) observe that students in an English Literacy undergraduate programme

found blended classes to be more convenient because they did not have to meet in class as often. This is similar to findings by Waha and Davis (2014, p. 175), Owston et al. (2013, p. 38) and Bower et al. (2015, p. 13) where students liked the flexibility and the convenience of online learning. Online students could also attend lessons at home by using any device (Wang et al. 2017, p. 111). A study by Chmiel et al., (2017, p. 176) suggests that nursing students also preferred a blended mode because of independence and balancing work commitments. However, Evans (2013, p. 110) suggests that the online format is neither better nor worse than the face-to-face format. In her study, although online students suggested that online courses offered them more flexibility, face-to-face classes included more support and better communication.

Blended learning can lead to different learning experiences. Bower et al. (2015, p. 10) suggest that students like the blended learning approach because they benefit from a broader range of experiences and have a greater capacity to contribute. As students progress through their studies at university, they become more independent in their deliberations and thus less attached to face-to-face lectures as the major source of knowledge (Owston et al., 2013, p. 39). A blended learning environment can help students develop a higher degree of self-regulation and it allows students to make more efficient use of their time by engaging in course content when they are not attending on-campus classes (Tseng and Walsh, 2016, p. 50). While blended learning may provide flexibility and convenience, I think that students, particularly first years, need to know how to manage their time effectively in order to benefit from such opportunities.

## 2.5.2 CHALLENGES OF BLENDED LEARNING

There are many challenges of blended learning cited in the literature. Dang et al. (2016) investigated students' perceptions towards the blended class in a computer systems course. They suggest that because of the reduced face-to-face class time and increased use of online systems, it is common to expect that students need to take more effort to get familiar with and make effective use of the blended learning environment. Therefore, to help keep them interested in learning, educators should put more effort in checking and making sure that students enjoy the learning environment (Dang et al., 2016, p. 127).



The role of the instructor can affect student satisfaction with blended learning. A study by Hung and Chou (2015, p. 322) suggest that the most important role of an online instructor is to act as an instructional designer. Dang et al. (2016, p. 127) advocate the importance for instructors to be enthusiastic, friendly and active in teaching in the blended environment. A study by Evans (2013, p. 114) found that online students did not think that instructors encouraged them to become actively involved in discussions. This highlights the need for better quality of instruction. In a study by Gecer (2013, p. 364), students perceived the role of the lecturer as being a leader, a guide and a model. Indeed, student suggestions for improving the blended learning experience is to reward distinguished performance by teachers (Zumor et al. 2013, p. 102). Gilly Salmon's model (2004, p. 29) highlights the importance of the role of teacher as an "e-moderator". A study by Cho and Cho (2014, p. 28) found that the instructors' role as a facilitator for social interaction is critical in creating positive online learning environments. Cunningham (2014, p. 39) suggests that "online students may feel isolated or excluded from the class as they are physically separated from the class". Social interaction is generally stimulated through introductory face-to-face sessions (Boelens et al., 2017, p. 11). I think that social interaction cannot be taken for granted but rather needs to be actively encouraged and fostered by lecturers in blended learning environments.

Another challenge of blended learning is the use of technology. Teachers can become overly focused on remote students, prioritising their queries and spending time troubleshooting their technical problems (Cunningham, 2014., p. 39). This might negatively affect the learning experience of the classroom students. However, a study by Wang, Quek, & Hu (2017, p. 109) which was conducted in a graduate course at a teacher training institute contradicts this. Their results show that students in the classroom did not believe that a blended synchronous learning environment negatively affected their learning experience because the instructor had to spend time troubleshooting technical issues for online students. Waha and Davis (2014, p. 176) found that students were frustrated with technical issues experienced when using the virtual classroom application which allowed them to attend live online classes. To participate, students needed a robust Internet connection. Comments included problems with audio input and output, recording failures and poor quality recordings. Another study highlighted network and system issues affecting the quality of the online

experience, with evidence of poor audio quality and computer crashes (Bower et al., 2015, p. 10). I think this research is valuable because it was not disinterest in attending the synchronous online classes that was an issue, it was frustration with the tool used for delivery. Student perceptions of the limitations of blended learning include technical problems faced and internet connectivity (Zumor et al. 2013, p. 101, Atwater et al, 2017, p. 7). I believe that each institution in HE should have a policy on online learning and offer training for lecturers as well as hardware and software and dedicated technical support to ensure that any transition from face-to-face to blended learning online is feasible. QQI suggest that

effective institutional arrangements are in place to provide assurance that any blended learning elements of provision have had the reliability of their delivery systems tested and signed off in advance, with confirmation that appropriate technical support and contingency plans are in place (QQI, 2017, p. 13).

This type of quality assurance could determine the success or failure of the integration of a blended approach into existing modules within GMIT.

Another issue which arises in the literature is that of student achievement. Mahmood et al., (2012, p. 135) suggest that one of the disadvantages of online learning is the achievement level reached by students. Evans (2013, p. 113) reports that the grades of the online students were much lower than those of the face-to-face students. While there were differences in the grades between different student groups in a study by Chmiel et al. (2017, p. 176), the grades were mainly correlated with professional workload during a masters programme. Their results suggest that variables unrelated to the blended learning format may explain student grades rather than being related to blended learning. In contrast, Owston (2013, p. 41) found that high achievers were the most satisfied with their blended course, and preferred the blended format more than face-to-face only. An implication of the study is that low achievers may not be able to cope with the blended learning environment as well as their high achieving peers. If this is the case, this could create a division among students and reduce the perceived improved communication among students observed by Zumor et al. (2013, p. 101). Boelens et al. (2017, p. 11) suggest that

Further work is required to gain more insight in the tension between providing maximum flexibility and autonomy for students on the one hand, and carefully taking into account the need for structure and guidance of (certain) students on the other hand.

I think that institutions have to offer choice to students in relation to the blend that suits their learning preference and programme level so that Universal Design for Learning is evident.

## **2.6 CONCLUSION**

This chapter reviewed the literature in relation to blended learning, EDR and student perceptions of blended learning. It outlined the search strategy used and the concept of blended learning across a number of disciplines. While there are many studies on blended learning, there are few specific ones on how to integrate it into existing multimedia applications modules using a pedagogical technique which integrates synchronous online learning design with face-to-face learning in computer laboratories. This study will help to address that gap in chapters 3 to 5. This chapter identified several EDR frameworks which can help the design process. Frameworks considered included the five stage model by Gilly Salmon (2004), Moule's e-learning ladder (2007), the SAMR model by Puentedura (2006) and Gagne's theory of instruction (1992). A model which included five core design elements of the ADDIE model was considered suitable as its main emphasis is the cyclical design process. Building on ADDIE components, I am situating the research within the generic model for EDR proposed by McKenney and Reeves (2012). This model reflects my theoretical approach of social constructivism and pragmatism which is discussed in chapter 3. It is suitable for this research in terms of structure and interaction with practice. The final part of this chapter highlighted student perceptions of blended learning identified in the literature. The benefits of blended learning identified include user friendliness, interaction, convenience and motivation. The challenges of blended learning include the technology itself, the role of instructors, social interaction and achievement. The next chapter outlines the research methodology and methods used for this study.

# **CHAPTER THREE: RESEARCH METHODOLOGY AND METHODS**

## **3.1 INTRODUCTION**

The aim of this study is to evaluate the integration of a blended learning approach into a multimedia applications module. As outlined in chapter one, a blended approach is defined as a pedagogical approach which integrates synchronous online lectures with face-to-face learning in computer laboratories. Chapter three describes and justifies the research methodology used to help answer the research question being explored in this study. Several perspectives are examined and a framework for this study is outlined. Integrating a blended learning approach into the Multimedia Applications module draws on two philosophies, namely pragmatism and constructivism which are both part of my background and teaching. Following this, designs and research approaches are examined from qualitative, quantitative and mixed method perspectives. A mixed method design using a single responsive case study is used for this thesis and it is situated within the EDR generic model by McKenney and Reeves (2012). Having outlined my methodological approach and design, the next part of chapter 3 describes the data collection and analysis phase. Data collection is identified and justified, using a triangulation which includes questionnaires, a focus group and personal interviews. Sampling methods are included and justified as well as discussions around the questionnaire design and questions used. Data analysis methods are examined and ethical considerations in data collection are acknowledged. The chapter concludes with a summary of key findings in relation to methodology and methods.

## **3.2 METHODOLOGY**

The literature on social philosophy identifies different ways of considering social reality. A wide range of perspectives on methodologies can be found. Methodology is the adoption of a philosophical position on the part of the researcher (Tight, 2012, p. 180). Two broad perspectives about the nature of social science are outlined by

Burrell and Morgan (1979, p. 3), namely the subjectivist approach and the objectivist approach as outlined in figure 8.

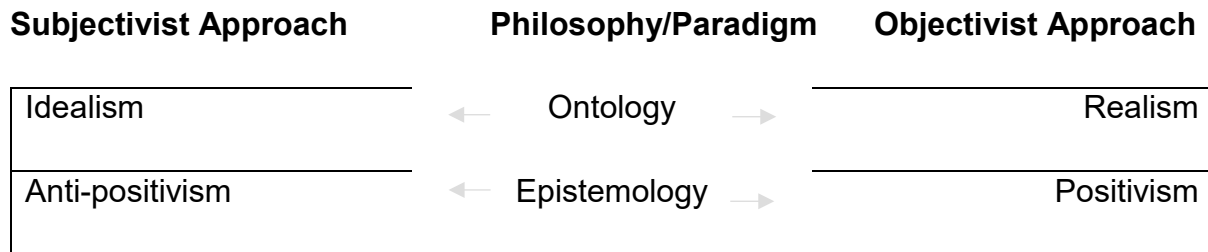


Figure 8. The Subjective-Objective Dimension (Adapted from Burrell and Morgan, 1979, p. 3).

Each approach has implications for the evaluation of integrating a blended learning approach into the Multimedia Applications module. The objectivist approach suggests that there is an objective reality which exists independently of the individual and is made up of causally interacting elements which are available for observation, that different sciences can be used to define that reality once consensus has been reached on what that reality is and that the research is replicable (Pring, 2015, p. 63). This view of objectivism is endorsed by Hammersley (2013, p. 10) who summarises it as quantitative research characterized by hypothesis testing, numeric data, “procedural objectivity”, generalization, identification of systematic patterns of association and the isolation and control of variables.

In contrast to this view, a subjectivist approach suggests that the world consists of ideas or a social construction, that researchers are part of the world in which they are researching, that meanings are discussed between participants, multiple realities exist and what is being researched is context-specific (Pring, 2015, pp. 65-66). This view of subjectivism is reflected in Hammersley’s definition of qualitative research (2013, p. 12) which uses less structured data, emphasizes subjectivity and interpretation in the research process and studies a smaller number of cases in detail, using verbal rather than statistical analysis.

Creswell & Creswell (2018, p. 5) categorise their views of social sciences into four segments: post-positivist, constructivist, transformative and pragmatic. This

framework has been adapted for the current study as it helps to communicate my philosophical stance and how it links with the research design and methods chosen. The framework is outlined in figure 9 and a rationale for the philosophies chosen follows on from this.

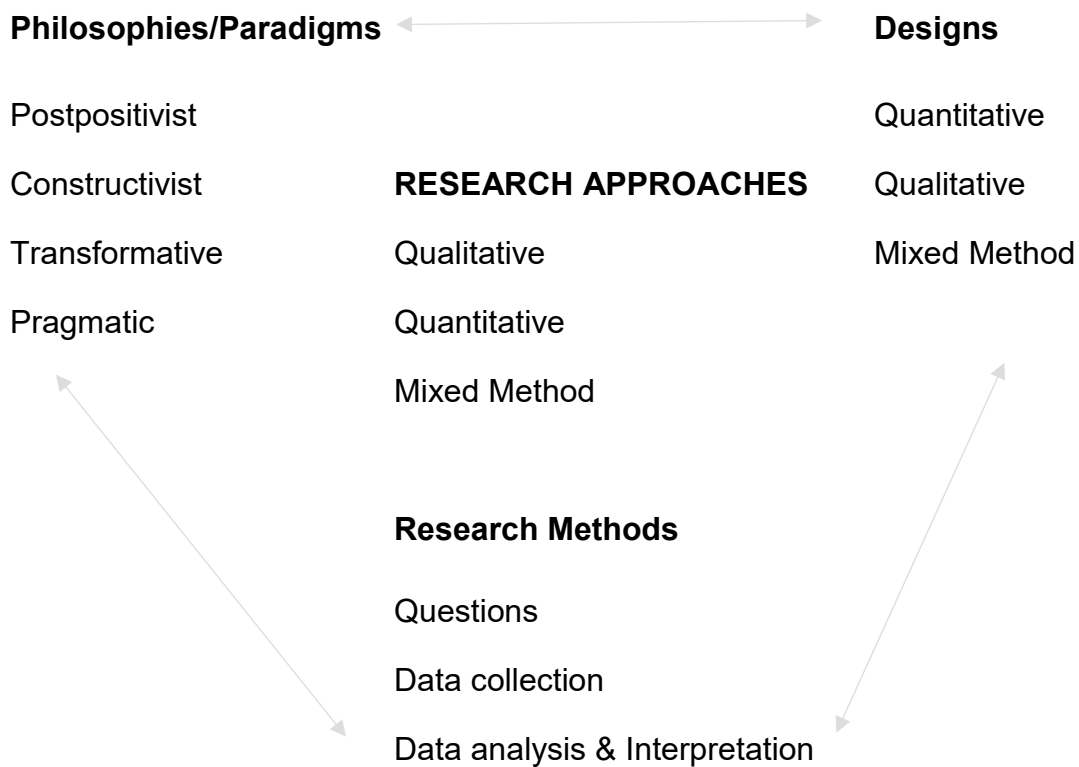


Figure 9. A Framework for Research (Adapted from Creswell & Creswell, 2018, p. 5).

Post-positivism/positivism emphasizes the identification of causality and its effects (Cohen et al. 2018, p. 10). Similar to Burrell and Morgan’s objectivist approach and Hammersley’s summary of quantitative research, it focuses on variables and their manipulation, careful observation and measurement, and testing hypothesis in a world where one view of reality exists (Burrell & Morgan, 1979, p. 3, Hammersley, 2013, p. 10). Creswell and Creswell (2018, p. 7) also refer to it as the scientific method. Quantitative researchers may align themselves with the scientific method, portraying themselves as searchers for the objective truth about the world and how it works, and

dismiss qualitative research as subjective, small-scale and lacking in rigour (Tight, 2017, p. 23).

Constructivism is the second philosophy in the framework (Creswell and Creswell, 2018, p. 5). It suggests that the objective of the research is to understand an event as it is seen and interpreted by the participants themselves, in a world where many views of reality exist. It recognises that things may look different to different individuals, and that a range of explanations and positions may be taken on understand a given phenomenon (Tight, 2017, p. 171). Rather than starting with a theory, researchers inductively develop a pattern of meaning. It is similar to the subjectivist approach suggested by Burrell and Morgan (1979) and concurs with Hammersley's summary of qualitative research (Hammersley, 2013, p. 10).

The third philosophy identified by Creswell and Creswell (2018, p. 9) is a transformative paradigm in which the research has a deliberate agenda of seeking to improve its participants' situation through qualitative research, focusing on issues of empowerment, emancipation, equality and social justice, in a world characterized by a political, negotiated view of reality. They align this paradigm with transformative design.

The final philosophy comes from pragmatists (Denscombe, 2008, p. 280, Tight, 2017, p. 24). Instead of focusing on methods, researchers emphasize the research question or problem and use all the approaches available to address the research question or problem. It is driven by fitness for purpose and uses quantitative and qualitative data as appropriate to help answer the research question. The researcher employs both inductive and deductive reasoning to investigate the multiple views of the research question. The principle underpinning pragmatism is that thought should lead to action, to prediction and problem solving (Cohen et al, 2018, p. 35). Mixed method research is based on pragmatist ontologies and epistemologies. Pragmatism is "practice driven" (Denscombe, 2008, p. 280). It is oriented to the solution of practical problems in the practical world. Pragmatism enables multiple methods, different philosophies and different assumptions, as well as different forms of data collection and analysis. Indeed, Tight (2017, p. 24), as a pragmatist himself, suggests that social researchers should be able to use and interpret both qualitative and quantitative methods.

