RESEARCH PROPOSAL SUBMISSION COVER SHEET
(MSC APPLIED E-LEARNING)

This sheet should be completed and signed and should accompany your research proposal submission for the Educational Research Design module.

Module Title: Educational Research Design
ECTS credits: 10 ECTS

Participant name: Gerard Kilkenny

Participant Student Number: D15128959

Programme of Study: MSc Applied eLearning

Date of Research Proposal Submission: 29th June 2017

Module Tutor Name(s): Dr Claire McAvinia, Dr Ita Kennelly

For reference, the programme learning outcomes are provided below.

Programme Learning Outcomes

On successful completion of this programme, graduates will be able to:

Knowledge

1. Demonstrate a thorough understanding of the theory of, and best practice in, eLearning in a range of educational contexts;
2. Demonstrate an awareness and understanding of current eLearning technologies and the challenges and opportunities associated with each.

Know-how and Skill

1. Identify instances and conditions where eLearning would be appropriate and evaluate its potential, and use, within different contexts;
2. Apply a thorough grounding in the theory and practice of eLearning in a range of contexts;
3. Create and evaluate strategies for the effective use of eLearning in a range of Higher Education learning environments;
4. Conduct critically focused literature reviews relevant to the use of eLearning within their selected discipline area;
5. Design a constructively aligned module integrating the appropriate use of eLearning technologies;
6. Design specific eLearning applications/resources and evaluate them to determine their value according to specified criteria;
7. Sustain from the research evidence obtained from the undertaking of an eLearning project, a reasoned argument and draw consistent and coherent conclusions;
8. Reflect self-critically on the process and outcomes of a development and eLearning implementation project.

Competence

1. Manage the design, development, implementation and evaluation of a number of appropriate eLearning resources;
2. Engage in research to evaluate the effective use of eLearning resources within a Higher

Education environment.
Submission Checklist and Declaration To ensure that the focus of the assessment of your assignment will be on the development of the higher order skills and competences associated with a level 9 qualification, please complete the checklist and declaration below. The checklist specifies the mechanical and lower order concerns that need to have been met before you can submit your work. I declare that the assignment I am submitting;

Has been proofread thoroughly for typographical errors. Meets the word count specification. Follows the recommended structure and format. Contains citations and references that have been formatted according to the guidelines provided. I understand that my work can be returned uncorrected if the criteria above have not been fulfilled.	Yes Yes (3,295 + 550) Yes Yes Yes
Signature: *Gerard Kilkenny*	Date: 29/06/17

Research Proposal

Gerard Kilkenny

Introduction

This research proposal makes the case for the creation of adaptive learning content for mathematics. Since the author's experience is of the Irish post-primary sector, the scope of the proposed research is Junior Certificate Mathematics. This leads to my research question: "How can an adaptive learning domain model, for post-primary mathematics, be designed, developed and evaluated?"

A rationale for the proposed research project is outlined followed by the research objectives. The literature review should provide the reader with an understanding how adaptive learning is modeled, as well as giving a historical perspective of the development of Adaptive Educational Hypermedia Systems (AEHS) and Intelligent Tutor Systems (ITS). Authoring systems are required to build AEHS/ITS and one of the reasons for the dearth of adaptive learning content is the difficulty of building user-friendly authoring systems to create this content.

The research design proposed stems from a constructivist perspective of how knowledge, concepts and skills are created and transmitted in the process of teaching and learning mathematics. The author suggests that the representation of mathematical concepts, in what is called the *Domain Model* (DM) of an AEHS is particularly challenging, and possibly new territory for post-primary mathematics. The ethical considerations, delimitations and limitations of the research project are outlined and discussed. Finally, the design and development of the digital artefact encapsulating the DM is presented.

Context and Rationale

The proposed research is motivated by a number of issues. First, the effectiveness of AEHS and ITS has been acknowledged in numerous research studies (Kulik & Fletcher, 2016). Second, a domain model is an essential part of an AEHS (Vrablecova & Simko, 2016). Third, the Junior Certificate Mathematics syllabus does not comprehensively define the learning content nor does it define connections between concepts (Department of Education and Science, 2016). Fourth, existing hard copy and non-hyperlinked electronic versions of textbooks are by their very nature unsuitable for adaptive learning. Fifth, in recent years there has been a paradigm shift from whole class instruction to individualised learning. Adaptive learning can support this shift (Jenkins, Williams, Moyer, George, & Foster, n.d.). Finally, many students do not properly understand the connections between concepts. This problem is acknowledged in the first report from the Chief Examiner for Junior Certificate Mathematics since

'Project Maths' was initiated: "Candidates had great difficulty when required to make connections between a function and its graph in Paper 1, Question 13." (State Examinations Commission, 2016).

Aims and Objectives

The overall aim of the research is to design, develop and evaluate an adaptive learning domain model for post-primary mathematics. This aim may be broken down into the following objectives:

(a) Identify topics in Strands 4 and 5 of the Junior Certificate Mathematics syllabus that have strong ontological connections, and use them the domain model.

(b) Design a domain model for the identified topics by using the syllabus and the recent past Junior Certificate examination papers.

