Brief description of how I plan to achieve each of the four short-term actions from Supervision Meeting 1 - 5th October 2017 (Gerard Kilkenny)

(a) Source literature relating to functions and patterns (pedagogy, learning theory, instructional design)

I have identified the following two titles by Ed Dubinsky et al as sources of material that I will use to guide the development of the functions part of my domain model. I envisage that this material will provide me with the necessary scholarly underpinning to justify some of the structure of my domain model.

Dubinsky, E., & Harel, G. (1992). The Concept of Function: Aspects of Epistemology and Pedagogy. In *MAA Notes* (Vol. 25). USA: The Mathematical Association of America. Retrieved from
https://www.researchgate.net/profile/Anna_Sierpinska/publication/238287243_On_understanding_the_notion_of_function/links/54188fa60cf25ebee988202a/On-understanding-the-notion-of-function.pdf.

Dubinsky, E., & Wilson, R. T. (2013). High school students' understanding of the function concept. *The Journal of Mathematical Behavior, 32*(1), 83-101. doi:10.1016/j.jmathb.2012.12.001

I also hope to use the following three sources in relation to learning theory and mathematics in my literature review:

Clements, D., & T. Battista, M. (1990). Constructivist learning and teaching. *Arithmetic Teacher, 38*(1), 34-35. Retrieved from
https://www.researchgate.net/profile/Douglas_Clements/publication/258933053_TEAM-Tools_for_early_assessment_in_mathematics/links/56f712b508ae38d710a1c177/TEAM-Tools-for-early-assessment-in-mathematics.pdf

Sriraman, B., & English, L. (Eds.). (2010). *Theories of mathematics education: Seeking new frontiers*. Berlin/Heidelberg: Springer Science.

Cottrill, J. (2009). An overview of theories of learning in mathematics education research. *Colección Digital Eudoxus*, (8). Retrieved from
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.668.7545&rep=rep1&type=pdf

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The following paper by Murray and Pérez is a very good study that compares adaptive learning with traditional learning:

Murray, M. C., & Pérez, J. (2015). Informing and performing: A study comparing adaptive learning to traditional learning. *Informing Science: the International Journal of an Emerging Transdiscipline, 18*, 111-125. Retrieved from http://www.inform.nu/Articles/Vol18/ISJv18p111-125Murray1572.pdf

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A good understanding of instructional design and learning objects will be important in the development of my domain model. I intend to draw on material from the following two sources:

Dick, W., Carey, L., & Carey, J. O. (2005). *The systematic design of instruction*. (6th ed.). Boston: Pearson.

Wiley, D. A. (2009). Learning Objects and Instructional Theory. In A. A. Carr-Chellman & C. M. Reigeluth (Eds.), *Instructional-design Theories and Models Volume III: Building a Common Knowledge Base*. New York: Routledge.

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The following link provides an excellent comparison of **Content Assets**, **Information Objects, Learning Objects, Learning Components** and **Learning Environment:**

Reusability Framework as a Function of Granularity
http://www.reusablelearning.org/about/Granularity.html

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(b) Define clearly what a domain model is

Probably the most succinct definition for a domain model can be found in a journal article by Aroya et al:

The *Domain Model* is a semantic structure of concepts and the relationships between these concepts (Aroyo, De Bra, Houben, & Vdovjak, 2004)

Aroyo, L., De Bra, P., Houben, G.-J., & Vdovjak, R. (2004). Embedding information retrieval in adaptive hypermedia: IR meets AHA! *New Review of Hypermedia and Multimedia, 10*(1), 53-76. https://doi.org/10.1080/13614560410001728146

However, it may be necessary to draw from other sources, and to provide diagrams, in order to provide the reader with the best possible chance of clearly understanding what a domain model is. Here are four excellent sources of material in relation to domain model:

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Brusilovsky, P. (Producer). (2015). *Domain Modeling for
 Personalized Learning.* Retrieved from https://www.slideshare.net/pbrusilovsky/gift2015-brusilovsky

Šimko, M. (2012). Automated Acquisition of Domain Model for Adaptive Collaborative Web-Based Learning. *Information Sciences and Technologies Bulletin of the ACM Slovakia, 4*(2), 1-9. Retrieved from http://acmbulletin.fiit.stuba.sk/vol4num2/simko.pdf