Integrating a blended learning approach into the Multimedia Applications module draws on two philosophies, namely pragmatism and constructivism. The research is based on a practical intervention of integrating a blended learning approach into the Multimedia Applications module so that in-depth data can be gathered, interpreted and findings used to inform the next iteration of the module. This approach can increase understanding and knowledge and recognises that the blend adopted may be perceived differently by different students. As Tight (2017, p 171), explains “a range of explanations and positions may be taken on understanding a given phenomenon”. The Multimedia Applications module under examination in this study is shared between the lecturer and student therefore the researcher is part of the world in which they are researching. This inseparability makes it unsuitable for a positivist/postpositivist philosophy.

In addition to outlining their philosophy, researchers have to decide how to design and implement the research based on design issues, research questions, sampling, data collection, analysis and reporting. Creswell and Creswell (2018, p. 12) examine three types of research design, namely quantitative, qualitative and mixed methods.

Quantitative research design is informed by objectivist epistemology and emphasizes the measurement and analysis of causal relationships between isolated variables (Yilmaz, 2013, p. 312). He also suggests that the researcher and the participants are viewed as relatively separate and independent. Quantitative research is concerned with measurement, causality, generalisation and replication (Bryman, 2004, p. 66). Examples of quantitative research designs include experiments and surveys.

Qualitative research is based on a constructivist epistemology and emphasizes the understanding of how social experience is created and given meaning (Yilmaz, 2013, p. 313). He suggests that qualitative research provides an in-depth description of an event from the perspective of the people involved and views the relationship between the researcher and the participants as linked. Qualitative researchers may highlight the richness and depth of their data and analysis, while arguing that everything cannot be reduced to mere numbers (Wellington, 2015, p. 259). Examples of qualitative research designs include action research and case studies.

Mixed methods design involves combining qualitative and quantitative research and data in a research study (Creswell and Creswell, 2018, p. 12, Cohen et al, 2018, p.



31). In mixed methods research, the kinds and methods of research are driven by the research question. The research design is based on the pragmatist paradigm with “fit for purpose” being the guiding principle. The core assumption of this form of inquiry is that the combination of qualitative and quantitative data yields additional insight beyond the information provided by either one alone (Creswell and Creswell, 2018, p. 4). Mixed method studies may involve collecting and analysing qualitative and quantitative data within a single study or within multiple studies. The mixed method design is suitable for this study as it involves both qualitative and quantitative elements. It is a single study which uses several tools of data collection and helps answer questions that cannot be answered by either method alone. The study is practical in nature and using mixed methods enables me to combine inductive and deductive thinking. Qualitative elements include an in-depth description of the integration of a blended learning approach into the Multimedia Applications module from the perspective of the students involved and the issues which occur in their natural setting of GMIT. Direct quotations from personal interviews and a focus group document their thoughts and experiences about the blended learning approach. This qualitative data can be used to understand and triangulate the quantitative data. This can offer greater reliability and validity by using contrasting sources of information. Quantitative elements of this study include a questionnaire with both open and closed questions.

Having chosen a mixed methods approach and decided on the level and type of combination between the qualitative and quantitative elements of the research, the sequence of these elements can be decided. Teddlie and Tashakkori (2009, p. 26) suggest a number of options including “parallel mixed designs”. In this typology, both qualitative and quantitative approaches run simultaneously but independently in order to address the research question. Creswell and Plano Clark (2011, p. 69) also include a similar approach where both methods run simultaneously but then they converge, giving triangulation of data. In the integration of a blended learning approach into the Multimedia Applications module, quantitative and qualitative data are collected and analysed separately and then compared and contrasted. The overall, combined results are reported to answer the research question as outlined in figure 10.

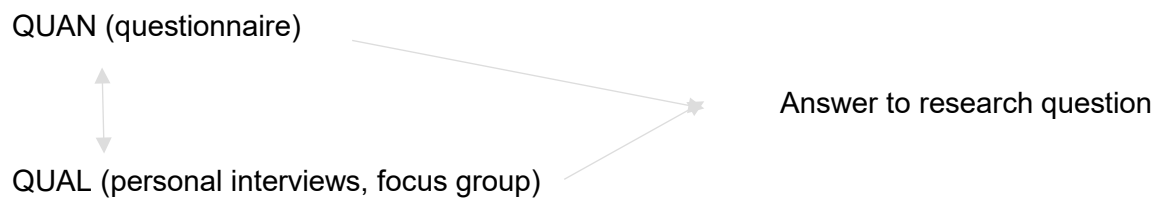


Figure 10. Mixed Methods Convergent Design (Adapted from Cohen et al. 2018, p. 40)

As previously outlined in this chapter, mixed methods research combines quantitative and qualitative research. While examples of both types of research have been provided, this section of the chapter examines two types of qualitative research methods, namely, action research and case study to identify which methodology fits the research question best in keeping with my constructivist and pragmatic philosophy.

Action research is defined as “a collaborative transformative approach with joint focus on rigorous data collection, knowledge generation, reflection and distinctive action/change elements that pursue practical solutions” (Piggot-Irvine et al. 2015, p. 548). It is explicitly designed and intended to achieve positive change in whatever topic and context is being researched. It normally goes through two or more iterations, with learnings from the first cycle being incorporated into the implementation of the next cycle (Tight, 2017, p. 96). The main aim of action research is to improve practice. I think it is a useful approach in that I can identify issues in my teaching and work out how to improve the design and delivery of module content. However, research by Bates (2008) suggests that a limitation of this type of approach is that it is cyclical in nature. The course she was interested in researching was short in duration and did not allow time for more than one cycle. Similar to the study by Bates, integrating a blended learning approach into the Multimedia Applications module in this study is one semester in duration and therefore does not allow for a second cycle. Hence, action research, while fitting, was thought not to be the most appropriate methodology for this study.

Another type of qualitative research is a case study. Bryman (2004, p. 48) defines a case study as “the detailed and intensive analysis of a single case”, which is corroborated by Tight, who defines a case study as ‘small-scale research with

meaning' (2017, p. 3). While they are limited in their scope, case studies have the potential to make significant contributions to our understanding. Gerring (2007, p. 17) suggests that a case study approach is qualitative and employs triangulation or "multiple sources of evidence". This view is echoed by Denscombe (2014, p. 54) who characterizes case studies as an in-depth study of one setting with a focus on processes, relationships and natural settings. A case study is commonly used in combination with a number of other research designs (Tight, 2017, p. 94). These combined uses both strengthen the appeal of a case study and make clear its robustness as a research design. Yin (1992, p. 124) suggests that the case study is not limited to either qualitative or quantitative data, but can incorporate both varieties of evidence. A case study provides an example of real people in real situations, enabling ideas to be understood more clearly than simply presenting them with abstract theories. It is able to incorporate an investigation of the context in which the blended learning takes place which helps to evaluate the intervention and the implementation process. However, the results provided by a case study may not be generalizable (Wellington, 2015, p. 174). Yet, maybe generalizability should not be a requirement as the evaluation of the integrating of a blended learning approach into the Multimedia Applications module in this study is not based on a positivist paradigm. Other researchers suggest that rather than viewing generalizability in a scientific sense, it should be viewed as the contribution it makes to similar possibilities in other situations (Simons, 2015, p. 175, Pring 2015, p. 56). These research will contribute to educational research in the field of multimedia applications.

There are many different types of case study. Stake (2005, p. 445) identifies three categories including intrinsic, instrumental and multiple/collective case studies. Intrinsic case studies are undertaken because one wants to understand a particular case better. Instrumental case studies examine a particular case in order to gain insight into an issue or a theory. Multiple/collective case studies are where a group of cases are studied in order to investigate a phenomenon. Yin (2009, pp. 19-21) outlines three categories of case study including 1) explanatory or causal, 2) descriptive and 3) exploratory. All of these may be single or multiple. An explanatory or causal case study tests theories. A descriptive case study provides a narrative account of a phenomenon while an exploratory case study can be used to generate hypotheses that are tested.

For the purpose of this study, the research question fits within the realms of Stake's instrumental category and Yin's descriptive category of a case study. A descriptive single case study approach is adopted. It is suitable for this research as it evaluates one module, namely, Multimedia Applications, for one semester and involves direct interaction with students in a real life context. It can also incorporate a triangulation approach for data collection which helps reliability and validity. It evaluates students' perceptions of blended learning and can go some way to answer the research question posed by this research through collaboration with students in their natural setting. It is also suitable for one person to undertake the research rather than at the cost of a research team. One further extension to the type of case study used in this research brings us back to Bates (2008, p. 98) and her assertions about the unsuitability of action research in solving her research problems due to its cyclical nature. Her reaction to this was to develop what she called the "responsive case study". She describes this as a methodology that allows participants to contribute what they perceive as relevant data to assist in the planning of the next offering of the course. This would form the basis for the next iteration of the course and the cycle would occur again with a new group of participant students (Bates, 2008, p. 98). This type of approach is suitable for this research study as it does follow stages of analysis, design, evaluation and it involves one cycle of the Multimedia Applications module over one semester. Students can contribute their views on the blend adopted and this can be used to assist in the planning of the next offering of the module. Multiple realities are possible in this study as students perceive blended learning differently, therefore there are multiple interpretations on any intervention. Understandings are created through interaction between the lecturer and the blended learning approach in an educational setting. Informed consent and ethical concerns are also considered important parts of the research design. They are discussed later in section 3.4 of this chapter. A summary of the methodology adopted for this study is illustrated in figure 11.

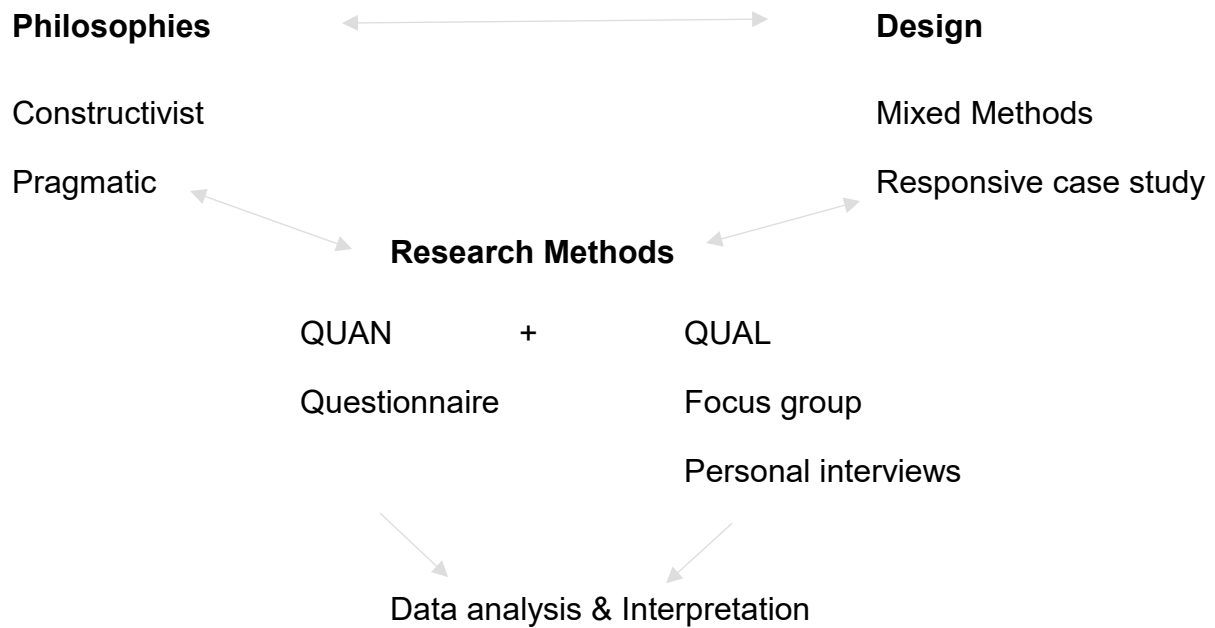
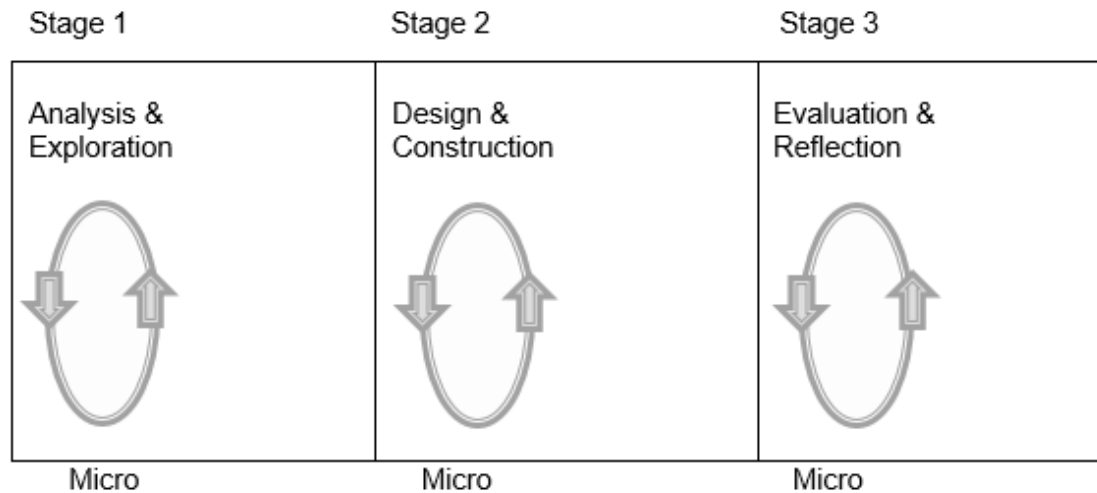


Figure 11. Research Design Summary (authors own).

### 3.3 EDUCATIONAL DESIGN FRAMEWORK

As outlined in chapter 2, integrating a blended approach into the Multimedia Applications module is situated within the generic model for EDR proposed by McKenney and Reeves (2012). This model directly reflects my mixed methods responsive case study approach within philosophical underpinnings of social constructivism and pragmatism. It has been adapted in conjunction with the framework used by Bates (2008, p. 98) to indicate one cycle of intervention which allows students at the end of one term to provide feedback which can then be used for the next iteration of the module with a new group of students. A summary of the model adapted for this study is outlined in figure 12.



Meso-Cycle 1: September 2017 – March 2018

Figure 12. Micro-Cycles and Meso-Cycle Timeframe identified for Integrating a Blended Learning Approach into the Multimedia Applications module (Adapted from McKenney & Reeves, 2012 p. 78).

EDR is based on cycles of intervention. In this study, the term “intervention” is used to describe the synchronous delivery of online lectures. For the purpose of this study, one meso-cycle has been identified to be completed by March 2018. While a second meso-cycle is outside the scope of this research, it is envisaged that a future study incorporating a second meso-cycle would be undertaken in September 2018, as a follow-on separate research enquiry. While the analysis, design and evaluation stages run chronologically, the process is flexible to allow for any unexpected circumstances.

Stage 1 of the generic model is analysis and exploration. Contexts and surrounding systems are not static and the people in them are largely responsible for making them dynamic. Although the importance of blended learning is documented at GMIT to-date, there is no formal policy for its implementation. This has implications for the resources necessary for interventions to occur, including the allocation of teaching hours and lab/classroom scheduling. There is also a lack of research in relation to what GMIT student perceptions of blended learning are and its benefits or drawbacks. The literature review outlined in chapter 2 helps in understanding the problem and identifying common themes which are then integrated into the research instrument.

Stage 2 of the model is design and construction. Ideas are generated and their feasibility assessed. It can be helpful to map out how a particular intervention is intended to work. This can be divided into the main design task, materials needed, processes/activities involved and participation by students in the intervention. A skeleton design for integrating a blended learning approach into the Multimedia Applications module is outlined in figure 13.