(c) Design and develop a digital artefact that will contain the domain model.

(d) Evaluate the domain model embedded in the digital artefact.

Literature Review

Background

Many researchers refer to the "one-size-fits-all" static content that migrated analogously from student books to electronic format. Static content exhibits none of the benefits of interaction and personalisation offered by AEHS (Šimko, Barla, & Bieliková, 2010; Brusilovsky, 2001).

An AEHS is a Web-based system that adapts to the needs of different users by building a *User Model* (UM) of their goals, preferences and knowledge. Personalised e-learning is achieved through the use of adaptive systems (Brusilovsky, 2001). AEHS were originally developed between 1990 and 1996 by either taking existing ITS and adding hypermedia components or by taking existing educational hypermedia and adding adaptive features (Brusilovsky, 2003). For a system to be classified as an Adaptive Hypermedia System (AHS), it should satisfy three criteria: it should have hypertext or hypermedia, a UM, and the ability to adapt the hypermedia using this UM (Brusilovsky, 1996).

Adaptive Learning Models

Some of the adaptive authoring tools that have been built to create personalised e-learning activities are based on abstract designs or reference models (O'Donnell, Lawless, Sharp, & Wade, 2015). Figure 1 below shows one such design: AHAM, the Adaptive Hypermedia Application Model. The diagram displays the essential components of an AEHS: the *User Model* (UM), the *Domain Model* (DM) and the *Teaching Model* (TM). In AHAM, these are collectively called the *Storage Layer* (De Bra, Houben, & Wu, 1999). The Teaching Model is also known as the *Application Model* (AM) (Aroyo, De Bra, Houben, & Vdovjak, 2004).

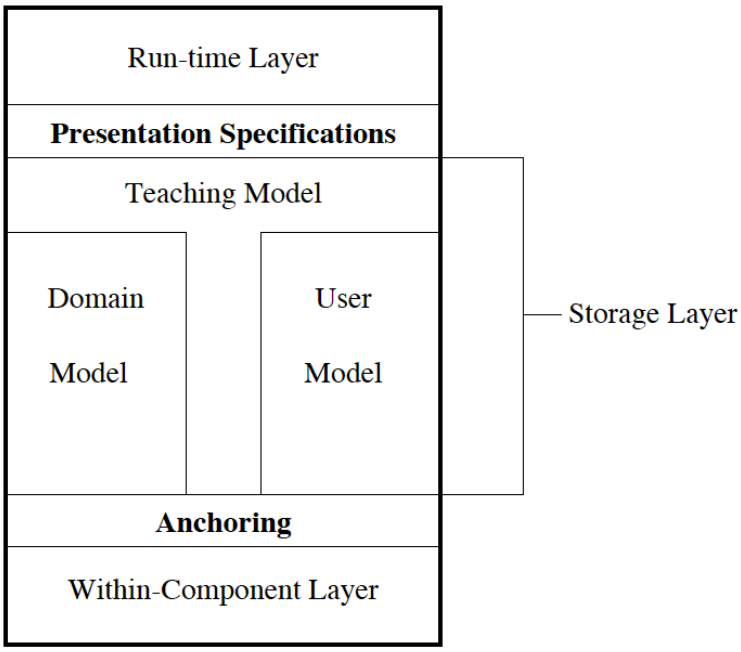

Figure 1: The AHAM model

The *Domain Model* is a semantic structure of concepts and the relationships between these concepts (Aroyo et al., 2004). Since the research objectives include developing and evaluating a DM for mathematics, this model is explored in more detail below.

In truly personalised systems, the *User Model* can represent the user's knowledge, interests, goals, background, and individual traits. In ITS, the *User Model* is known as the *Student Model* and represents mainly the user's knowledge of the subject or domain. Since user knowledge is the principal feature being modelled in the UM of an AEHS or ITS, adaptive learning systems often use what is known as an *overlay model*. In Fig 1.3 below, an overlay model is used to represent the user's knowledge of the various concepts in the DM as a number (scalar) from 0 to 10 (Brusilovsky & Millán, 2007).

The *Teaching Model* contains a set of pedagogical rules (De Bra et al., 1999). These rules are used by an *adaptive engine* to generate personalised content based on the learners' knowledge and performance stored in the UM (Vassileva, Bontchev, Chavkova, & Mitev, 2009). An adaptive engine is the software that is used to construct and adapt content and links based on elements from the DM, UM and TM (Wu, Houben, & De Bra, 1998). In the case of AHAM, the adaptive engine uses the pedagogical rules to manipulate link anchors from the *anchoring* and to generate the *presentation specifications* (refer to Figure 1 above) for the personalised content (Wu, Houben, & De Bra, 1999).