Tifrea, O. (2010). *The Domain Model of an Adaptive Learning System for Poor Comprehenders*. (Masters thesis), Free University of Bozen-Bolzano, Italy. Retrieved from https://emcl-study.eu/fileadmin/master_theses/thesis_tifrea.pdf

Vrablecova, P., & Simko, M. (2016). Supporting Semantic Annotation of Educational Content by Automatic Extraction of Hierarchical Domain Relationships. *Ieee Transactions on Learning Technologies, 9*(3), 285-298. doi:10.1109/tlt.2016.2546255

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(c) Decide when to send survey email to the Irish Mathematics Teachers' Association

Here is the text of the email I sent to Elizabeth Oldham, Honorary Treasurer of **Irish Mathematics Teachers' Association (Dublin Branch)** on 19/11/17.

Hi Elizabeth,

If you recall, I spoke to you by telephone a few weeks ago about the possibility of having a link to an electronic survey, and an Information Sheet attachment, included with the email circular that you will be sending to IMTA Dublin Branch members in early January 2018. The electronic survey is part of my MSc in Applied eLearning project for Year 2. I have attached the following documents to this email:

- 3865219035225909467.pdf (Research Ethics Application which includes two sections entitled 'Lay Summary' and 'Overall Aim of the Study')
- Domain Model (Survey) - Google Forms.pdf (Electronic Survey Mk 1)
- Information Sheet A.pdf (Participant Information Sheet for the Electronic Survey).

I am hoping to have approval from DIT's Research Ethics and Integrity Committee to carry out my proposed research (including electronic survey) by January 2018. As you can see, I have attached my Research Ethics Application to this email.

I would appreciate if you could let me know:

(1) if you can you include the link to the electronic survey created with Google Forms, and the Information Sheet A, in this email or in a separate email?
(2) the contact email addresses (and possibly the contact phone numbers) for all of the other IMTA branches. (I would like to have the survey completed by all branches, not just the Dublin branch).

Do you know what date in January 2018 you plan to email IMTA Dublin Branch with the list of branch activities for the rest of the school year?

It might be better to send the electronic survey as a separate email to Dublin Branch members. There is probably no good reason to include it with the branch activities and I would be a little worried that members might read the information about the branch activities and 'forget' to do the survey! There is also the possibility that I might not have the digital artefact that the survey is based on until mid to later January 2018. Not sending the survey email until mid to late January 2018 would buy me more time if necessary. What do you think Elizabeth?

Regards,

Gerry.

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(d) Study the Marksheet and Assessment Criteria in the Applied eLearning Project Handbook in relation to:
Applied eLearning Project (pp. 22-24), Journal Paper (pp. 25-27), ePortfolio (pp. 28-30).

I have carefully studied this material.
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Description of what I intend to cover at the November 25th Works in Progress (Gerard Kilkenny)

I intend to cover the following at the WIP presentation on 25th November 2017.

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(1) Development of my digital artifact to include the following:

(a) Microsoft Access Database and Excel Spreadsheet of the learning outcomes associated with my domain model
(b) An interactive visualization of these learning outcomes using the following Rhumbl map:

https://rhumbl.com/embed/59fcc0c294470c00102c0d18

Note: The Rhumbl map contains links to GeoGebra teaching and learning material I have created. This material is stored on my ePortfolio and has been designed to illustrate the conceptual nature of some of the learning outcomes. Here is one example GeogGebra resource:

http://gerardkilkenny.ie/08-Seq(Tab_0)XY.html

(c) Two screenshots from the GAM Authoring Tool:
  (i) hierarchical structure of my domain model
  (ii) relationships mapping inherent in my domain model

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(2) Electronic Survey via Google Forms:

The survey is available at the following link:

https://goo.gl/forms/Z8POvd5a6aImSHtF3

However, I can demonstrate the entire survey via Google Forms by logging in to my DIT account and going into edit mode at the following link:

https://docs.google.com/forms/d/1fGhLif2IMFhojcsD7CEV_dZMtKVtuxyPs4-rpvZ4dZE/edit

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