Stage 2

Design & Construction



Design Task	To deliver synchronous online lectures
Materials	Powerpoints, videos, Skype for Business.
Activities/processes	Synchronous online theory lectures. Multimedia practical classes in laboratories.
Participation	Students view the theory lecture “live” or they may also access the recording later. Students attend practical classes in laboratories.

Figure 13. Skeleton Design for Integrating a Blended Approach into the Multimedia Applications module (author’s own).

Stage 3 of the generic model for conducting EDR by McKenney & Reeves (2012, p. 77) is evaluation and reflection. Evaluations may study the feasibility of the intervention and its long term impact. Reflection is undertaken to develop the integrated research and development agenda and recommendations for re-design are considered. This research assumes the inclusion of social interaction and linkage characteristics as highlighted by Havelock (1974, p. 11 - 20) as it relies on the social interaction and collaboration between students and the lecturer in the implementation and evaluation of the intervention.

From a theoretical perspective, the knowledge produced by student evaluation and reflection in this phase contributes to a broader understanding of the issues involved in the integration of a blended approach into the Multimedia Applications module. The intervention itself, contributes directly to the student experience of online learning. From the start to the end of the generic model, my focus is on the delivery of synchronous online lectures to students in GMIT. This is a new experience for BIS students as none of their modules are currently delivered in blended format. Early in the cycle, my work is mainly concerned with analysis and thinking through how the lectures will operate, including considerations of timetables, hardware, software, technical support and training for students on using a blended approach. In later stages, information is collected and processed to identify the advantages and disadvantages of the intervention from a student perspective. The results will be used to decide if a blended approach will be adopted in the delivery of the Multimedia Applications module in the future. It may also provide valuable insights to other lecturers who are interested in delivering part of their modules online.

### **3.3 DATA COLLECTION AND ANALYSIS**

This section explains the data collection methods used in gathering the data in order to critically evaluate the integration of a blended learning approach into the Multimedia Applications module. As outlined in chapter 2, for this study, a blended approach is defined as a pedagogical approach which integrates synchronous online lectures with face-to-face learning in computer laboratories. The synchronous online lectures are delivered via Skype for Business and are also made available to students as reusable learning objects in the form of mp4 videos via the learning management system, Moodle.

GMIT was chosen as the location for this study. It offers a number of programmes in the School of Business. The population chosen for this study consists of 40 second year students studying BSc in Business Information Systems, Levels 7 & 8 Irish NQF. The BIS Level 7 is an Ordinary Bachelors degree under the Irish National Quality Framework (NQF) awarded by QQI. The BIS Level 8 is an Honours Bachelors degree under the Irish National Quality Framework (NQF) awarded by QQI. The module



identified for this study is entitled Multimedia Applications which is a mandatory 5-credit module running over one semester and is examined through 100% continuous assessment. Data is collected at the end of the semester in weeks 12 and 13. In order for students to be eligible to participate in this research for data collection purposes, they are required to have attended a minimum of 4 out of 8 synchronous online lectures. The next section outlines the data collection methods used in this study.

### 3.3.1 DATA COLLECTION METHODS

Primary data collection in this study involves collecting student views in relation to the blended approach adopted in the Multimedia Applications module. These views are derived using both qualitative and quantitative methods. It is important to remember that while feedback in relation to the intervention is required, it is also essential that the procedures employed guarantee, as far as possible, the validity of the knowledge produced (Koenig, 2009, p. 26). Therefore, a triangulation approach was adopted for data collection. Golafshani (2003, p. 603) suggests that this approach improves the validity and reliability of research or evaluation of findings. It may include multiple methods of data collection and data analysis, but does not suggest a fixed method for all research. Creswell and Plano Clark (2011, p. 69) indicate that triangulation of data offers complementary data on the question or topic in question and Denscombe (2014, p. 160) advocates that it reduces bias in research. There are many instruments that can be used for primary data collection including questionnaires, interviews, focus groups, observations, tests, personal constructs, role-play and visual media, for example. In this study, questionnaires, a focus group and personal interviews are selected as data collection methods, based on their fitness for purpose and their reflection of my adopted dual philosophies of social constructivism and pragmatism.

Questionnaires are used by market researchers to gather data on preferences and opinions (Dillman et al, 2014, p. 1). While Creswell (2009, pp.132-133) states that surveys are associated with studying relationships between variables through implementing quantitative research questions, they can also incorporate qualitative data from both open and closed questions. In this study, demographic data is collected in relation to student gender, age and level of programme of study. Student grade

point average (GPA) from the previous year is also examined as a variable in their responses. While strictly speaking, this is outside of the defined boundaries of this case study, it is included for qualitative comparison alone. Surveys provide a quick, inexpensive, efficient and accurate means of assessing information about a population (Zikmund, et al., 2013, p. 186). However, there are also challenges; there may be low response rates if students do not have the time to complete the questionnaire and the generalisability of the data may be slight within the confines of the case study if the sample size is small (Cohen et al, 2018, p. 335).

Part one of the data collection process in this study uses a questionnaire (see appendix 1 for questionnaire). Eligible students are asked to complete a questionnaire in week 12 via SurveyMonkey to evaluate the effectiveness of the integration of a blended learning approach into the Multimedia Applications module. They are given time in the classroom schedule to complete the questionnaire and they access the survey through a link on the learning management system (LMS) Moodle which is used in GMIT. Any students who are absent on the day of data collection have the opportunity to complete it at a time that suits them up until the end of week 13. All students must complete consent forms prior to participating in the data collection (see appendix 5 for sample consent form). These printed forms are distributed to students and signed prior to data collection. The average length of time for completing the questionnaire is estimated to be 16 minutes. Cohen et al. (2018, p. 208) suggest that a smaller sample size can be estimated when one has guarantees of response rates and the researcher's own presence at the time of conducting the research. In this study, allowing students class time to complete questionnaires and the lecturer's own presence at the time of conducting the research helps to increase the number of returns. However, because participation is voluntary in this study and there are no incentives provided for participation, the number of returns may be reduced. Another challenge that arises is the possibility of bias responses. This could be related to a person's state of mind at the time of completing the questionnaire, the wording of the instrument itself or the fact that I may be present in the room when then questionnaires are being completed. I am cognisant of these issues in the design and the administration of the questionnaire and the validation of findings by using triangulation.

Following the literature review, five themes were identified: 1) pedagogical design, 2) social design, 3) technical design, 4) perceived differences in modes of delivery and

5) student preference in modes of delivery and these were linked back to the research question. In order to evaluate the integration of a blended learning approach into the Multimedia Applications module, the questionnaire consists of a combination of open and closed questions and is designed around a five-point Likert scale. A copy of the final questionnaire is included in appendix 1. Rating scales are widely used in research as they combine the opportunity for a flexible response with the ability to determine frequencies, correlations and other forms of quantitative analysis (Cohen et al., 2018, p. 481). A rating scale was used in this study because it enables the degree of differentiation in student opinions on integrating a blended learning approach to the Multimedia Applications module to be identified, whilst still generating numbers. The Likert rating scale questions used in the research instrument are therefore both inductive (scale used) and deductive (explain your choice section) in nature. The five-point Likert scale asks participants to agree or disagree with a statement which varies from 'strongly agree' to 'strongly disagree'. Each participant is then asked to explain the choice they have made.

Careful consideration is given to the phrasing and sequence of each question. Questions are not independent of each other, and as Dillman et al. (2014, p. 235) suggest "what comes first affects what comes later and respondents use the early questions as a standard against which they compare the later questions". The questionnaire is divided into eight sections as outlined in table 1.

Table 1: Questionnaire Sections (author's own).

<b>Section</b>	<b>Number of Questions</b>	<b>Type</b>
Pedagogical design	10	Open and Closed
Social design	7	Open and Closed
Technical design	8	Open and Closed
Perceived differences In mode of delivery	5	Open and Closed
Student preference in mode of delivery	7	Open and Closed

Table 1 (Continued): Questionnaire Sections (author's own).

Advantages of blended learning	1	Open
Disadvantages of blended learning	1	Open
Demographics/Profile	5	Closed

It is good practice to pilot data collection tools (Creswell, 2009, p. 150). A pilot can increase the reliability, validity and practicability of the questionnaire (Verma and Mallick, 1999, p. 120). The questionnaire was pilot tested to check the clarity of questions and layout. Six questions were refined and two were deleted due to overlap of questions being asked. Pilot results were not included in the main dataset for analysis. A total of 33 students completed the questionnaire. Two other students were not eligible as they had not attended a minimum of four online lectures. A response rate of 87% was achieved for the questionnaire.

One issue mentioned by some students as they completed the final questionnaire was that when they strongly agreed with an issue, SurveyMonkey awarded one star, whereas when they strongly disagreed with an issue, they gained five stars. Some students felt that they should be five stars for strongly agree and one for strongly disagree. This issue was considered in the initial design of the questionnaire. However, if five stars were awarded for strongly agree, the label would have to appear last on the scale. This could have reduced the likelihood of it being selected. This issue has been highlighted in the past by Hartley and Betts (2010, p. 25). They found that categories on the left-hand side of a scale are used more frequently than those on the right-hand side of a scale. One solution to this is to mix the item scales so that sometimes there are positive scores on the left and sometimes positive scores on the right. However, for this study, I felt that this would be too confusing for students.

Whilst a questionnaire is used as an instrument in part one of the data collection process in this research and results help to identify a general pattern of students' reactions to the integration of a blended approach into the Multimedia Applications module through deduction, it is limited in providing insights into the students' thoughts and experiences in their own words. Part 2 (focus group) and part 3 (personal

interviews) of the data collection process provide greater opportunity to gather more in-depth data and explore the issues further.

A face-to-face focus group was used to collect data in part 2 of the data collection process. Focus groups provide a quick and convenient way to collect data from several people simultaneously and explore their experiences (Kitzinger, 1995, p. 299, Morgan 1988, p. 43). Participants are encouraged to talk to one another, ask questions and comment on each other's views. They provide greater coverage of issues than is possible in a survey and can be used to triangulate with the questionnaire and personal interviews for data reliability and validity (Robson, 2002, p. 284). It is from the interaction of the group that the data emerges, hence the dynamics of the groups are important (Denscombe, 2014, p. 189). A focus group is suitable for this study as it allows students to share their own experience of blended learning and learn from each other. It is based around a clear agenda of: 1) pedagogical design, 2) social design, 3) technical design, 4) perceived differences in modes of delivery and 5) student preference in modes of delivery. While it does not yield numerical, quantifiable data, it can provide a cross-check of student perceptions of the blended learning approach used for the Multimedia Applications module leading to more reliability of results.

Similar to the administration of the questionnaire, the focus group is carried out in week 12 of the 13-week semester. Its duration is one hour. The focus group is audio taped. It is felt that this method is suitable for this study as making notes during the interview could be off-putting for some respondents (Cohen, et al., 2011, p. 424). Audio recording of the interviews also enables the tone, pitch of voice and speed of the speech to be heard. Markle, et al. (2011, p. 1) suggest that working with audio data can allow for greater trustworthiness and accuracy, as well as more informative reporting.

The final part of the data collection process is personal interviews. Robson (2002, p. 284) suggests that interviewing is a powerful way of getting insights into interviewee's perceptions. Similar to the focus group method, personal interviews allow triangulation of data with the questionnaire to increase reliability. Prompts enable the interviewer to clarify questions, if they have been misunderstood, or rephrase a question or give an example. However, as an interviewer, I must be neutral. The personal interviews

are based around the same agenda as the focus group, namely, 1) pedagogical design, 2) social design, 3) technical design, 4) perceived differences in modes of delivery and 5) student preference in modes of delivery. Similar to the administration of the questionnaire and the focus group, personal interviews are carried out in week 12 of the 13-week semester. The length of each interview is estimated to be 20 - 22 minutes and it is audio taped. A summary of the data collection instruments used in this study and the timeframe is outlined in table 2.

Table 2: Data Collection Instruments & Timeframe (author's own).

<b>Data Collection</b>	<b>Part 1</b>	<b>Part 2</b>	<b>Part 3</b>
Instrument	Questionnaire	Focus group	Personal interviews
Number of students asked	40*	10	6
Number of participants	33	7	3
Percentage participants	100%	21%	9%
Timeframe	Weeks 12 & 13 November 2017	Week 12 November 2017	Week 12 November 2017

\*Total population was 40 students. However the sample was reduced to 38 as two of the students had not met the requirement of attending a minimum of four synchronous online lectures.

### 3.3.2 SAMPLING

Sampling is an important element of the research as it impacts its quality. Sampling decisions may determine the nature, reliability, validity and generalisability of the data collected (Cohen et al., 2018, p. 226). Large representative samples are used in quantitative research so that researchers can generalise their findings from the sample and produce more sophisticated statistics. Yilmaz (2013, p. 313) suggests that using smaller samples for case study research limits the possibility of generalising research findings to other settings or situations. Stake (1995, p. 8) disagrees and states “the

real business of case study is particularisation, not generalisation". As outlined in chapter one, the purpose of this study is not to generalise from a statistical perspective, therefore it is appropriate to use a smaller sample and produce qualitative, in-depth information about student perceptions of integrating a blended learning approach into the Multimedia Applications module while cross-checking with other samples for reliability.

Teddlie and Tashakkori (2009, p. 180 – 81) suggest that it is commonplace for mixed methods research to use more than one kind of sample. As the current study uses a mixed methods convergent design (adapted from Cohen et al. 2018 p. 40) that generates qualitative and quantitative data to answer the research question, it is appropriate to use a combination of probability and non-probability sampling (i.e. a mixed method sample). Using mixed methods sampling also supports my dual philosophical approaches of social constructivism and pragmatism and is suitable to answer the research question.

The sampling procedure used for this study is purposive sampling. In purposive sampling, researchers handpick the cases to be included in the sample on the basis of their judgement of their typicality or possession of a particular characteristic being sought (Cohen et al, 2018, p. 218). One class of BIS students within the School of Business has been selected so that they can be studied in order to evaluate the integration of a blended learning approach into the Multimedia Applications module. This sampling method is selective and biased but it gives access to students who have in-depth knowledge about the impact of the blended learning approach on their learning experience. In terms of the sample chosen for the questionnaire, complete collection sampling is used, in which all of the BIS class are invited to participate in the online survey. In parallel with the questionnaire sample, students are chosen from the complete collection sample to participate in the focus group. A probability sample is useful in this context. Systematic sampling involves selecting subjects from a population list in a systematic manner (Cohen et al, 2018, p. 215). Systematic random sampling is used for the focus group. Every 4<sup>th</sup> person on the student attendance register list for lab practical classes is chosen and an email invitation is sent (see appendix 2). If a student is unable to attend, the next person on the list is contacted. It is important to note that the attendance register list for lab practicals is not in strict alphabetical order. This ensures that every student has an equal chance

of being included in the sample. The final stage of sampling is for the personal interviews. Systematic sampling is also used for the personal interviews. Every 9<sup>th</sup> person on the list is chosen and an email invitation is sent (see appendix 3). However, if the person has already been chosen for a focus group, they are not eligible to participate in a personal interview and vice versa. If a student is unable to attend, the next person on the list is contacted. A summary of the sampling procedures is outlined in table 3.

Table 3: Summary of Sampling Procedures used (author's own).

<b>Data Collection</b>	<b>Sample Type</b>	<b>Sample Invited</b>	<b>No. of actual participants</b>
Questionnaire	Non-probability purposive sampling: complete collection	40*	33
Focus Group	Probability systematic sampling	10	7
Personal Interviews	Probability systematic sampling	6	3

\*Total population was 40 students. However the sample was reduced to 38 as two of the students had not met the requirement of attending a minimum of four synchronous online lectures.