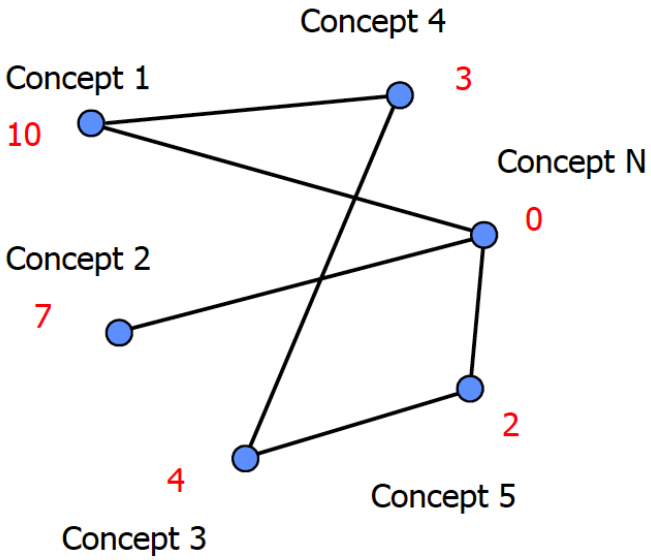

Fig. 1.3. A network domain model with a simple numeric overlay user model

The Case for Adaptive Learning and ITS

Most of the eLearning course materials available today are oriented for a homogeneous audience of well-prepared and well-motivated students who have access to teachers. However, learners have very different goals, knowledge levels, and learning capacity. Surely there is an *a priori* case to make for students to receive personalised content and a personalised order of presentation? The consequence of "one-size-fits-all" non-adaptive static content is that some students waste time by reading material that they already know, while others are presented with content that is beyond their current capabilities (Brusilovsky, Eklund, & Schwarz, 1998).

In a meta-analysis of 50 controlled evaluations of ITS, (Kulik & Fletcher, 2016) describe evaluations that were carried out on four continents over the course of nearly three decades. They reported an effect size of 0.66 and this is considered to be moderate to large. Another meta-analysis involving 14,321 participants established an effect size of 0.57. It discovered that the use of ITS was linked with significantly higher achievement outcomes than all other modes of instruction except small-group human tutoring and individual human tutoring (Ma, Adesope, Nesbit, & Liu, 2014).

Adaptive Authoring Tools

Given the *a priori* case for adaptive learning, and the evidence for the effectiveness of ITS, why is adaptive learning not more prevalent today? It appears that the main barrier to the mainstream adoption of adaptive learning is the complexity of existing authoring tools (O'Donnell, Sharp, Wade, & O'Donnell, 2013). It appears that most serious attempts to build practical authoring tools for adaptive learning have been driven by academics working in universities. There are at least three strands of

authoring tool development that this author has identified, and specific adaptive learning models underpin these strands. The development work occurred between 1996 and 2013, and to a large extent the three strands occurred simultaneously. The first authoring tools were developed by Peter Brusilovsky and his team at Pittsburgh University and led to the development of InterBook in 1996 (Brusilovsky et al., 1998). He followed this up with KnowledgeTree two years later (Brusilovsky, 2004). The second strand was based on the AHAM model and is associated with Paul De Bra and his team of researchers in Technical University, Eindhoven (TU/e). He instigated the development of AHA! in 2003 and its development continued until 2007 (Wu et al., 1999; De Bra, 2007). One year after the development of AHA! was frozen, the GRAPPLE project began. This was a significant collaborative initiative comprising TU/e (Paul De Bra), University of Warwick (Alexandra Cristea), Trinity College, Dublin (Vincent Wade) and a number of other third level institutions and private companies (GRAPPLE, 2011; Smits & De Bra, 2011; De Bra et al., 2013). Alexandra Cristea and her team in University of Warwick created the third strand of authoring tools. They developed a tool called My Online Teacher (MOT) between 2000 and 2007 which was based on an adaptive architecture called LAOS (Cristea, 2007). Having evaluated the authoring tools that emerged from these three stands, I propose to use the GRAPPLE tools to develop the digital artefact that will embody my domain model.

Towards a Domain Model for Mathematics

The user's knowledge of the subject being taught seems to be the most important user feature for existing AES and AHS (Brusilovsky & Millán, 2007). The importance of a domain model is underscored by Šimko (2012) who states that the "adaptation engine responsible for advanced functionality in the educational system relies on the domain model semantically describing subject domain."

The primary documentation that will be used to create the concepts for the domain model in this research project will be the Junior Certificate Mathematics syllabus (Department of Education and Science, 2016) and the Junior Certificate examination papers (State Examinations Commission, n.d.). The syllabus defines the topics and learning outcomes for each of the five strands. Each year, a new examination paper is created as a summative test of students' knowledge and understanding of the syllabus. The proposed creation of a network domain model (see Fig 1.3 above) is implicitly encouraged in the syllabus which states that "in each strand, and at each syllabus level, emphasis should be placed on making connections between the strands…" (Department of Education and Science, 2016).