### 3.3.3 DATA ANALYSIS

The analysis of case study evidence is one of the most challenging aspects of doing case studies. Yin (2009, p. 127) suggests that in too many instances, investigators start case studies without having any idea about how the evidence is to be analysed. In evaluating the integration of a blended learning approach into the Multimedia Applications module, five evaluation areas which were derived from the literature review (chapter 2) and the research instruments (chapter 3) are coded and analysed, including: 1) pedagogical design, 2) social design, 3) technical design, 4) perceived differences in modes of delivery and 5) student preference in modes of delivery. Questionnaire data is exported from SurveyMonkey as an Excel spreadsheet. The five-point Likert scale results are merged into three (i.e. combining agree/strongly



agree, disagree/strongly disagree, unsure). The main reason for this is to simplify the presentation of results. It is a justifiable approach as the sample size is small and the aim of the research is not to generalise results statistically but rather to get an overall picture of positive or negative perceptions towards the integration of a blended learning approach into the Multimedia Applications module. Audio recordings from the focus group and personal interviews are analysed. They are not transcribed as transcriptions lose data from the original meeting such as the tone of voice, the mood of the participant and who is speaking to whom. Transcribing is also time-consuming. Walford (2001, p. 92) suggests a ratio of 5:1 – five hours to transcribe one hour of interviews. Instead, for this study, themes are identified from all the interviews and compared with the questionnaire data. Uni-variate analysis of questionnaire data includes frequency analysis. Bi-variate analysis of questionnaire data includes identifying aspects of the participant's profile with their opinions. Participant profile data includes gender, age, programme of study and the GPA achieved in the previous year.

### **3.4 ETHICAL CONSIDERATIONS**

Documentation which is critical to the primary research includes: (1) Participant information leaflet, and (2) Informed consent forms. A participant information leaflet (see appendix 4) which was approved by the MA in Teaching & Learning Research Ethics Committee in GMIT was distributed to students before primary data collection commenced. Informed consent is an important ethical principle in data gathering. Howe & Moses (1999, p. 21) suggest that respondents have the right to assess the risks and benefits of being involved in a piece of research, and decide for themselves whether to take part. In this study, students were free to choose to take part (or not). The original signed consent form is stored in a secure file on an external hard drive and a copy given to the participant (see appendix 5).

### **3.5 CONCLUSION**

This chapter has described and justified the research methodology used in this study. The dual philosophies of social constructivism and pragmatism have been adopted as they are both part of my background and teaching and they help answer the research question. A mixed methods design using a single responsive case study was deemed appropriate for this study as it is fit for purpose from a philosophical point of view and it allows participants to contribute what they perceive as relevant data to assist in the planning of the next offering of the Multimedia Applications module. Primary data collection includes both qualitative and quantitative methods for triangulation of data to ensure validity and reliability. Instruments include questionnaires, a focus group and personal interviews. In keeping with my constructivist and pragmatist philosophy and the mixed methods employed in a responsive case study design adopted, more than one type of sampling is used for this thesis. Non-probability purposive sampling is used for the questionnaire along with probability systematic sampling from the complete collection sample for the focus group and personal interviews. Following this, chapter three considered the data analysis methods used and the rationale for presentation of results. Finally, ethical considerations in data collection were considered. The next chapter outlines the research findings as a result of the data analysis undertaken.

# CHAPTER FOUR: RESEARCH FINDINGS AND ANALYSIS

## 4.1 INTRODUCTION

This research study critically evaluates the integration of a blended learning approach into the Multimedia Applications module at GMIT from a students' perspectives. A responsive case study is used to evaluate the integration of the blended approach in the following areas: 1) pedagogical design, 2) social design, 3) technical design, 4) perceived differences in modes of delivery and 5) student preference in modes of delivery. The analysis which follows, compares and contrasts the original findings from this study with the literature and links back to the research question. A summary of the data analysis process adopted is outlined in table 4.

Table 4: Data Analysis Process (author's own)

Stage	Task
1	Charts are created in SurveyMonkey and downloaded. Raw data is downloaded as an Excel spreadsheet.
2	Five data categories are merged into 3 to enhance readability of results: Agree/strongly agree, Unsure, disagree/strongly disagree.
3	Data is coded under questionnaire headings: Pedagogical, social, technical, perceived differences in modes of delivery and student preference in modes of delivery.  Overview of all findings and themes are identified in open-ended questions and linkages between the questions are identified.
4	Audio interviews are analysed and themes are identified.
5	Data is analysed in relation to the literature review and linked back to research question.
6	Two questions are examined in more depth in relation to aspects of the respondents' profiles: GPA from the previous year, programme and age.

I now outline the research findings beginning with the first theme of pedagogical design.

## **4.2 PEDAGOGICAL DESIGN**

Nine of the ten questions investigated in the area of pedagogical design indicate positive results in relation to integrating a blended approach into the Multimedia Applications module.

94% of students who completed questionnaires felt that participating in blended lectures was a useful experience for them. A reason for this cited by student 30 in a questionnaire was that they could go back and listen to the lecture multiple times to “get the most out of it”. Another student (student 14) indicated that it made it easier to ask questions via the conversations window online as they did not have to worry about saying it in front of a class face-to-face. In the focus group, student C claimed that face-to-face classes were a faster pace and they tended to ask more questions in the online lecture. In the questionnaires, Student 28 stated that it was easier to focus at a location of their own choice. In a personal interview, student 2 indicated that they viewed the content of the online lecture a second time to help them with their assignment. In the focus group, student F also highlighted the benefit of revisiting the recording to study for an assessment. Student G commented “it’s a nice resource to have if you are stuck on something, you can go back to the recording”.

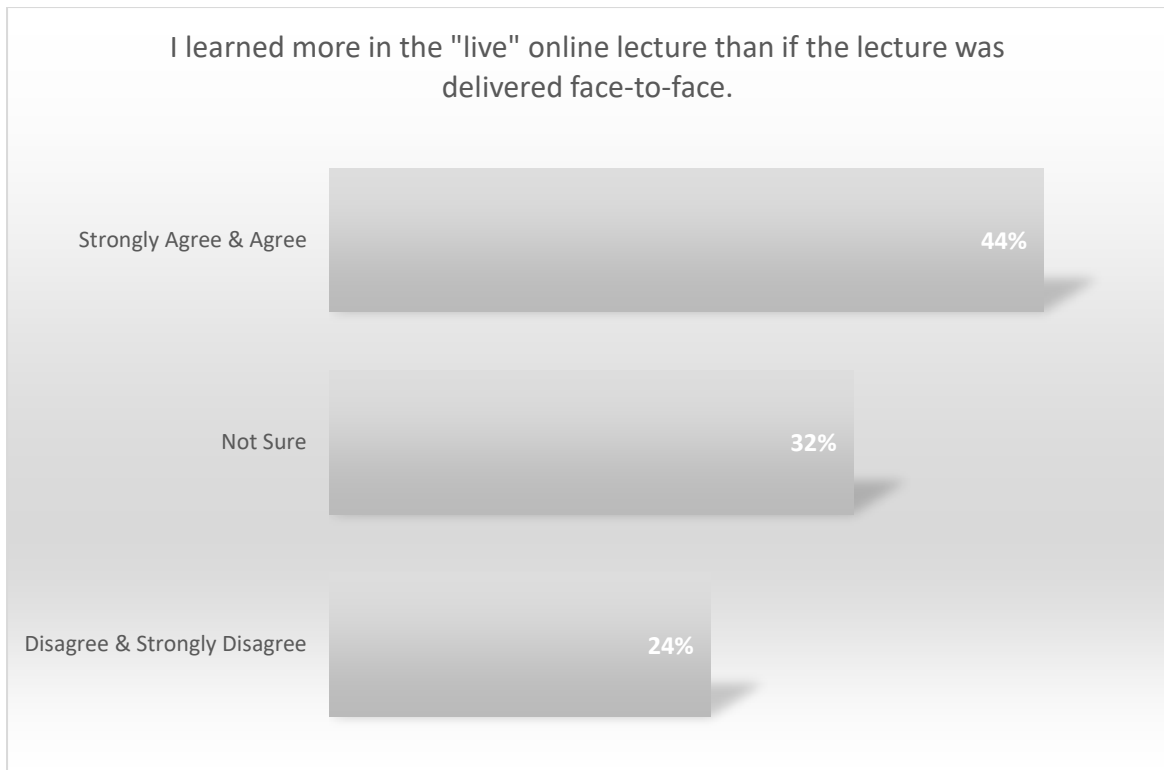


Figure 14. Question 2: Pedagogical Design

The results from 33 questionnaires are inconclusive in relation to whether students learned more in the “live” online lecture than if the lecture was delivered face-to-face as 32% were unsure and 44% either strongly agreed or agreed. When asked if they believed that blended learning could improve their learning experience rather than face-to-face, 55% agreed or strongly agreed, 30% were unsure. Students who felt that they learned more in the “live” online lectures cited reasons of better concentration, less distractions and ease of asking questions. In a personal interview, student 3 strongly agreed that they learned more in the online lecture, stating “I don’t have to talk to people. I am more focused at home with no distractions of people around me”. In a personal interview, Student 1 indicated that they could “zone in more” when they were at home and instant feedback in the conversations window was fantastic. “In face-to-face, you say nothing for longer because someone else answers or says the same thing as you were thinking”.

In the focus group, student B stated that there was more interaction in the online lecture because most people were active in the conversations window. “In face-to-

face practicals, everyone is focused on their own screens rather than interacting with others in the class”.

Students who felt that they learned less in the “live” lecture cited reasons of more distractions and less engagement. Student 19 indicated that they learned more in a face-to-face class taking notes and actively listening.

Students who were unsure indicated that they found both modes of delivery equally effective. This mixed result could be due to the academic level of the student, their age or their year of undergraduate degree programme as shown in tables 5 - 7. All students surveyed were in the second year of their undergraduate degree programme. This question was cross tabulated with age, grade point average from the previous year and programme level to investigate further.

Table 5: I learned more in the “live” online lecture than if the lecture was delivered face-to-face (by Age variable).

<b>Age</b>	<b>Strongly agree/agree</b>	<b>Not Sure</b>	<b>Disagree/strongly disagree</b>
18-20	56%	22%	22%
21-23	40%	40%	20%
Over 23	20%	60%	20%

The results of this study illustrate that the younger students feel that they learn more in the “live” online lecture than if the lecture was delivered face-to-face and while only 20% of the students over 23 agree/strongly agree. Perhaps this is linked to the fact that the 18-20-year-old category has grown up with technology as part of their daily lives. This result is in contrast to theory which suggests that as students progress through their studies at university, they become more independent learners and self-regulatory, therefore are less attached to face-to-face lectures as a major source of knowledge (Owtson et al., 2013, Tseng and Walsh 2016).

This question was also cross tabulated with programme level to examine further. In Ireland, programmes are awarded under the Irish National Quality Framework (NQF) awarded by QQI. The BIS Level 7 is an Ordinary Bachelors degree under the Irish National Quality Framework (NQF) awarded by QQI. The BIS Level 8 is an Honours Bachelors degree under the Irish National Quality Framework (NQF) awarded by QQI. Both these levels are included in table 6.

Table 6: I learned more in the “live” online lecture than if the lecture was delivered face-to-face (by Programme Level variable).

<b>Programme level</b>	<b>Strongly agree/agree</b>	<b>Not Sure</b>	<b>Disagree/strongly disagree</b>
BIS level 7 Irish NQF	23%	38%	38%
BIS level 8 Irish NQF	60%	30%	10%

A higher percentage of BIS level 8 students surveyed agreed/strongly agreed that they learned more in the “live” online lecture than if the lecture was delivered face-to-face than the BIS level 7 group. This suggests that student learning in the implementation of a blended learning approach to a module varies with programme level. Those on a higher programme level learn more in “live” online lectures than those on a lower level programme. This has implications in the integration of a blended approach into the Multimedia Applications module and may present challenges for the lecturer when both groups are mixed for classes.

This question was also cross tabulated with GPA to examine further. GPA was provided by the students as part of the questionnaire and so is subjective. While this is outside the boundaries of the case study, it is used only for comparison and qualitative discussions alone. It is not directly comparable to the blended aspect of this particular module.

Table 7: I learned more in the “live” online lecture than if the lecture was delivered face-to-face (by GPA variable).

<b>GPA*</b>	<b>Strongly agree/agree</b>	<b>Not Sure</b>	<b>Disagree/strongly disagree</b>
40-59	54%	31%	15%
60-69	46%	31%	23%
70-100	29%	42%	29%

The majority of students in the lower grade point average (40-59) agree/strongly agree that they learned more in the “live” online lecture than the face-to-face lecture. Agreement levels are lower for the higher GPA groups. This could mean that the students in the lower GPA category learned more due to the ease of communication in the conversations window or that they are more comfortable asking questions via screen rather than face-to-face. It may also be linked to comments in personal interviews and the focus group in relation to quieter students participating online. While the link between those in the lower GPA category and quieter, less confident students is not shown, it may have implications in the implementation of a blended learning approach into a module.

All students who completed the questionnaire, agreed that student contributions via the conversations window in the online lecture were encouraged by the lecturer. In a personal interview, student 3 stated “I was used to using the conversations window as I used Adobe Connect before for staff training when I worked with Apple. They used the conversations window to check if people were paying attention”. One student who completed the questionnaire commented that “the lecturer always asked questions so we were able to see if we had understood the information given”. Another student stated “the lecturer waited until the class answered questions before moving on. She also clarified any information that we were unsure about”. This is an encouraging result as it can be difficult for a lecturer to simultaneously ensure equal attention to the students in the “physical” classroom and the students accessing remotely. The result is in contrast to the research by Evans (2013), where online students did not think that



instructors encouraged them to become actively involved in discussions. This is a missed opportunity for instructors to act as facilitators for social interaction and practice student-centred learning (Cho and Cho., 2014). However, by ensuring that online conversations are relevant to the module content, from a constructivist perspective, I believe that students perceptions of blended learning can be positive as is the case for this Multimedia Applications module delivery. Frequent attention to the conversations window and posing relevant questions to both groups of students can ensure a positive learning experience for both. Course activities should be meaningfully connected with the learning objectives of the module as advocated previously by Tseng and Walsh (2016, p. 50) and Hung and Chou (2015, p. 323).

All of the students surveyed indicate that the lecturer is enthusiastic about teaching the class. One student commented “the lecturer likes what she does”. Another suggested that there was excellent coverage of content and it was well explained. Student 12 indicated that the lecturer was always on time and always organised while student 5 stated that the lecturer always had a smile or a laugh. This result is positive and illustrates the potential of a lecturer to create a positive learning experience for students both online and in the physical classroom. If students see that a lecturer is enthusiastic about teaching, they “buy into it” and this encourages them to participate and learn. This result endorses the research of Dang et al. (2016) and Gecer (2013).

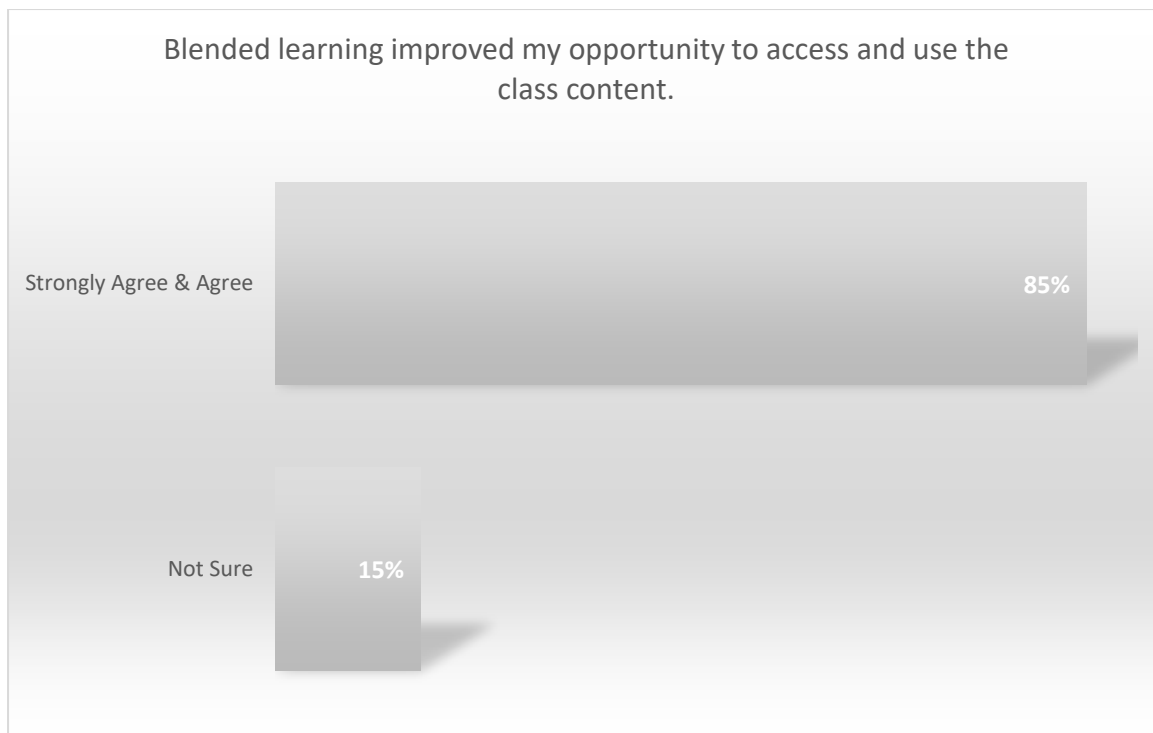


Figure 15. Question 5: Pedagogical Design

The majority of students surveyed stated that blended learning improved their opportunity to access and use class content. 84% of students commented that if they could not attend the “live” lecture, they accessed the recording at a later stage. Student 16 suggested that it gave them a variety of ways to learn so that “I wasn’t just learning from chunks of written theory”. Student 14 stated that due to the timing of the lecture (11am, Monday), they would not have been able to attend the face-to-face lecture. Without their journey to college, they were able to participate in the online lecture and attend another appointment each week. This supports the research by Mann and Henneberry (2014, p. 11) who suggested that where students selected online over face-to-face courses, one of the deciding factors for them was the timing of when the face-to-face version was offered.

Another student (student 18) commented “it is useful to have the recording to look at again even if you attended the “live” one or not”. 76% of students who completed questionnaires indicated that blended learning improved their understanding of key concepts. Student 11 commented “with the online lectures, I was able to understand a lot more as I could follow the lecturer more easily”. In the focus group, students A

and B indicated that the face-to-face practicals and theory online lecture content complemented each other. Student H felt that they understood the key concepts better through “live” online sessions as they were able to attend the lecture by themselves at home where they were more comfortable.

These findings suggest that the blend adopted, provided students with greater access to content, allowing those who could not physically attend to still participate and learn. It reinforces the research findings by Cunningham (2014) in relation to greater educational access through online classes. If students can access the learning materials at a time that suits them, it could result in more active learning as suggested by Bower et al. (2015).

94% of students who completed questionnaires indicated that the blend of “live” online lectures and face-to-face components enhanced the delivery of the other. One student commented “you could ask questions freely in the online lecture and if you needed any more help, the lecturer would show you in the face-to-face lab session”. Another student indicated that because it was a computer-based module, they felt it was only right that some of the lectures should be delivered online. In a personal interview, student 1 stated “it was a perfect balance because a lot of the theory was delivered online and if you needed to follow-up, you could ask in the next practical lab class”. In a personal interview, student 2 commented “you need the face-to-face laboratories in case you have problems with software or questions which relate specifically to your project”.

73% of students surveyed, stated that they would choose online “live” lectures if they were given this option in other modules. One student commented “it depends on the module. It would not work for the practical lab classes”. In a focus group, student C indicated that “it worked well for multimedia applications but it would not be suitable for a module like economics or accounting”. Student B commented “it works for design-based subjects but not for something like accounting. It also depends on the numbers in the group. When the groups are larger, there is a lot of noise in the face-to-face classroom”.

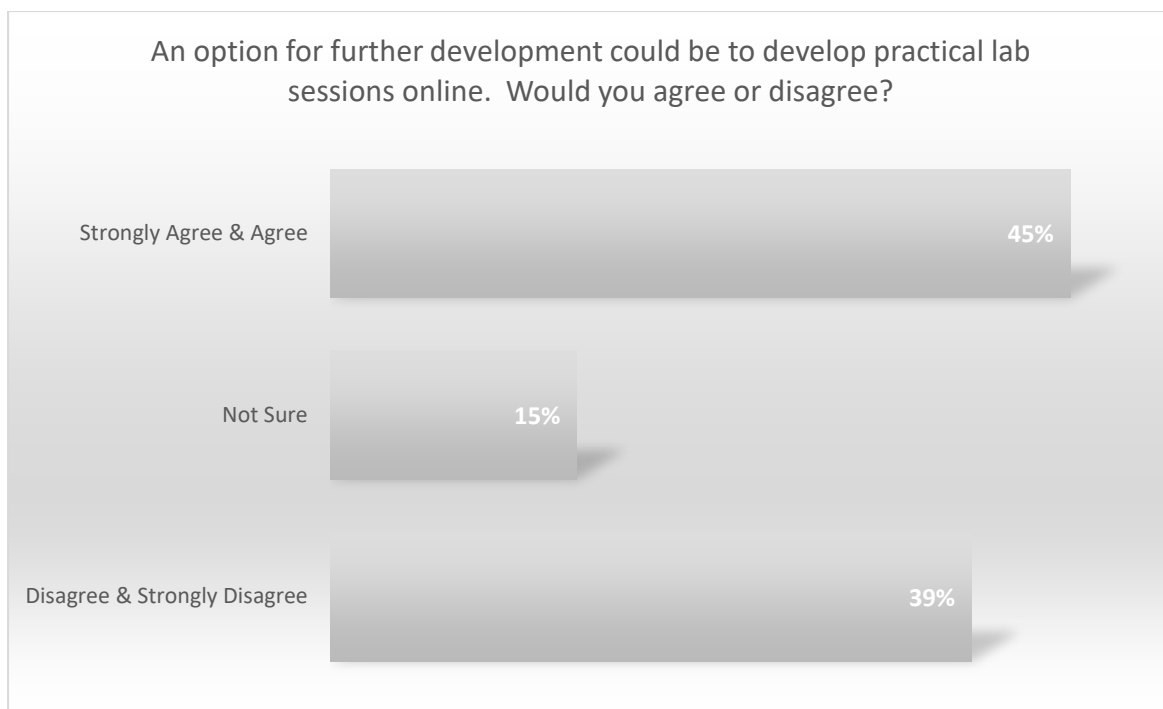


Figure 16. Question 34: Student Preference for Future Blend

Results are mixed when students were asked if more practical lab sessions in the module could be conducted online. 45% agree or strongly agree, 39% disagree or strongly disagree and 15% are unsure. Student 5 commented “practicals are more confusing and people would get lost easily”. Another student (student 27) stated “I think moving practical lab sessions online would be detrimental to students who are struggling to understand the programs”. In a personal interview, student 3 suggested that there would be issues with using Adobe licences at home (e.g. Premiere) and if you had a problem it would be difficult to describe it in the conversations window. In the focus group, student G commented “it depends what you have at home. In practicals, using video software like Adobe Premiere, I like to use a big screen. I don’t think it would work so well on my mobile”. Student B stated “you need face-to-face practicals to show the steps in how to use the software but the online lecture is good for the theory part”. These results could imply that the blend adopted (i.e. one theory synchronous lecture online and two practicals in a lab face-to-face) may be the optimum one in relation to the Multimedia Applications module. However, as noted by Waha and Davis (2014) and Shantakumari and Sajith (2015), the “right blend” varies across different content areas and lecturers need to be cognisant of this in their

particular discipline. Getting the online and face-to-face balance is critical to the success of integrating a blended approach into a module.

91% of students who completed questionnaires stated that the “live” online lecture was easy to follow. One student (student 3) indicated that the lecture was well presented. Timely information was given about when the lectures were on and updates on schedule changes were emailed immediately. Another student (student 19) stated that “everything was explained thoroughly”. In the focus group, student G indicated that once clear instructions are given, blended learning works but it also depends on the type of person you are (i.e. easily distracted or not). In the next section I outline the research findings in relation to the second theme of social design.

### **4.3 SOCIAL DESIGN**

Six of the seven questions investigated in the area of social design indicate positive results in relation to integrating a blended approach into the Multimedia Applications module.

The majority of students (94%) stated that they could easily communicate with the lecturer during the online lesson and they found the conversations window in Skype for Business easy to use (94%). One student (student 15) commented “any time anyone asked a question, the lecturer stopped what she was doing and answered it until they knew what they were doing”. Another student (student 2) indicated that it was easy to type in a message and it was read straight away. 68% of students also suggested that blended learning improves communication between students and lecturers. One student (student 20) stated “I felt the lecturer got to know us all during the online lectures”. Another student (student 13) commented that, for students who do not like to speak out loud in a face-to-face class, they find it easier to type in a text box. In a personal interview, student 3 stated “I noticed that the people posting in the online session are the ones that don’t normally talk in the face-to-face classes. Quieter people seem to participate”. In another personal interview, student 1 stated “quieter people seemed to post more”. In the focus group, student B indicated that it gave the opportunity for people who are not confident at asking questions in face-to-face class to participate and ask questions online instead.

This result is similar to findings of previous scholars (Shantakumari and Sajith, 2015, Zumor et al. 2013, Chmiel et al. 2017) in relation to online learning improving communication.

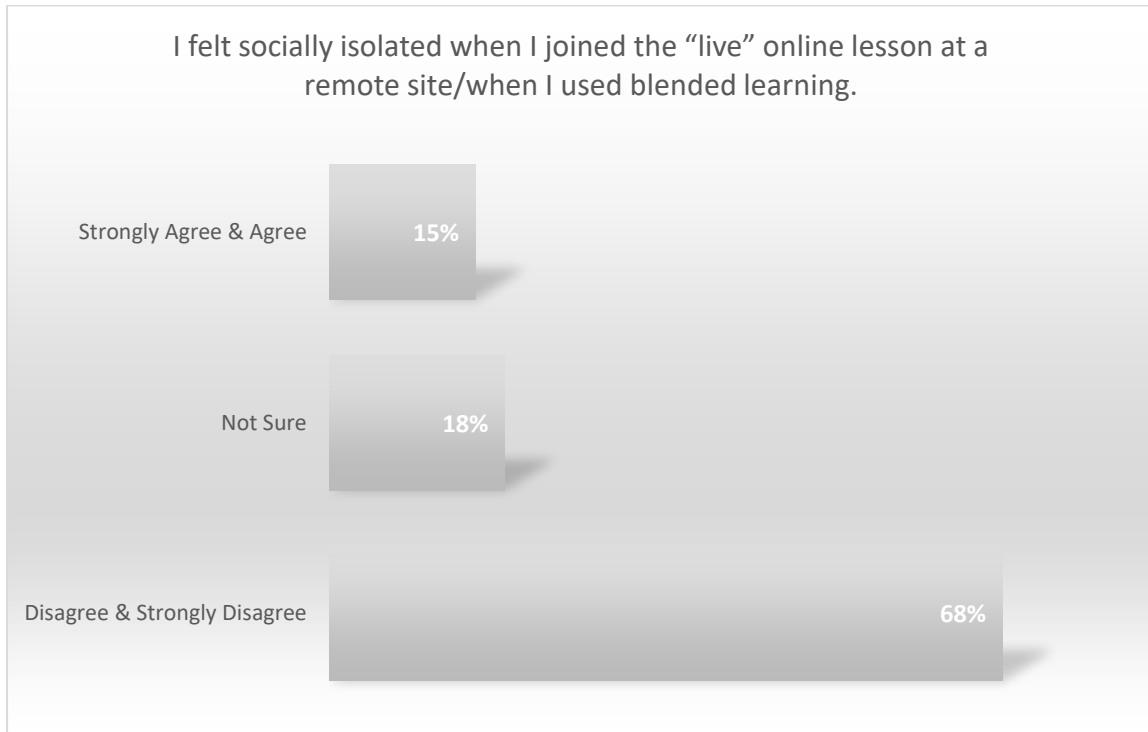


Figure 17. Question 12: Social Design

Havelock (1974, p. 11 - 20) highlights the importance of including social interaction and linkage characteristics as part of any design process. In this study, the majority of students surveyed disagreed or strongly disagreed that they felt socially isolated when they joined the “live” online session at a remote site (68%). One student (student 22) commented “I was at different locations during some online lectures, sometimes with other people from my class”. Another student indicated that it took distractions away and made it easier to concentrate. This view was echoed by student C in the focus group “I am more inclined to chat to friends in the face-to-face session and be distracted. I focus more at home”. Student 26 who completed the questionnaire stated that they did not feel socially isolated because they still had face-to-face lab sessions later in the week when they would meet everyone.

In a personal interview, student 1 stated “no, I did not feel isolated because I could see everyone in the conversations window and their photos”. I need to have the skill of attending online meetings in the business world after I graduate from GMIT”. This view was also reported by student G in the focus group. This a positive result as the success of the integration of blended learning into the Multimedia Applications module relies on the social interaction and collaboration between students and the lecturer.

In a personal interview, student 3 stated that because they had an introductory face-to-face session on how to use the technology and the format a lecture would take, this made interaction easier when they went online remotely. This endorses the work of Boelens et al. (2017) who suggests that social interaction is generally stimulated through introductory face-to-face sessions.

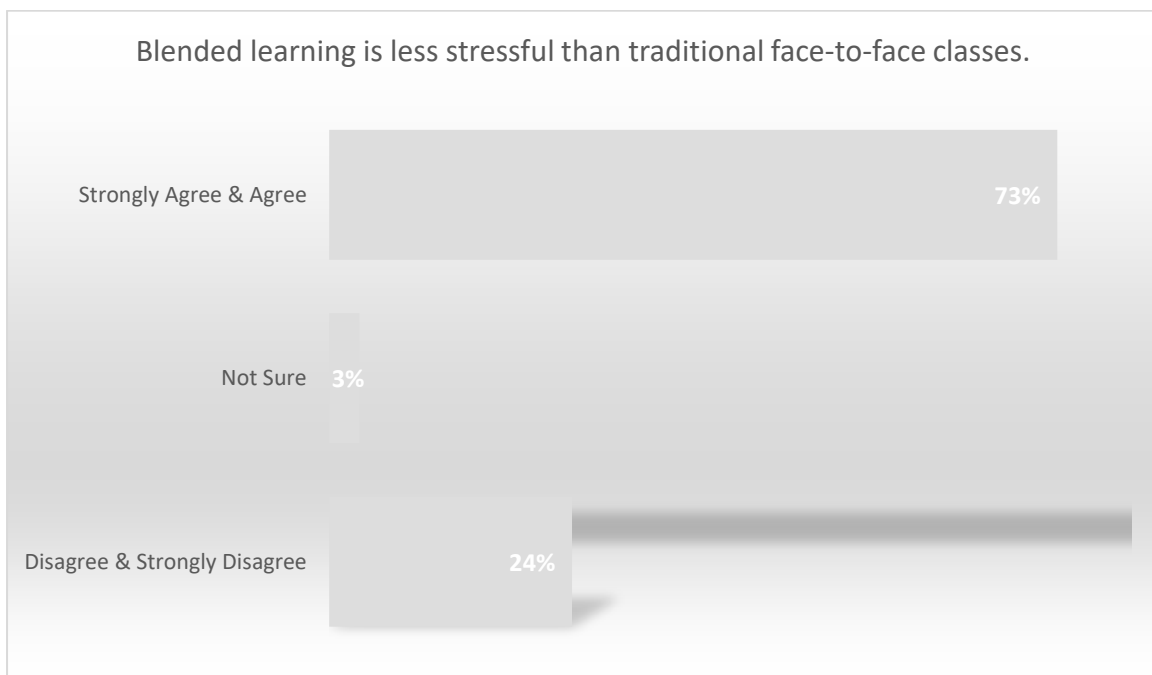


Figure 18. Question 16: Social Design

The majority of students surveyed (73%), agree or strongly agree that blended learning is less stressful than traditional face-to-face classes. One student commented “you don’t have the fear of people’s judgement when you answer a question”. Another student (student 30) indicated that they found it very relaxed. In a

personal interview, student 3 commented “if you are having a bad day, you may not want to go to a face-to-face session. In other personal interviews, student 1 and student 2 suggested that it was less stressful because even if they were late, they could still join in the online lecture without disrupting the class. Student 2 indicated that online was less stressful than the face-to-face laboratories because less time was spent starting up machines and they could organise themselves better before the lecture started.