Research Design

Theoretical Perspective

My proposed research is essentially an ontological and pedagogical exploration of how mathematical concepts can be explicitly structured and sequenced to form the foundation layer (domain model) of an adaptive learning system. Since there is no universal agreement as to how learning occurs, it is not a foregone conclusion that a group of mathematics practitioners will all agree on how to structure and sequence mathematical concepts for optimal learning. In the 'Description of Artefact' section below, I describe how I plan to design and develop the domain model. To evaluate my model, I plan to use a range of mathematics practitioners, working in different but complementary areas of mathematics education, to ascertain the value of this domain model. I also hope to elicit from these practitioners suggested changes to the model that, in their opinion, would improve it. I believe that my understanding of how best to teach mathematics is inextricably linked to how I was taught to teach the subject, my experience of teaching mathematics, my interactions with fellow professionals, and my experience of authoring eLearning content. These experiences over the past thirty-three years have yielded a constructivist perspective of the teaching and learning of mathematics. This perspective is consistent with an ontological position that learning is a social phenomenon produced through social interaction (Grix, 2002). Consequently, I will be adopting an inductive approach to the proposed research (Gray, 2013).

Methodology

The evaluation of adaptive learning is a complex research question and it has been suggested that case study methodology is the one best suited to this task (O'Donnell et al., 2015). This is because case studies can be used to achieve a deeper understanding of the complexity inherent in developing adaptive learning applications (Zainal, 2007).

The labeling of some research designs (e.g. experimental) automatically suggests the epistemology (objectivist), theoretical perspective (interpretivist), approach (deductive), methodology (experiment/survey), and data collection methods (sampling/quantitative). Historically, case study research was associated with qualitative research only but over the past 40 years, it has undergone significant change. Case studies can now be a methodology or a method, have an inductive or deductive approach, can use qualitative or quantitative methods, and have been variously referred to across the literature as approach, design, strategy, and inquiry (Harrison, Birks, Franklin, & Mills, 2017).

Due to the variety of case study designs available, compounded by the ambiguous terminology, I think it is important to outline the characteristics of my research design. In my research study, I plan to take an approach that emphasises inductive logic, seeks the opinions and subjective accounts of participants, relies on qualitative analysis of data and the research study will be more concerned with contextual description and analysis then trying to generalise to a larger population.

Finally, case studies by definition have an *object* or *topic of interest* (Harrison et al., 2017). In the proposed study, there are two objects: a *process* and a *product*. The case study will seek to *describe the process* of creating the digital artifact and to *qualitatively evaluate the product* (a domain model abstract embedded in a digital artifact).

Methods

The data collection sources for the case study can be divided into data that will be collected (a) as part of the *process* of developing the digital artefact (b) during the evaluation of the *product* (the domain model).

The development of the digital artefact will use Government publications as its data sources. It is planned to extract data from the syllabus (one PDF file) (Department of Education and Science, 2016) and from the Junior Certificate Mathematics examination papers from 2012 to 2017 inclusive (six PDF files) (State Examinations Commission, n.d.).

The evaluation of the domain model will use as its data source eight participants from the following categories (numbers in brackets) who will all be interviewed individually after an exposition and explanation of the domain model:

(a) Mathematics teachers (2)
(b) Text book authors (2)
(c) Department of Education and Science mathematics inspectors (1)
(d) Lecturers in mathematics education in third level colleges (1)
(e) State Examinations Commission personnel (Mathematics) (1)
(f) Adaptive learning practitioners (1)

In order to build *validity* into the research process, I propose to ask a larger number of teachers to complete an online questionnaire. This means it should be possible to triangulate the dataset from the interviews with the dataset from the survey and to possibly make a case for generalising the research

findings. The teachers will be provided with a web link to the domain model and asked to evaluate aspects of the model by completing the questionnaire. I plan to contact these teachers through the Irish Mathematics Teachers' Association and I hope to get upwards of fifty responses (IMTA, 2017). The eight interviewees will also be asked to complete the questionnaires.

It is important that another researcher doing the same case study can replicate its findings and conclusion. If these conditions for *reliability* are to be achieved, then it is important that procedures are conscientiously documented throughout the research process (Yin, 2014).

Ethical Considerations

'Codes of Ethics' have been development by professional associations whose members engage in research. In the UK, the British Educational Research Association (BERA) has published ethical guidelines for the conduct of educational research (BERA, 2011). In Ireland, the universities have published a policy statement on research integrity (Irish Universities Association, n.d.).

In relation to the face-to-face interviews, I plan to mitigate any ethical issues that may arise in my research study by using the principle of voluntary informed consent. An information sheet will be given to each participant containing my contact details, purpose of the research, methods to be used, possible outcomes and what will be required of the participant, e.g. time involved, number of meetings, meeting duration and location. If the interviews are to be recorded, the participants will be made aware of this and will need to provide their consent by signing a form. They will be made fully aware that participation is voluntary and that they can withdraw from the research study at any juncture. The confidentiality of the data collected and the anonymity of the participants will be protected at all times. Appropriate use of computer passwords and data encryption will help to ensure that personal data is not compromised (BERA, 2011; Irish Universities Association, n.d.).

A 'Research Ethics Decision Tree', preferably supplied by the institution where the research is to be carried out, can be a helpful construct for deciding precisely what documentation needs to be submitted with a research proposal (Dublin Institute of Technology, 2017c). For example, if the answers to the questions 'Do you plan to publish your research?' and 'Will your research take place in DIT?' are both in the affirmative, then an application to the Research Ethics Committee (REC) should take place prior to the commencement of any data collection (Dublin Institute of Technology, 2017a). The REC have an online facility for DIT staff who wish to submit a research application (Dublin Institute of Technology, 2017b) .

Delimitations and Limitations

It has been suggested that the models in the classic DM/UM/TM architecture can guide a *layered* evaluation process so as to inform the design of an overall AEHS before it is built (Brusilovsky, Karagiannidis, & Sampson, 2004). However, Brusilovsky et al make no suggestion as to how the DM layer might be evaluated and I am unaware of any standard procedure for doing so in the literature. Therefore, it is possible one of the two objects of the case study, the evaluation of the domain model, will be exploratory in nature. In choosing the participants for the proposed research study, I will not be using a random sample. Therefore, the data resulting from the interviews and questionnaires will not be generalisable to some larger population.

The research question limits the scope of the research study to a domain model and to post-primary mathematics. Although the adoption of a domain model as part of the architecture of adaptive learning is almost universally accepted in the literature, I am unaware of studies that describe how to build domain models in general and domain models for mathematics in particular. For the purpose of this research study, the scope of post-primary mathematics has been further narrowed to *Patterns* from Strand 4 and *Functions* from Strand 5 of the Junior Certificate syllabus (Department of Education and Science, 2016) and to the examination papers from 2012 to 2017 inclusive (State Examinations Commission, n.d.).

Outline of Timescales

The table below illustrates the probable timescales for the proposed research project:

FROM	**TO**	**DESCRIPTION**
01/09/17	31/10/17	Design and develop Digital Artefact – Part 1 (MS Office)
01/11/17	31/12/17	Design, develop and test Digital Artefact – Part 2 (GRAPPLE)
01/09/17	31/12/17	Design interview format, create interview topics/questions
01/09/17	31/12/17	Design online survey, create survey topics/questions
01/01/18	31/01/18	Implement online survey of IMTA members
01/02/18	28/02/18	No research work during correction of school examinations
01/03/18	14/04/18	Conduct interviews with the eight participants
15/04/18	30/04/18	Implement data analysis
01/05/18	30/06/18	Write Research Paper

Summary

Research suggests that the best approach to achieving adaptive learning activities is to separate the domain and application models (Aroyo et al., 2004). In recent years, there has been a shift from building a system as a whole to separating its different components (Cocea & Magoulas, 2015). The research project, as proposed, is consistent with this approach. If the results from the evaluation are positive, the next step may be to build a prototype adaptive learning system for mathematics comprising the domain model (already built), user model, application model and adaptive engine.

Description of Artefact

Creating the artefact will be a two-part process. Part one of the design and development of the domain model will involve parsing the syllabus into a set of mathematical concepts for a 'Topic 1' (*Patterns* from *Algebra* - Strand 4) linked with another set of mathematical concepts for a (related) 'Topic 2' (*Functions* - Strand 5) (Department of Education and Science, 2016). Applications from the Microsoft Office suite (Microsoft, 2017) will be used for Part one using the following procedure:

(a) Impose a structure on the PDF syllabus by converting it to a Microsoft Access database. See **Figure 1** below – an early **Access** prototype.