74% of the students surveyed indicated that they are less anxious using blended learning. One student (student 25) commented “there is no anxiety due to being on your own in an environment of your choice”. In the focus group, student B stated that it was more chilled out. Student C commented “Because it was my first lecture on a Monday, I could wake up five minutes before the lecture and then access it via my mobile”. These are similar to findings by Shantakumari and Sajith (2015), where healthcare students perceived blended learning to be less stressful and more effective than traditional face-to-face class delivery.

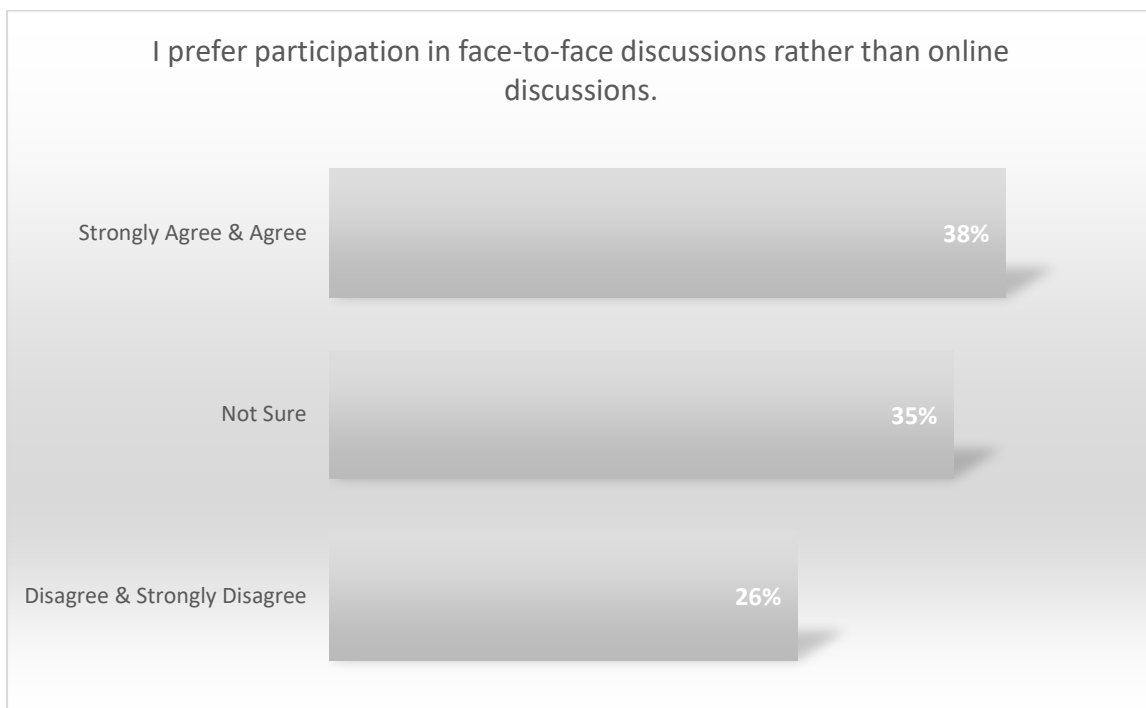


Figure 19. Question 17: Social Design



The results of this study in relation to student preference for face-to-face discussions rather than online discussions are inconclusive, as shown in figure 19. Questionnaire results indicate that 35% of respondents are unsure and 26% either disagree or strongly disagree. In a personal interview, student 2 indicated that they prefer face-to-face discussions but the chatbar in the online lecture was useful. In the focus group, six of the eight students suggested they like both rather than one over the other. The 35% unsure category in the questionnaire result is a surprising one, considering other positive results reported in relation to ease of communication, social inclusion and a less stressful environment. Perhaps it relates to a particular course topic or the learning style of the students. One third of the students who were unsure commented that they liked both methods of participation. In a personal interview, student 1 stated “I think it should be 50/50. Have some initial online sessions where quieter students can build up their confidence asking questions and then have face-to-face class discussions after that”. In the next section I outline the research findings in relation to the third theme of technical design.

#### **4.4 TECHNICAL DESIGN**

Six of the seven questions investigated in the area of technical design indicate positive results in relation to integrating a blended approach into the Multimedia Applications module. However, the majority of percentages are lower than in the areas of pedagogical and social design.

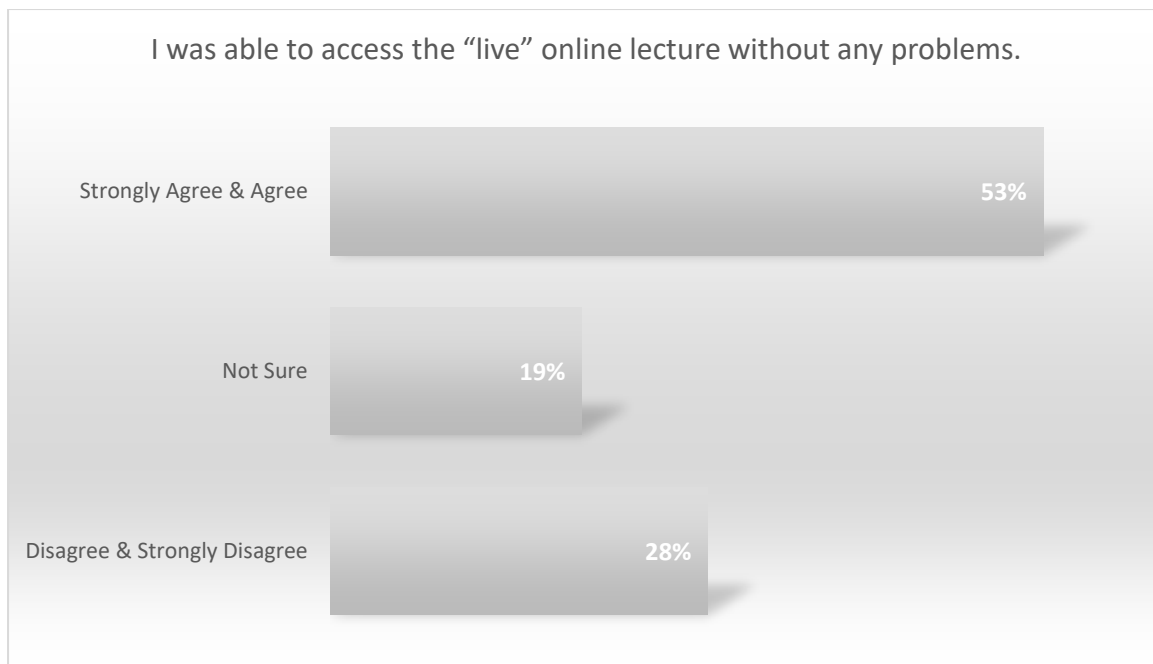


Figure 20. Question 18: Technical Design

The majority of students who completed questionnaires (53%) suggested that they were able to access the “live” online lecture without any problems, although 19% were unsure and 28% disagreed or strongly disagreed. One student (student 12) commented “I had problems with audio because my headphones would not work in the IT centre but the following week they worked in the library and they also work at home”. Another student (student 21) indicated that they had issues with their own Wi-Fi. Student 34 stated that sometimes the connection was slow. However, 94% of students surveyed claimed that they received enough information on how to access the online lecture initially and that accessing the online lecture was considered easy (85%). One student (student 31) commented “it was simple to follow the link in the email every Monday”. In a personal interview, student 2 indicated that receiving the email with the link on a Sunday evening was a good reminder of the lecture happening the following day. These results are similar to the findings of previous scholars (Wang et al., 2017, Chen and Yao 2016) that user friendliness is important for student satisfaction. Re-design of a module by reducing face-to-face class time and increasing the online learning component recognises that it may require more effort by students to get familiar with the new environment (Dang et al. 2016) and that this should be made as easy as possible for them to adapt. Initial preparation and ongoing support

for students is a crucial factor if the integration of a blended learning approach into the Multimedia Applications module is to be successful.

55% of students who completed questionnaires stated that they did not have any technical problems when they joined the meeting while 24% disagreed or strongly disagreed and 21% were unsure. One student (student 11) indicated that their headphones would not work. Another student (student 12) commented “headphones did not work all the time although the lecturer fixed the issue by lending us some if we were on campus”. In a personal interview, student 1 stated that they had listened to the lectures via Bluetooth in their car and the connection failed when they drove under bridges on the motorway. 88% felt that they received adequate assistance in the case of technical problems faced. One student (student 5) commented “the lecturer always asked if everyone experienced the lecture okay and if anyone had problems, she would help them out with it”. In the focus group, student C indicated that they had problems in two of the online lectures with a “buffering” message on their screen. The implementation of a blended learning approach into the Multimedia Applications module can only be effective if technical problems are minimised. Otherwise students will lose confidence in the lecture delivery and motivation will decrease. It is also important to communicate possible technical issues to students at the beginning of the implementation of a blended learning approach so that they know what to expect or what action to take to solve these issues.

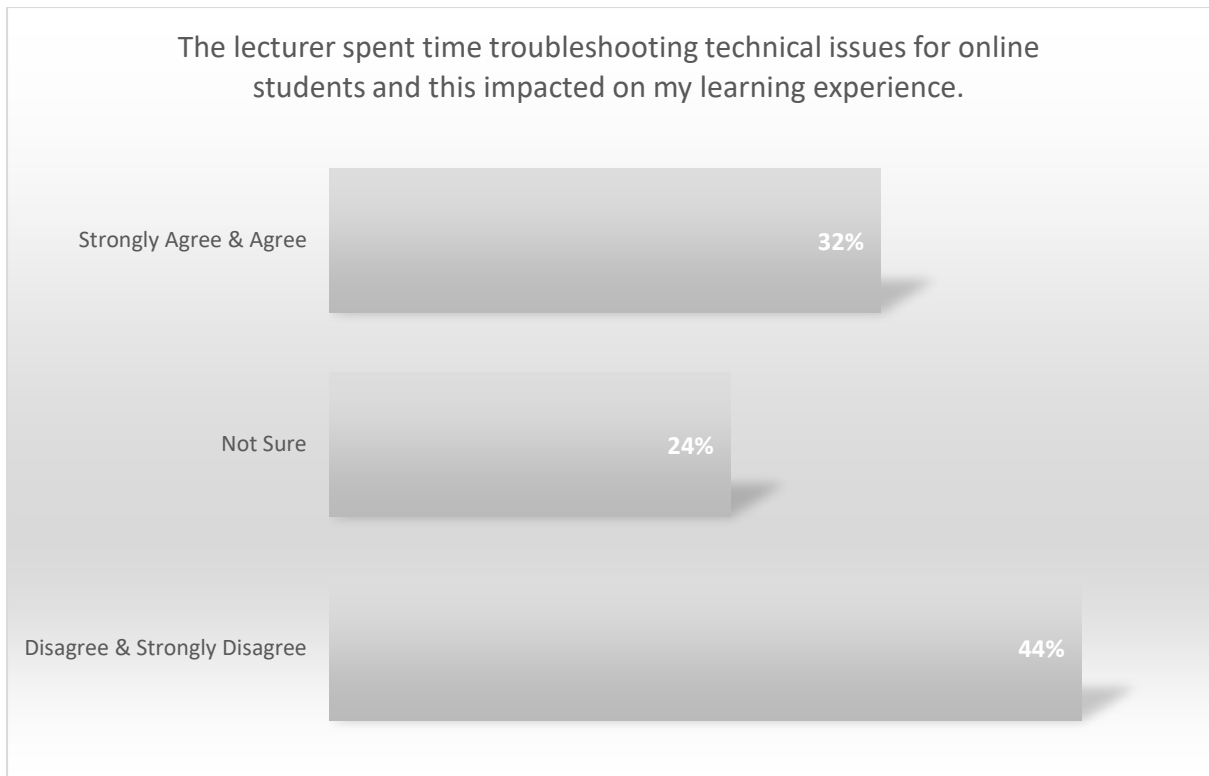


Figure 21. Question 24: Technical Design

Results in relation to the time spent by the lecturer troubleshooting technical issues for online students and its impact on their learning experience are inconclusive. Although 44% of students surveyed stated that the lecturer spending time troubleshooting technical issues for online students did not have an impact on their learning, 32% agree or strongly agree and 24% are unsure. This issue was also highlighted in studies by Wang et al. (2017) and Cunningham (2014). One student (student 14) commented “it took some time at the start of every session to make sure that everyone was logged in without any issues”. Another student (student 5) indicated that troubleshooting happened in the first and second sessions but time spent troubleshooting decreased after that. This view was supported by majority of students in the focus group. In a personal interview, student 3 stated that because the students knew that it was the first time a blended learning approach was being adopted, they expected the lecturer to have to troubleshoot issues.

The majority of students who completed questionnaires felt that slow internet connectivity was not a problem that they faced in using the blended learning (53%)

while 34% disagree or strongly disagree and 13% were unsure. Two students skipped this question. One student (student 8) commented “most people have more than a 5mb connection that this would need to run seamlessly”. Another student indicated that their mobile internet worked fine. Student 30 stated that the picture would lag sometimes but they thought it was more an issue with the Skype for Business application rather than internet speed. In the focus group, student G stated that the internet connection in Glasan was slow but when they switched to 4G on their mobile, they had no problems.

This result contradicts previous research by Waha and Davis (2014), Zumor et al., (2013) and Atwater et al., (2017) where internet connectivity was a limitation. However it does highlight that internet connectivity and access to 5mb broadband or more is a critical success factor in the implementation of a blended learning approach into the Multimedia Applications module. Given the demographic of students who attend GMIT are from Mayo and other rural areas, it cannot be assumed that everyone has access to adequate broadband. This highlights the importance of the National Broadband Plan in Ireland. As of September 2017, 65% of the 2.3 million premises around the country have access to high speed broadband. By the end of 2018 it is expected that 77% will have access to high speed broadband (Department of Communications, Climate Action and Environment, 2018). In the next section I outline the research findings in relation to the fourth theme of perceived differences in modes of delivery.

#### **4.5 PERCEIVED DIFFERENCES IN MODES OF DELIVERY**

All of the five questions investigated in the area of perceived differences in modes of delivery indicate positive results in relation to integrating a blended approach into the Multimedia Applications module.

61% of students surveyed stated that they were as engaged in the online lecture as much as in the face-to-face classroom. One student (student 5) commented “I was engaged more due to the fact that I could access it where I wanted”. Another student (student 11) indicated that the lecturer prompted for input regularly and this helped their engagement.

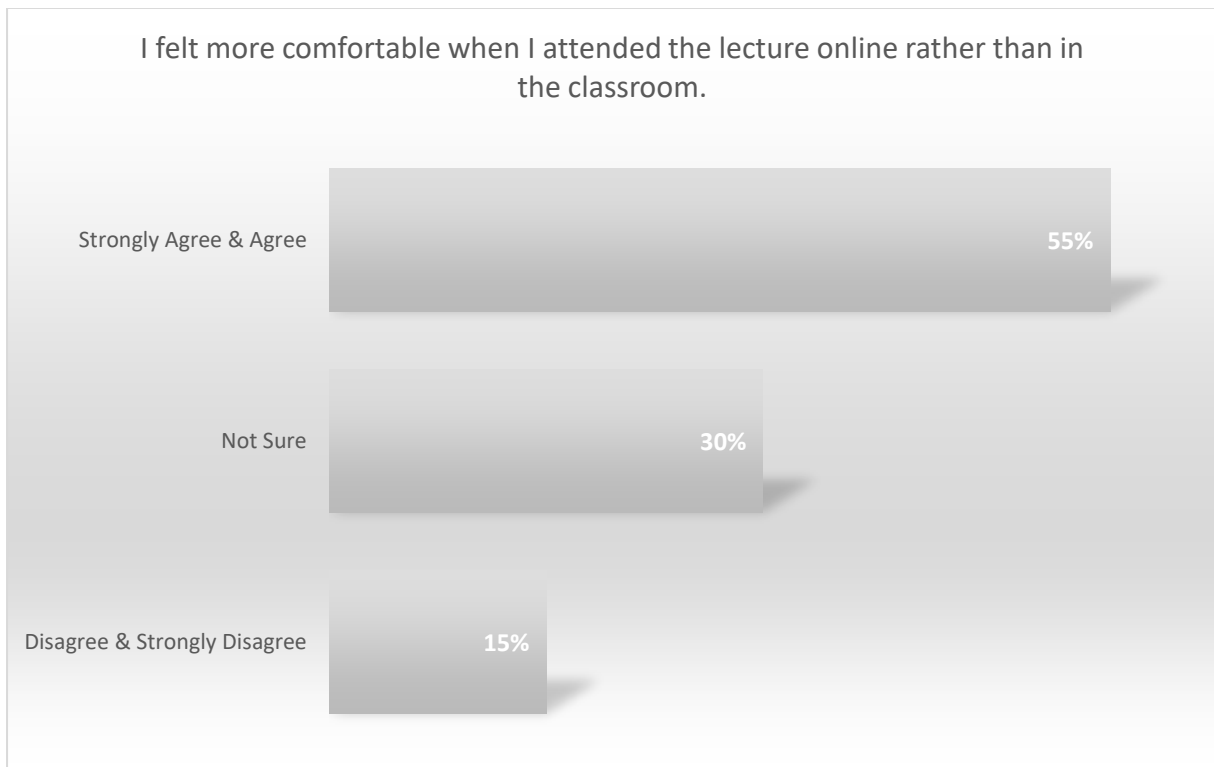


Figure 22. Question 2: Perceived Differences in Modes of Delivery

55% of students who completed questionnaires felt more comfortable when they attended the lecture online rather than in the classroom. 15% disagreed or strongly disagreed and 30% were unsure. One student (student 4) commented “I got to sit on my own couch in my own surroundings”. Another student (student 32) indicated that it was more comfortable to do the lecture in their own space. The result of 55% is lower than expected when compared to the higher levels of agreement in relation to ease of use (94%), less anxious (74%) and less stressful (73%). The result was higher (63%) when the question was rephrased as “I prefer attending a lecture via skype for business rather than attending it in the classroom”. One student (student 9) indicated that it fitted their schedule more. Another student (student 13) commented “I can stretch, I can be in my jocks and still be learning”. As the synchronous online lecture was the first one students had on a Monday morning, timetabling probably influenced these findings. In the focus group, student B stated that once they had their headphones on, they were more comfortable and could concentrate better. Perhaps the results of comfort and attendance are linked to their opinions regarding preference

for discussions online or face-to-face. While they prefer and are more comfortable attending the lecture online, they are more unsure in relation to whether online discussion or face-to-face discussions are their preference. This question was cross tabulated with age, programme level and GPA (from previous year) to probe further.

Table 8: I felt more comfortable when I attended the lecture online rather than in the classroom (by Age variable).

<b>Age</b>	<b>Strongly agree/agree</b>	<b>Not Sure</b>	<b>Disagree/strongly disagree</b>
18-20	56%	33%	11%
21-23	70%	10%	20%
Over 23	20%	60%	20%

A higher percentage of students in the 21-23 age category agree/strongly agree that they felt more comfortable when they attended the lecture online rather than in the face-to-face classroom compared to those in the 18-20 category and those over the age of 23. This result is surprisingly high considering that only 40% of the 21 – 23 age category agreed that they learned more in the “live” online lecture than if the lecture was delivered face-to-face.

Table 9: I felt more comfortable when I attended the lecture online rather than in the classroom (by Programme Level variable).

<b>Programme level</b>	<b>Strongly agree/agree</b>	<b>Not Sure</b>	<b>Disagree/strongly disagree</b>
BIS level 7	54%	15%	31%
BIS level 8	55%	40%	5%

While the majority of students feel more comfortable when attending the lecture online, a higher proportion of the BIS level 7 students are less comfortable when compared with BIS level 8 students. This has implications for a lecturer designing a blend and delivering classes where programme levels are mixed and there may be mixed abilities.

Table 10: I felt more comfortable when I attended the lecture online rather than in the classroom (by GPA variable).

<b>GPA</b>	<b>Strongly agree/agree</b>	<b>Not Sure</b>	<b>Disagree/strongly disagree</b>
40-59	62%	23%	15%
60-69	54%	23%	23%
70-100	43%	57%	0

A higher percentage of students in the lower grade category (62%) feel more comfortable attending the lecture online rather than in the classroom compared to the higher grade categories as outlined in table 10. This result is significant as it shows that students with higher academic grades are unsure or less comfortable attending the lecture online rather than face-to-face. It cannot be assumed that students with a higher academic achievement are more independent learners and self-regulatory.



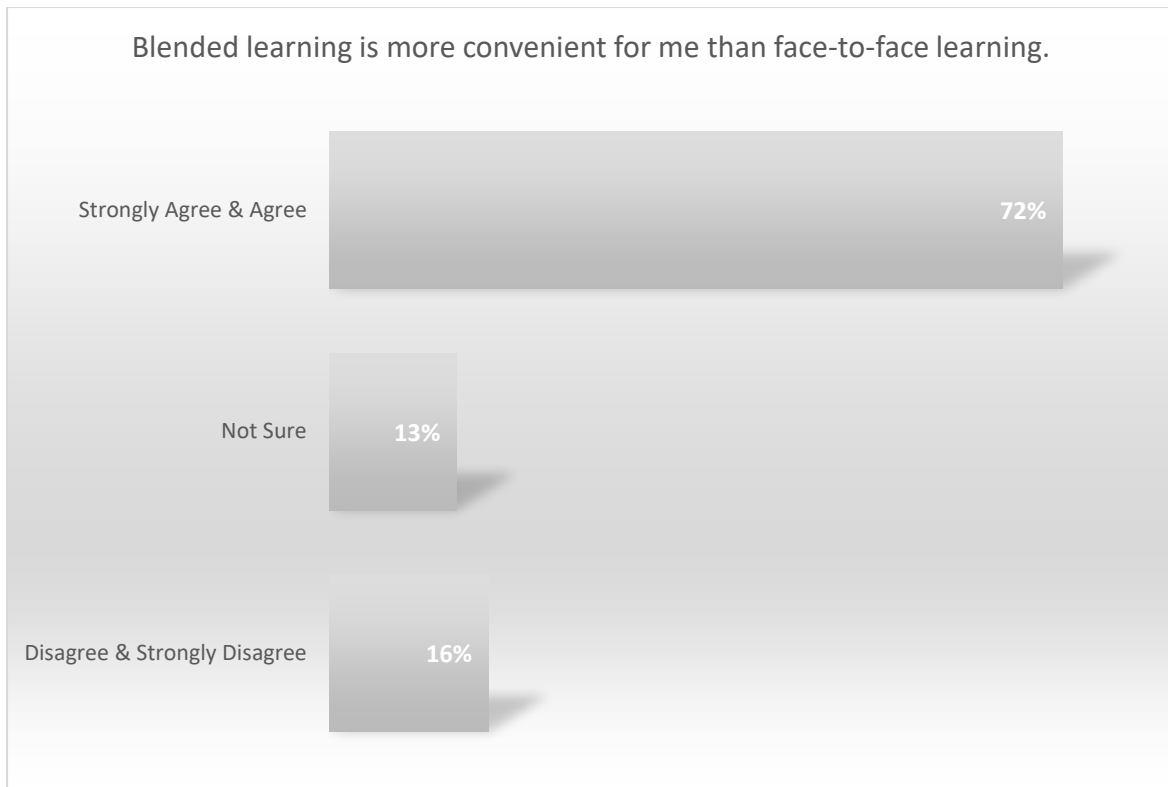


Figure 23. Question 28: Perceived Differences in Modes of Delivery

72% of questionnaire respondents indicated that blended learning is more convenient for them than face-to-face learning while 94% suggested that it offers them more flexibility and allows them to make more efficient use of their time. One student commented “for those commuting to college, blended learning is a brilliant way to attend lectures on time”. Another student (student 3) indicated that if all of their modules were online, it would save them time and money. Student 14 stated that they could cook breakfast while listening and learning online. In a personal interview, student 1 commented “you are getting more efficiencies in terms of being able to manage time better and efficient learning because you can take more notes and access recordings a number of times”. In the focus group, student E stated that if they missed the “live” online lecture on a Monday, they accessed the recording on a Friday. “If I was travelling home for a basketball match, I would listen to the recordings on the train”. These findings support the notion that blended learning offers flexibility and convenience to students as highlighted by previous scholars (Tseng and Walsh, 2016, Waha and Davis, 2014, Owston et al., 2013, Wang et al. 2017). Flexibility can result in a more open education in which students are more involved in their learning and

have greater control (Scott, 2015). The issue of students saving money by not having to commute to college was not identified in the literature but it is an important one to be considered in the integration of a blended approach to any module. In the next section I outline the research findings in relation to the fifth theme of student preference in modes of delivery.

#### **4.6 STUDENT PREFERENCE IN MODES OF DELIVERY**

88% of students surveyed liked the blended approach adopted in the Multimedia Applications module and 97% were satisfied with the lectures conducted “live” online. In a personal interview, student 3 commented “it exposes you to the idea of online meetings and conferences which are frequently used in the corporate world”. Another student, in a personal interview, indicated that there was an excellent balance between online and face-to-face lab practicals. In the focus group, student F stated “the mix of theory online and practicals face-to-face works”.

Students who completed questionnaires perceived the main advantages of blended learning using “live” online lectures to be flexibility, convenience, ability to go back and access the recordings again, ease of access, time management and the ability to ask questions more freely online. One student (student 5) commented “if someone is at home sick, they can still join the lecture”. Another student (student 18) stated “it’s a change from the monotonous face to face lectures incorporated in every educational institution”. In personal interviews, students 1 and 2 indicated that they could leave an online lecture early if they had other things to attend to. Students also highlighted the advantages of flexibility and convenience in the focus group.

Students who completed questionnaires perceived the main disadvantages of blended learning using “live” online lectures to be distractions, technical difficulties including internet access and speed, poor Wi-Fi and audio not working. Another disadvantage identified was interaction. One student (student 27) commented “its slower to answer a question and can slow the class down”.

## 4.7 CONCLUSION

This chapter analysed the primary data collected for this study. It compared and contrasted the results with the literature and linked back to the research objective of critically evaluating the integration of a blended learning approach into a multimedia applications module.

The majority of questions investigated in the area of pedagogical, social and technical design indicate positive results in relation to integrating a blended approach into the Multimedia Applications module. The blended approach provides students with the opportunity to access and view content a number of times and to ask questions easily. Student learning varies with age, programme level and GPA's. Students feel socially included, more comfortable, less stressed and the blend improves communication for some students. It is easy to access the synchronous lecture and troubleshooting technical issues does not negatively impact student learning.

The results are also positive in relation to perceived differences in modes of delivery and student preference in modes of delivery, with flexibility and convenience highlighted as the main benefits. Areas which have inconclusive results include whether students learn more in the "live" lecture than if it was delivered face-to-face, their preference for face-to-face discussions rather than online discussions and whether more sessions in the Multimedia Applications module could be conducted as blended learning. Results suggest that the optimum blend has been reached in that the theory is delivered synchronously online and the practical classes are delivered face-to-face. The next chapter summarises key research findings, highlights the most significant conclusions and makes recommendations arising out of the research.

## **CHAPTER FIVE: CONCLUSIONS & RECOMMENDATIONS**

The aim of this research was to critically evaluate the integration of a blended learning approach into a multimedia applications module in GMIT. The objectives were to critically evaluate the literature in relation to the area of blended learning and to conduct a responsive case study to evaluate the effectiveness of integrating it into a multimedia applications module. Five themes emerged from the literature including: 1) pedagogical design, 2) social design, 3) technical design, 4) perceived differences in modes of delivery and 5) student preference in modes of delivery. These themes formed the pillars for the primary research. My epistemology draws from both social constructivism and pragmatist philosophies and I considered a mixed method study suitable for this research study as it allowed the use of both quantitative and qualitative data to help answer the research question.

Data was analysed and results were presented and discussed under each of the themes identified in the literature review. In the area of pedagogical design, the integration of a blended learning approach has proved a useful experience for students. It provides them with an opportunity to access and view the content a number of times and they find it easier to ask questions via the conversations window in the synchronous lecture. Student learning from the online lectures varies with age, with the younger students learning more in the “live” lecture than the older groups who feel that they learn more in face-to-face lectures. This result does not support the literature which suggests that as students progress through college, they become more independent learners and are less attached to the environment (Owtson et al., 2013, Tseng and Walsh, 2016). This study shows that student learning using a blended approach also varies with programme level, with those on Level 8 programme learning more in the synchronous online lecture than those on Level 7. There are also variations when overall GPAs from the previous year are examined, with those on a lower GPA learning more in the “live” online lecture than face-to-face. This has implications for the delivery of programme modules in GMIT as students from different programme levels (e.g. 7 & 8) are mixed for the delivery of lectures.

The positive results of this study illustrate the importance of a lecturer creating a positive blended learning experience both online and in the classroom which has been highlighted in the past by Dang et al. (2016) and Gecer (2013). Students need and

appreciate clear guidance through the blended learning process. Finding the right blend is also crucial to its successful integration into any module. In this study, students are positive in relation to the blend adopted so one “live” lecture and two practicals seems to be the optimum one in relation to the Multimedia Applications module. However, for other modules and discipline areas it may vary as noted by Waha and Davis (2014) and Shantakumari and Sajith (2015).

In the area of social design, students do not feel socially isolated when accessing the synchronous online lectures. This may be due to the fact that photos of other students are visible and they can communicate via the conversations window at any time. They also meet for two lab sessions each week. Results from this study show that students who may not be confident asking questions in a face-to-face environment participate more in the online lecture through the conversations window. Therefore, a blended learning approach can improve communication for some students as highlighted by previous scholars (Zumor et al., 2013, Chmiel et al. 2017). The majority of students in this study feel that blended learning is less stressful than face-to-face and they are less anxious using it. This supports previous findings by Shantakumari and Saijith (2015). The surprising result in the area of social design is that despite the majority of students feeling socially included, less stressed, less anxious and finding it easy to communicate using a conversations window, their responses are inconclusive in relation to preference of face-to-face discussions or online discussions. This may be because many students like both methods of communication. This is an important factor from the point of view of UDL.

In relation to technical design, the majority of students were able to access the online lectures without any difficulty. However, where problems did arise they were in relation to audio connection and occasionally Wi-Fi connection. Results from this study highlight the importance of communicating possible technical issues to students at the start of the process, minimising such problems, and helping students solve them. In this study, results indicate that because it was the first time a blended learning approach was being adopted in the module, students expected the lecturer to have to troubleshoot issues, but troubleshooting decreased after the initial two lectures. As BIS students, they see this as part of a process rather than a barrier. However, issues of internet connectivity and student access to broadband are crucial to the integration

of the blend as previously highlighted by Waha and Davis (2014) and Atwater et al, (2017).

In relation to perceived differences in modes of delivery, the majority of students felt comfortable when they attended the lecture online although the percentage was higher among students who were in the lower GPA categories. This has implications when integrating a blended learning approach as it illustrates that students with higher GPAs may be less comfortable with attending lectures online.