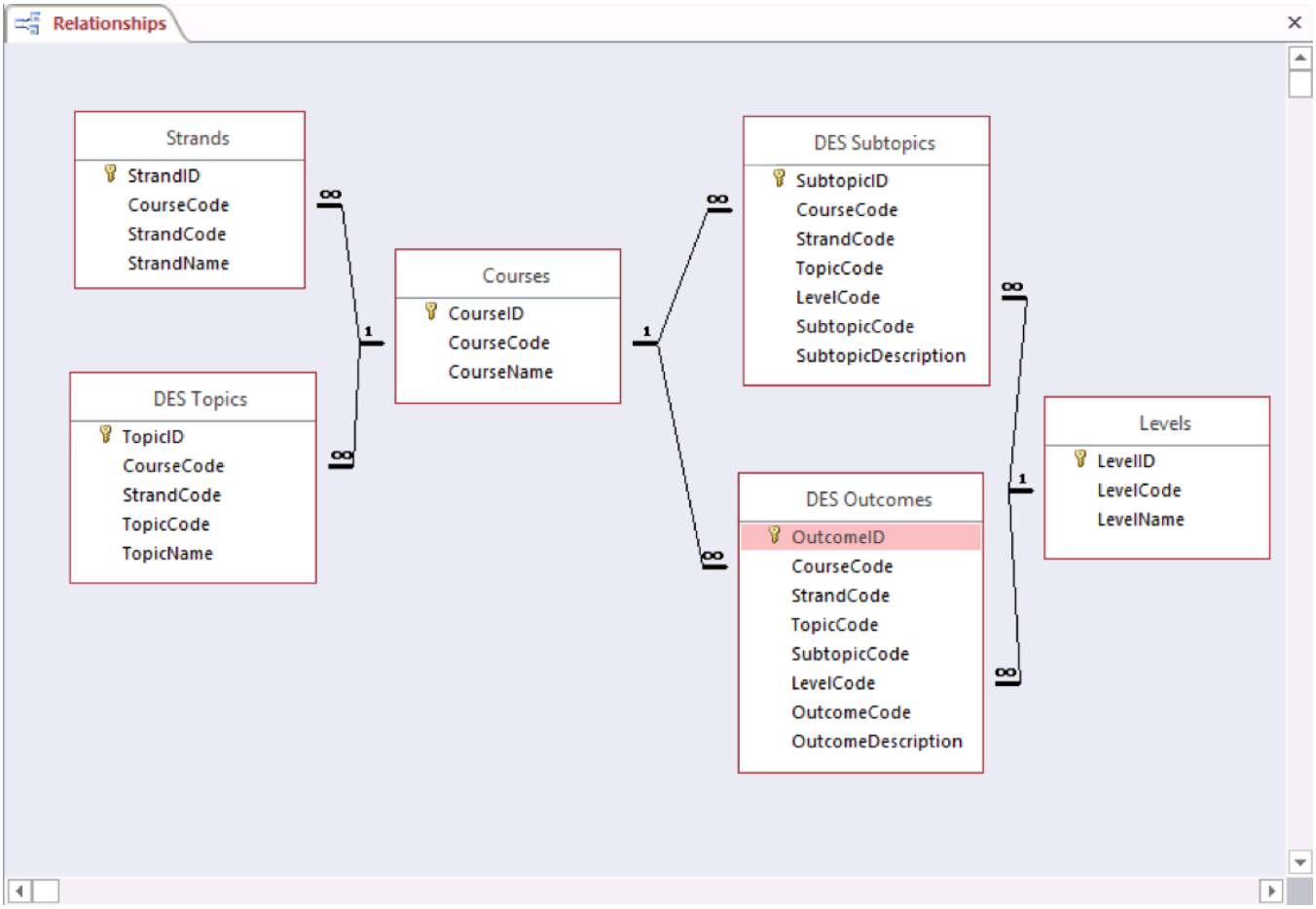

Figure 1 (Microsoft Access)

(b) Identify the pertinent concepts for *Patterns* and *Functions*, by keywords and phrases, with reference to the syllabus.

(c) Extract the keywords and phrases that describe these concepts by copying and pasting them into a Microsoft Excel spreadsheet. Bloom's Taxonomy will be used to rate the concepts. See **Figure 2** below – an early **Excel** prototype.

	A	B	C	D
1			KEY WORDS	
2	**Patterns**	**Patterns**	**Functions**	**Functions**
3				
4	**BLOOM: 1-Remember, 2-Understand**			
5	positions		inputs	domain
6	terms		outputs	range
7	(position, term)		(input, output)	ordered pair or couple
8				
9				
10	**BLOOM: 4-Analyse, 3-Apply**		function machine	mapping diagram
11	position -> position-to-term rule -> term		part 1 (add)	constant
12			part 2 (multiply)	coefficient
13				
14	**BLOOM: 4-Analyse, 3-Apply**		input ->	domain element ->
15	position -> position-to-term rule -> term		function machine rule ->	mapping diagram rule ->
16			output	range element
17	**BLOOM: 1-Remember, 2-Understand**			
18	nth term	Tn	function of x	f(x)
19				
20	**BLOOM: 4-Analyse, 3-Apply**			
21	linear sequence	first difference	linear function	
22	quadratic sequence	second difference	quadratic function	

Domain 1

Figure 2 (Microsoft Excel)

(d) Sequence the concepts for *Patterns* by identifying which concept(s) is/are a pre-requisite(s) for other concepts(s).

(e) Create links between concepts in *Patterns* and *Functions* that are ontologically analogous to one another using Microsoft Excel. (This has been partially achieved by placing analogous concepts on the same row of the spreadsheet in **Figure 2** above).

(f) Create a new relational database structure in Microsoft Access to represent the sequenced and linked concepts in the spreadsheet.

(g) Identify the questions in recent past Junior Certificate examination papers which have examined students' knowledge and understanding of concepts from *Patterns* and *Functions*.

(h) Impose a structure on the PDF examination papers by linking questions (and parts of questions) on *Patterns* and *Functions* with syllabus topics, sub-topics, keywords and phrases in the Microsoft Access database. This will be achieved by creating new database tables and relationships for these questions.

Part two of the design and development of the domain model will involve using the GRAPPLE

Authoring Tools (GAT) to create XML code to build a domain model that will work in the GRAPPLE Adaptive Learning Environment (GALE). This will involve the following procedure:

(a) Write XML code to represent the domain model abstraction in the Access database.

(b) Create learning objects for the linked concepts in the domain model (Wiley, 2009). These learning objects will be PDF files created from the questions (and parts of questions) on *Patterns* and *Functions* that were extracted from the past Junior Certificate examination papers in Part one (earlier).

(c) Create a list of URLs, using a nomenclature for the PDF files based on the Access database table that stores the actual questions in these files.

(d) Create links in GALE between the concepts in the domain model and their corresponding learning objects on the web.

(e) Test the domain model in GALE.

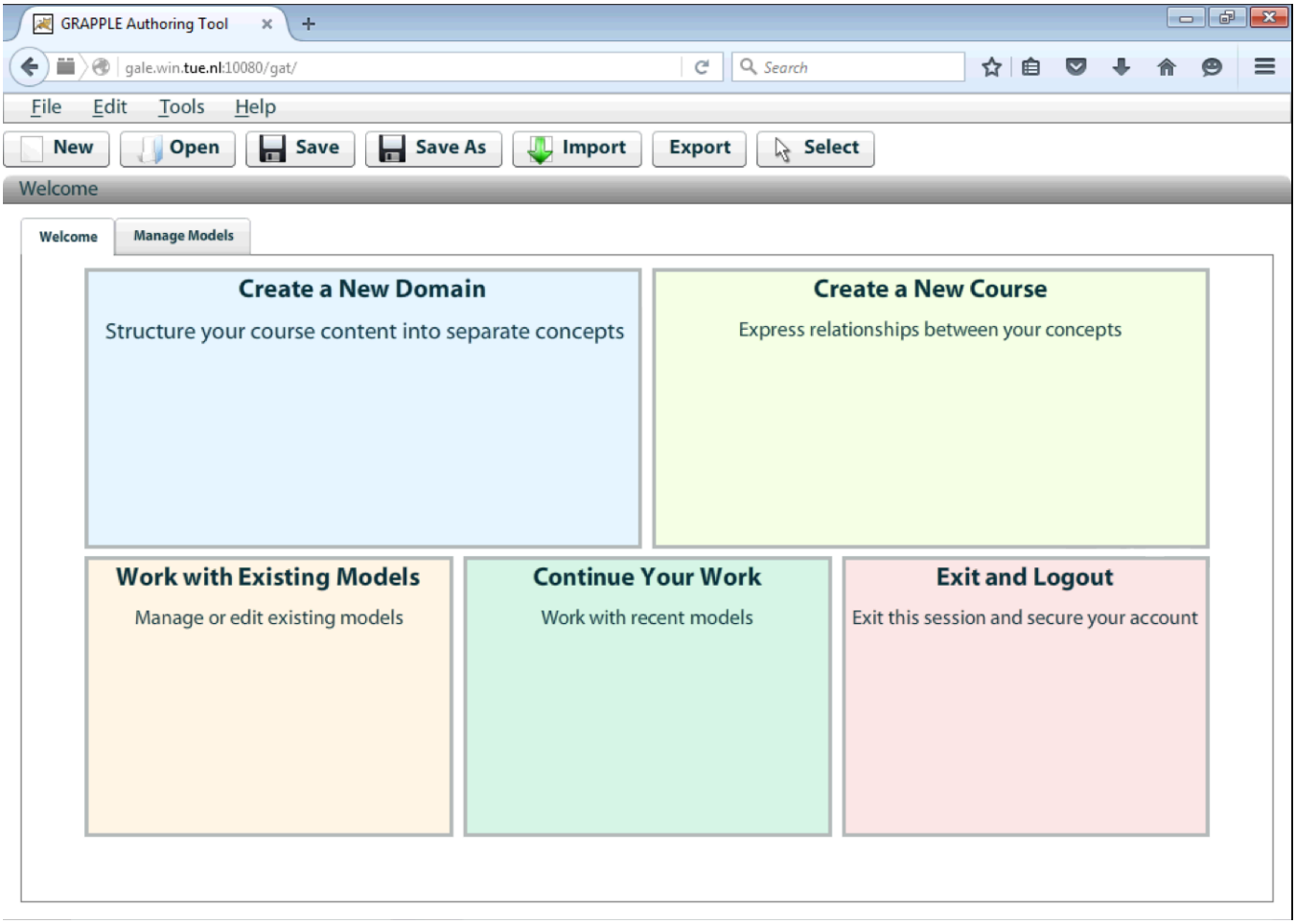

Figure 3 (GRAPPLE Authoring Tool)

Finally, it should be noted that the literature review revealed one particular learning system with the ability to represent mathematical content in a semantic xml-based format. 'ActiveMath' was a generic and adaptive web-based learning system that dynamically generated mathematical courses adapted to the student's goals, preferences, capabilities, and knowledge. However, the project which ran from 2004 to 2007 and cost 4.77 million euros, appears to be dormant with large parts of the website unavailable, including the 'Official Demo' (LeActiveMath, 2007; Melis et al., 2001).

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Appendix

DECLARATION OF
RESEARCH ETHICS AND/OR ASSESSMENT OF RISK

All research and scholarship proposals, whether funded or not by internal or external funds, must submit a RESEARCH ETHICS/ASSESSMENT OF RISK FORM to the DIT Research Ethics Committee.

This is a self-declaration process. The researcher is asked to formally identify any possible ethical issues or risks that might arise in the course of the work, and to sign the documentation.

Please refer to the Guiding Principles and Procedures indicated on the DIT Research Ethics website prior to completing this form:

- http://www.dit.ie/DIT/graduate/ethics/index.html

PLEASE NOTE

- You are requested to attach a copy of your research application to this form.
- The RESEARCH ETHICS /ASSESSMENT OF RISK FORM must be signed by the applicant(s)
- Ethical Approval must be granted prior to start of any research/scholarly activity or prior to funding being released for the project, as appropriate.
- No postgraduate research student will normally be registered until the proposal is cleared by the DIT Research Ethics Committee.

Completed forms should be returned to: Research Ethics Committee, c/o Office of Graduate Studies, DIT, 143-149 Lower Rathmines Road, Dublin 6.

Title of the proposed project: The Design and Evaluation of an Adaptive Learning Domain Model for Post-Primary Mathematics		
Applicant Details (Use Block Capitals):		
Surname: **Kilkenny**	Forename: **Gerard**	Title: **Mr**
Present appointment: **Student on MSc in Applied eLearning (DIT, Aungier Street)**		
School/Department/Centre: **Learning, Teaching & Technology Centre** Faculty: Work Tel: **01 402 7875** Fax: E-mail: **lttc@dit.ie**		

Other departments/organisations/individuals involved:

a) **Dr Claire McAvinia Tel: 01 402 7861 E-mail: claire.mcavinia@dit.ie**
b) **Dr Ita Kennelly Tel: 01 402 7884 E-mail: ita.kennelly@dit.ie**
c)

Source of Funding: **Not Applicable**

Has the current research project already received approval from another research ethics committee? **Not Applicable**

If so, please enclose relevant information and documentation

Generic Projects:

Researchers may receive approval for a cluster of similar research activity by approval of a *generic protocol* to cover repetitive methodologies or activities. A *generic protocol* should comprise a covering letter setting out the circumstances and rationale for generic approval, outlining the procedures to be followed in all such projects, in addition to completion of the appropriate appendices.

If this project is part of a cluster of research with similar methodology, please tick here and submit a generic protocol to cover all such projects. ☐

Insurance

Normally, DIT insurance covers standard research activity, including fieldtrips. Are you aware of any unusual or exceptional risks or insurance issues to which DIT's insurance company should be alerted? If so, please list the issues:

Please note that no contract should be entered into for clinical/medical (including drug testing) or surgical trials/tests on any human subject until written confirmation has been received from the DIT's insurers that the relevant insurance cover is in place.

Are you or any members of the research team a member of any organisation that provides professional indemnity insurance?

Name of the organisation: **Not Applicable**

Please provide written confirmation of the terms of insurance cover. **Not Applicable**

Professional Code of Conduct

Please reference, if appropriate, the Code of Ethical Conduct produced by your relevant professional organization(s), which also informs your research.

Please note that: Where those requirements conflict with DIT requirements, the latter will normally be followed. In all such circumstances, please contact the Office of Research Ethics for clarification.

All researchers must confirm with the Data Protection Act 1988. Please consult the DIT Data Protection Officer for advice.

IDENTIFICATION OF ETHICAL ISSUES AND/OR RISK

Do any of the following ethical issues or risks apply in your research? If so, tick all box(es) which apply and complete the relevant Appendix, which can be downloaded from http://www.dit.ie/DIT/graduate/ethics/index.html

Yes	No	Does your research involve…
✓		Impact on human subject(s) and/or the researcher(s) [Appendix 1]
✓		Consent and advice form given to subjects prior to their participation in the research [Appendix 2]
	✓	Consent form for research involving 'less powerful' subjects or those under 18 years [Appendix 3]
	✓	Conflict of interest [Appendix 4]
	✓	Drugs and Medical Devices [Appendix 5]
	✓	Ionising Radiation [Appendix 6]
	✓	Neonatal Material [Appendix 7]
	✓	Animal Welfare [Appendix 8]
	✓	General Risk Assessment [Appendix 9]
	✓	Hazardous Chemical Risk Assessment [Appendix 10]
	✓	Biological Agents Risk Assessment [Appendix 11]
	✓	Work involving Genetically Modified Organisms Risk Assessment [Appendix 12]
	✓	Field Work Risk Assessment [Appendix 13]

If other risk and/or ethical issues are identified please provide a written submission which outlines the issues and the manner in which they are being addressed.

Please tick the appropriate box below

☐ **No, there are no** ethical issues and/or risks involved in your research project, **please tick here, and sign the declaration on page 5.**

☑ **Yes, there are ethical** is☑sues and/or risks involved in your research, **please tick here and complete the appropriate forms identified above.**

In accordance with the Principles of the Declaration of Helsinki and DIT Principles and Procedures, I declare that the information provided in this form is true to the best of my knowledge and judgement.

I will advise the DIT Research Ethics Committee *of any adverse or unforeseen circumstances or changes in the research which might concern or affect any ethical issues or risks, including if the project fails to start or is abandoned.*

Signature of applicant 1: *Gerard Kilkenny*_____

Signature of applicant 2: _____

Signature of applicant 3: _____

(An electronic signature is permissible)

Checklist

Please ensure the following, if appropriate, are attached:

Documents to be attached	**Tick if attached**	**Tick if not appropriate**
Research Proposal	✓	
Letters (to subjects, parents/guardians, GPs, etc)		
Questionnaire(s)		
Advertisement/Poster		✓
Ethical clearance from other ethical research committees		✓
Copy of signed agreement of professional indemnity		✓
Generic Protocol		✓
Other (please specify)		✓