Students in this study highlight convenience and flexibility as two of the main advantages of the blend adopted in the Multimedia Applications module. It allows them to make more efficient use of their time and they can review content “live” or at a later stage. Previous scholars have also highlighted convenience and flexibility as benefits (Tseng and Walsh, 2016, Wang et al, 2017). One other benefit highlighted by students in this study but not in the literature is the opportunity of blended learning to reduce the cost of commuting to college. This may open up educational opportunities for potential students who are not able to travel.

Overall, the majority of students in this study liked the blend adopted and were satisfied with the synchronous online lectures. Indeed, some of them highlighted that it was a skill that they felt they would need for meetings in industry after they graduate. They embraced the technology and this may be because they see it as a fundamental part of their BIS degree. The final part of this thesis highlights recommendations arising from the research.

Recommendations arising out of this study include 1) research of group needs, 2) timetabling, 3) access, 4) technical support, 5) assessment and 6) further studies. For this study, I, as the lecturer decided on the blend in advance of the module commencing. In a future iteration, the information from this study could be used to inform the decision on the blend. This could involve researching the class needs before the module commences (e.g. GPAs, programme level, age) and involve the students in deciding what blend would be appropriate for their particular group and module. An example of the flexibility of this type of Universal Design for Learning (UDL) was evident in the research by Waha and Davis (2014, p. 174) where all students had equal access to online tools and materials and they could mix them to suit their needs. They also had the option to attend face-to-face sessions.

Timetabling is a key influencing factor for any lecturer who would like to adopt a blended learning approach. In this study, the synchronous online lecture was on Monday 11am and this suited the students as they had no class before this time so they could travel to college later. However, it would not make sense to have them in a lecture from 10 – 11 for one module and then have a synchronous online one from 11-12 as they would not gain the advantages they mentioned as part of this study (i.e. flexibility, convenience). Scheduling of the lecture is therefore a key factor where all of their other modules are being taught face-to-face. In the focus group, some students recommended that the synchronous online lecture could take place on a Friday in preparation for the practical classes the following week. From a lecturer perspective, a dedicated timetabled room in the college for delivery and recording of online lectures is important. The majority of teaching staff share offices so from a noise level perspective, it is not a suitable environment for recording lectures.

Access to content is a critical success factor for integrating a blended learning approach into a module. The more options that a lecturer can provide students, the more flexibility it gives them. In this study, making the recording of the “live” lecture available afterwards is important to students because 1) if they missed the lecture they can catch up, (2) it allows them to revise content and 3) it allows them to go at their own pace. Recommendations for a future iteration of the blend is to record the face to face practicals as they are happening in the laboratories and put up the recordings of these “live” lectures so that students can access them afterwards. This will help them with project work.

In relation to technical support, it is recommended that a manual or guide to troubleshooting technical issues should be prepared and the learnings from this study incorporated. It could be a video, document or both and become part of the introductory session for students at the beginning of the module when the technology is being demonstrated and tested.

As part of the results of this study, some students commented about the importance of the online lecture/meeting as a skill for the outside business world. In this context, it is recommended that in the next iteration, the online lecture/meeting will become part of the assessment process of the module. For example, students could set up and conduct an online revision lecture for other students. In this way, it encourages

students to collaborate as part of their learning and refines their skills for industry when they graduate.

Further studies in the area of blended learning could include an examination of class size in relation to the blend adopted. Is there an optimum class size for blended synchronous learning? In this study, the class size was 40. Would the results differ if I implemented the same strategy for a group of 145 BBS (Bachelor of Business Studies) level 8 students? Further research could be carried out in this area.

This case study has provided in-depth information in relation to the integration of a blended learning approach into a multimedia applications module. While results are not generalizable from a scientific perspective, this was not the purpose of the study. It has provided a descriptive account of a single class, BIS students year 2 at GMIT, experiencing a blended learning approach for the first time and the learnings from this can contribute to the knowledge among lecturers in other schools and institutes who would like to implement a similar blended learning approach.



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# APPENDICES

## Appendix 1. Questionnaire

Integrating a Blended Approach into a Multimedia Applications Module

**Pedagogical Design**

1. Participating in blended lectures was a useful learning experience for me.

Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
☆	☆	☆	☆	☆

Explain your choice

2. I learned more in the "live" online lecture than if the lecture was delivered face-to-face.

Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
☆	☆	☆	☆	☆

Explain your choice.

3. The lecturer encouraged student contributions via the conversations window during the online lecture.

Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
☆	☆	☆	☆	☆

Explain your choice.

4. The lecturer is enthusiastic about teaching the class.

Strongly Agree

Agree

Not Sure

Disagree

Strongly Disagree



Explain your choice.

5. Blended learning improved my opportunity to access and use the class content.

Strongly Agree

Agree

Not Sure

Disagree

Strongly Disagree



Explain your choice.

6. The proportion of "live" online theory lectures and face-to-face lab sessions on this module was appropriate to multimedia applications.

Strongly Agree

Agree

Not Sure

Disagree

Strongly Disagree



Explain your choice.

7. The blend of "live" online lectures and face-to-face components enhanced each other.

Strongly Agree

Agree

Not Sure

Disagree

Strongly Disagree



Explain your choice.

8. Blended learning has improved my understanding of key concepts.

Strongly Agree

Agree

Not Sure

Disagree

Strongly Disagree



Explain your choice.

9. The "live" online lecture was easy to follow.

Strongly Agree

Agree

Not Sure

Disagree

Strongly Disagree



Explain your choice.

10. If I could not attend the "live" lecture, I accessed the recording at a later stage.

Strongly Agree

Agree

Not Sure

Disagree

Strongly Disagree



Explain your choice.

## Social Design

11. I could easily communicate with the lecturer during the lesson when I was online.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

12. I felt socially isolated when I joined the "live" online lesson at a remote site/when I used blended learning.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

13. Blended learning improves communication between students and lecturers.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

14. It was easy to use the conversations window in Skype for Business to communicate.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

15. Would you agree or disagree that you were more anxious using blended learning?

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.



16. Blended learning is less stressful than traditional face-to-face classes.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

17. I prefer participation in face-to-face discussions rather than online discussions.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

## Technical Design

18. I was able to access the "live" online lecture without any problems.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

19. I had technical problems when I joined the online meeting.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

20. I received enough information on how to access the online lecture initially.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

21. I received adequate assistance in case of technical problems faced.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

22. Accessing the online lecture was easy.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

23. Slow internet connectivity was a problem I faced in using blended learning.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

24. The lecturer spent time troubleshooting technical issues for online students and this impacted my learning experience.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

### Perceived Differences in Modes of Delivery

25. I was engaged in the online lecture as much as in the face-to-face classroom.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

26. I felt more comfortable when I attended the lecture online rather than in the classroom.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

27. I believe that blended learning can have an improved learning experience than face-to-face classroom learning.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

28. Blended learning is more convenient for me than face-to-face learning.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

29. Blended learning offers me more flexibility.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

### Student Preference

30. I prefer attending a lecture via skype for business rather than attending it in the classroom.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

31. Blended learning allows me to make more efficient use of my time.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

32. I would choose online "live" lectures if I am given this option in another module.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

33. More sessions in this module could be conducted as blended learning.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

34. An option for further development could be to develop practical lab sessions online. Would you agree or disagree?

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

35. I like the blended "live" learning approach adopted in this module.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

36. Overall, I am satisfied with the lectures conducted "live" online.

Strongly Agree

Agree

Unsure

Disagree

Strongly Disagree



Explain your choice.

### Benefits and Challenges of Blended Learning

37. In your opinion, what are the advantages of blended learning using "live" online lectures?

38. In your opinion, what are the disadvantages of blended learning using "live" online lectures?

### Demographics

39. Programme

- BSc in Business Information Systems Level 7
- BSc in Business Information Systems Level 8

40. Gender

- Male
- Female

41. Age

- 18 - 20
- 21 - 23
- Over 23
- Prefer not to comment

42. What is your current overall GPA (grade point average) from last year?

- 70 - 100
- 60 - 69
- 50 - 59
- 40 - 49
- 35 - 39

## Appendix 2. E-mail Invitation for focus group and follow-up sent to students

Dear

You are invited to participate in a focus group in relation to integrating a blended approach into the Multimedia Applications module. The focus group consists of yourself and 9 other classmates who will have a discussion on the topic. Participation is entirely optional. The research is important, as it seeks to establish whether the use of the "live" online lecture in conjunction with face-to-face lab classes is beneficial to students or not. Your contribution is important, and we would value your input. Details:

Monday 27th November 2017

Time: 11 - 12 (our usual "live" lecture slot)

Venue: Meeting room 1 (top floor, new building).

Tea, coffee and biscuits will be provided.

If you would like to help us in this research, please reply to Lucia by Monday 20th November 2017.



Multimedia Blended Learning Focus Group

Conversations Files Calendar Notebook \*\*\*

Hello Everyone

Thank you all for agreeing to participate in the discussion next Monday. It seeks to establish whether the use of the "live" online lecture in conjunction with face-to-face lab classes is beneficial to students or not. Your contribution is important, and we value your input. The discussion centres around the questions you have already answered in the questionnaire online but it provides an opportunity for you to have a group conversation about it. Tea, coffee and biscuits at 11am, followed by discussion.

Monday 27th November 2017

Time: 11 – 12 (our usual "live" lecture slot)

Venue: Meeting room 1.

Regards

Lucia

### **Appendix 3. E-mail Invitation for personal interviews sent to students**

Dear

You are invited to participate in a personal interview in relation to integrating a blended learning approach into the Multimedia Applications module. The interview consists of a face-to-face discussion about the topic and should take approximately 30 minutes. Participation is entirely optional. The research is important, as it seeks to establish whether the use of such an approach is beneficial to students or not. Your contribution is important, and we would value your input.

If you would like to help us in this research, please reply to Lucia by Monday 20th November 2017. The individual interviews will take place during the week beginning 4th December, on a date and time that suits your schedule.

Regards

Lucia



## **Appendix 4. Participant Information Leaflet**

1. Title of study: A critical evaluation of integrating a blended learning approach into a multimedia applications module.
2. Introduction: The purpose of the study is to critically evaluate the integration of a blended learning approach into the Multimedia Applications module. Literature will be reviewed in relation to the concept of blended learning, educational design research and student perceptions of blended learning. A Mixed Methods approach will be used to evaluate the integration of a blended learning approach from a student perspective. Questionnaires, a focus group and personal interviews will be used for data collection. All students will be involved in the module implementation from September 2017 – December 2017. As part of the module delivery, students are required to participate in a minimum of 4 synchronous online lectures. 10% of the overall assessment marks are allocated to participation in synchronous online sessions. Participants chosen for the evaluation of the re-design will be involved during a three-week period (13<sup>th</sup> November 2017 – 1<sup>st</sup> December 2017). The definition of blended learning for the purpose of this study is the combination of “live” online lectures via Skype for Business with face-to-face practical classes in the laboratories.
3. Procedures: Part one of the data collection will focus on a questionnaire. Purposive sampling will be used for the questionnaire. The sample will consist of 40 second year students studying a BSc in Business Information Systems, Levels 7 & 8. The module identified is “Multimedia Applications” which is a mandatory module with 100% continuous assessment. Demographic data will be collected in relation to gender, age, level of programme of study and Grade Point Average (GPA) from last year. No incentives will be provided for participation in the study. Part two of the data collection process will be a face-to-face focus group with 6-8 students using similar content to the questionnaire. Systematic random sampling will be used for the focus group. Every 4<sup>th</sup> person on the student register list will be chosen. The final part of the data collection process will be personal interviews with 3 students. Every 9<sup>th</sup> person on the list will be chosen.
4. Benefits: The study will be of benefit to students as student perceptions will contribute to the re-design of the module and their needs addressed. It will also be of benefit to lecturers who would like to integrate blended learning into their modules but don’t know where to begin.
5. Risks: There are no material risks, discomforts or side effects involved in participating in the study.
6. Exclusion from participation: You cannot participate in this study if you have not participated in at least 4 synchronous online lectures.
7. Confidentiality: Your identity will remain confidential. All identifying features will be removed. Your name will not be published and will be coded in any publication (e.g. student 1, student 2).
8. Compensation: This study is covered by standard institutional indemnity insurance. Nothing in this document restricts or curtails your rights.

9. Voluntary Participation: You have volunteered to participate in this study. You may withdraw at any time. If you decide not to participate, or if you withdraw, you will not be penalised and will not give up any benefits that you had before entering the study.

10. Stopping the study: You understand that the investigators may withdraw your participation in the study at any time without your consent.

11. Permission: This research will be submitted to the MA in Teaching & Learning Research Ethics Committee for approval.

12. Further information: You can get more information or answers to your questions about the study, your participation in the study, and your rights, from Lucia Cloonan who can be telephoned at 091 770555 Ext 2376 or e-mail [lucia.cloonan@gmit.ie](mailto:lucia.cloonan@gmit.ie). If the study team learns of important new information that might affect your desire to remain in the study, you will be informed at once.

## Appendix 5. Informed Consent Form

Informed consent is an important ethical principle in data gathering. Howe & Moses (1999, p. 21) suggest that respondents have the right to assess the risks and benefits of being involved in a piece of research, and decide for themselves whether to take part. In this study, students will be free to choose to take part (or not). Lucia will retain the original of a signed consent form in a secure file on an external hard drive and give one copy to the participant. The first form will be used prior to the questionnaires being distributed.

<b>Project Title:</b> A critical evaluation of integrating a blended learning approach into a multimedia applications module.		
<b>Principal Investigator:</b> Lucia Cloonan		
<p><b>Background:</b> The purpose of the study is to critically evaluate the integration of a blended learning approach into a multimedia applications module. As part of the module delivery, students are required to participate in a minimum of 4 synchronous online lectures. 10% of the overall assessment marks are allocated to participation in synchronous online sessions. Participants chosen for the evaluation of the re-design will be involved during a three-week period (13<sup>th</sup> November 2017 – 1st December 2017). Three instruments will be used: (1) questionnaire, (2) focus group, and (3) personal interviews. Participation in the evaluation of the blended learning approach is optional for every student. Those who do participate are assured of confidentiality at all times. You may participate in no more than two of the data collection methods. For example, you may complete a questionnaire and also be involved in a focus group or personal interview. If you are chosen for a focus group, you will not be involved in a personal interview and vice versa. If you are chosen for a focus group and can't attend on a particular date, you may become involved in a personal interview instead, if you choose to.</p>		
<b>Participant Declaration:</b>		
Tick yes or no as appropriate.		
I have read or have had the information sheet read to me and I understand the contents.	<b>Yes</b>	<b>No</b>
I have been given an opportunity to ask questions and am satisfied with answers.	<b>Yes</b>	<b>No</b>
I have given consent to take part in the study.	<b>Yes</b>	<b>No</b>
I understand that participation is voluntary and that I can withdraw at any time.	<b>Yes</b>	<b>No</b>
I understand that withdrawal will not affect my access to services or legal rights.	<b>Yes</b>	<b>No</b>
I consent to possible publication of results.	<b>Yes</b>	<b>No</b>
<b>I (the participant) give my permission to:</b>  use the data obtained from you in other future studies without the need for additional consent.	<b>Yes</b>	<b>No</b>
<b>Researcher Declaration:</b>		
Tick yes or no as appropriate.		

I have explained the study to the participant.	<b>Yes</b>	<b>No</b>
I have answered questions put to me by the participant about the research.	<b>Yes</b>	<b>No</b>
I believe that the participant understands and is freely giving consent.	<b>Yes</b>	<b>No</b>

**Participant's Statement:**

I have read, or had read to me, this consent form. I have had the opportunity to ask questions and all my questions have been answered to my satisfaction. I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights. I understand I may withdraw from the study at any time. I have received a copy of this consent form.

Participant's Name:

Contact Details:

Participant Signature: (where participant is over the age of 18)

Date:

**Researcher's Statement:**

I have explained the nature and purpose of this research study, the procedures to be undertaken and any risks that may be involved. I have offered to answer any questions and fully answered such questions. I believe that the participant understands my explanation and has freely given informed consent.

Signature:

Date: