

# Interview Questions (Maths Professional)

## Section 1 – Introduction

I am pleased to welcome **Dr Firstname Lastname**, Mathematics Professional to my interview today. I will be interviewing Firstname for approximately one hour as a key informant for my research study entitled '**The Design, Development and Evaluation of a Domain Model for Post-Primary Mathematics**'.

Good afternoon, Firstname. Thank you very much for agreeing to meet me here today, the 11th April 2018, in the **Interview Venue**. You are already aware that I asked you to be a participant in my Research Study in an email on 6th March 2018. I attached an Information Sheet B, Consent Form and these Interview Questions to the most recent email that I sent you on 7th April 2018. I would like to emphasise once again that your participation is entirely voluntary. If you do wish to participate in my Research Study and proceed with this interview, I need to confirm the following:

- 1.1 Are you aware that the audio of the interview that has just begun is being recorded using an Olympus DS-30 Digital Voice Recorder and that this entire interview will be recorded?
- 1.2 Have you read Information Sheet B and the Consent Form?
- 1.3 Are you happy to sign the Consent Form and proceed with this interview?

Thank you for signing the Consent Form. The interview will last for approximately one hour. As you know, I emailed you the questions/themes that I am about to use in this interview. It will be based on the screencasts, domain model artefacts and Google Forms survey and the context will be the new Draft Specification for Junior Cycle Mathematics published in November 2017. You have been chosen as a **Key Informant** for this Research Study as a result of your **experience working in Maths and Education**.

To begin, I would like to get some idea of your previous experiences as a student and teacher in the area of Mathematics.

## Section 2 – Experience of Maths

- 2.1 Did you **like Maths** in school and were you always good at Maths?
- 2.2 Would you say that Maths was your **favourite subject** in school and if not where did it rank?
- 2.3 Did you study Maths at university and if so was it your **favourite subject**?
- 2.4 How much of your **undergraduate degree course** was devoted to Maths and was Maths one of your **final year degree subjects**?
- 2.5 Did you ever work as a **Maths teacher**?
- 2.6 If so, **for how many years did you teach Maths** to post-primary students?

2.7 Did you **enjoy teaching Maths** to post-primary students and do you miss it?

### Section 3 – The Concept of Adaptive Learning

3.1 Were you aware of the concept of **adaptive learning** prior to this research study?

3.2 Did you understand the concept of **adaptive learning** prior to this Research Study?

3.3 Did my Screencast help you understand the concept of **adaptive learning**?

### Section 4 – The Domain Model

4.1 Were you aware of the concept of a **domain model** prior to this research study?

4.2 Did you understand the concept of a **domain model** prior to this research study?

4.3 Did my **screencast** help you understand the concept of a **domain model**?

### Section 5 – Draft Specification (PDF), Unpacking Learning Outcomes and Repacking Learning Outcomes (Microsoft Excel)

We will now use the computer to have another look at the learning outcomes in the new Draft Specification for Junior Cycle Mathematics. We will then look again at the **45 unpacked learning outcomes** in my **Microsoft Excel** spreadsheet. You have already seen both of these in the screencast.

5.1 Do you think that the **learning outcomes** in the **mathematics syllabus** should be the principal data source for a **domain model**?

5.2 Should there be any other data source for a **domain model** and if so, what?

5.3 Having watched the **screencast**, did you understand the **unpacking process** from the **8 learning outcomes** in the **Draft Specification** to the **45 learning outcomes** created by me? Any comments?

5.4 Which set of **learning outcomes** do you think will be more beneficial for the teaching, learning and assessment of **Junior Cycle Mathematics** and why:  
- the **8 long paragraph** based learning outcomes that are in the **Draft Specification** or  
- the **45 short sentences** created by me to describe these **learning outcomes**?

5.5 Having watched the **screencast**, have you any comments on the **repacking process** from **45 learning outcomes** to **33 learning outcomes**? This was achieved by amalgamating the topics patterns and functions.

5.6 Having watched the **screencast**, have you any comments on the **repacking process** from **33 learning outcomes** to **23 learning outcomes**? This was achieved by amalgamating linear, quadratic and exponential from separate topics to one topic.

## Section 6 - Domain Model (GAM Authoring Tool)

We will now use the computer to have another look at the **domain model artefact** created by the **GAM Authoring Tool**. First, we will look at a short screencast, set to music, which follows the development of this domain model. At the end of the screencast, we will look at an image of the entire domain model.

- 6.1 Do you think that the **visual display** for this version of the **domain model** is **easy to understand**?
- 6.2 Do you think that the **concepts** in this version of the **domain model** are **correctly sequenced**?
- 6.3 Do you think that the **concepts** in this version of the **domain model** are **correctly connected**?
- 6.4 Do you think that this **visual display**, extended to include the entire Junior Cycle Maths Syllabus, could be used as a **domain model representation** in an overall **Adaptive Learning System for Junior Cycle Mathematics**?

## Section 7a - Domain Model (Mindomo Organigram 3)

We will now use the computer to have another look at the **three domain model artefacts** I created using the **Mindomo** mind mapping tool. We are now looking at a graphic of the domain model created using **Mindomo** that contains 45 learning outcomes represented by words or short phrases. I have called this mind map (or concept map) **Mindomo Organigram 3**. Incidentally, it is not in the survey that was sent to 8 branches of the Irish Mathematics Teachers' Association earlier this month (March 2018).

- 7.1a Do you think that the **visual display** for this version of the **domain model** is **easy to understand**?
- 7.2a Do you think that the **concepts** in this version of the **domain model** are **correctly sequenced**?
- 7.3a Do you think that the **concepts** in this version of the **domain model** are **correctly connected**?
- 7.4a Do you think that this **visual display**, extended to include the entire Junior Cycle Maths Syllabus, could be used as a **domain model representation** in an overall **Adaptive Learning System for Junior Cycle Mathematics**?

## Section 7b - Domain Model (Mindomo Organigram 2)

We are now looking at a graphic of the domain model created by me using **Mindomo** that contains 45 learning outcomes represented as labels or codes such as 1a-1. For example, 1a-1 means “represent linear patterns and relationships in tables”. This is the same as the artefact we were looking at a few moments ago except I use codes rather than words and short phrases for the learning outcomes. I have called this mind map (or concept map) **Mindomo Organigram 2** and it is in the survey that was sent to 8 branches of the Irish Mathematics Teachers’ Association earlier this month (March 2018).

**7.1b** Do you think that the **visual display** for this version of the **domain model** is **easy to understand**?

**7.2b** Which of these two Mindomo domain model artefacts do you prefer: the artefact using words or short phrases or the artefact using labels such as 1a-1?

## Section 8 - Domain Model (Mindomo Organigram 1)

In a moment, we will examine the third and final **Mindomo** domain model artefact. This artefact was achieved by amalgamating linear, quadratic and exponential patterns and functions into a single topic. This process was examined when we looked at the Microsoft Excel listings of the learning outcomes a few minutes ago.

We are now looking at a graphic of the domain model created by me using **Mindomo** that contains approximately 23 learning outcomes represented by words or short phrases. These are the same 23 learning outcomes you saw in the **Microsoft Excel** spreadsheet a few moments ago and is similar in style and layout to the last organigram. I have called this mind map (or concept map) **Mindomo Organigram 1** and it is in the survey that was sent to 8 branches of the Irish Mathematics Teachers’ Association earlier this month (March 2018).

**8.1** Do you think that the **visual display** for this version of the **domain model** is **easy to understand**?

**8.2** As a result of amalgamating the concepts associated with linear, quadratic and exponential patterns and functions, this **Mindomo** domain model artefact contains 20 fewer learning outcomes than the first two **Mindomo** artefacts that we examined a few minutes ago. I think that the previous two **Mindomo** artefacts can be used to ensure that all 45 learning outcomes are **taught and assessed separately**. However, this third and final **Mindomo** artefact could be used to **teach linear, quadratic and exponential patterns and functions in a systematic fashion**. This is where I can see the **Teaching Model** component of an Adaptive Learning System interacting with the Domain Model component. Assessment would of course take place via the **User Model** component. Does this make sense? Any comments?

## Section 9 - Domain Model (Excel Spreadsheet for Rhumbl)

We are now looking at a Microsoft Excel spreadsheet template provided by **MIT Mapping Labs** as part of the data input component of their Rhumbl software application. I entered the topics and learning outcomes onto this template. You have already seen this Rhumbl spreadsheet in the screencast.

- 9.1** Do you think that the **matrix of Topics and Learning Outcomes** in this spreadsheet template designed as part of Rhumbl is easy to understand?
- 9.2** Do you think that the **topics** and **learning outcomes** are **correctly connected** using the digit 1 to indicate a connection?

## Section 10 - Domain Model (Rhumbl Map)

We will use the computer to have a look again at the **domain model artefact** I created using the **Rhumbl** concept mapping tool. There are two different map views: by **topic** and by **learning outcome**.

We are now looking at the **Rhumbl** map graphic that is the output from the spreadsheet input we looked at a few moments ago. I would like you to take a few minutes to look at and evaluate this Rhumbl domain model artefact using the two different map views: by **topic** and by **learning outcome**. This Rhumbl map is in the survey that was sent to 8 branches of the Irish Mathematics Teachers' Association earlier this month (March 2018).

- 10.1** Do you think that the **map views** for this version of the domain model are **easy to understand**?
- 10.2** Do you think that the **learning outcomes** in this version of the domain model are **correctly connected** to the **topics**?
- 10.3** Which of the two map views do you prefer: by **topic** or by **learning outcome**?

## Section 11 – Learning Outcomes and Topics

- 11.1** What do you think teachers should use as the **main framework to teach** the new Junior Cycle Maths course that commences in September 2018
- (a) Text book **topics** (chapters) and **sub-topics** (sections)
  - (b) The new **syllabus learning outcomes**
  - (c) A larger set of **unpacked learning outcomes**, when available, as described in my screencast?
- 11.2** What do you think students should use to **frame their learning** for the new Junior Cycle Maths course that commences in September 2018?
- (a) **Text book topics** (chapters) and sub-topics (sections)
  - (b) The new **syllabus learning outcomes**
  - (c) A larger set of **unpacked learning outcomes**, when available, as described in my screencast?

## **Section 12 - Patterns and Functions**

**12.1** Do you think that teachers should **present 'Patterns and Functions' as a single topic** using a unified set of learning outcomes as presented in the domain model artefacts and described by me in the screencast?

## **Section 13 - Sequencing and Connecting Concepts in Mathematics**

**13.1** Do you think Junior Cycle Mathematics should be taught and learned as a hierarchical system of sequenced concepts?

**13.2** If 'Yes', can you explain why it should be taught this way and give an example of parts of the Junior Cycle Mathematics course that can be taught in this way?

**13.3** If 'No', can you explain why it should not be taught in this way?

**13.4** Do you think Junior Cycle Mathematics should be taught as a system of connected concepts?

**13.5** If 'Yes', can you explain why it should be taught this way and give an example of parts of the Junior Cycle Mathematics course that can be taught in this way?

**13.6** If 'No', can you explain why it should not be taught in this way?

## **Section 14 - Future Adaptive Learning System for Post-Primary Mathematics**

**14.1** Do you think that a Domain Model is necessary to create an Adaptive Learning System for Mathematics?

**14.2** Do you think that an Adaptive Learning System, with a core Domain Model, could enhance the teaching and learning of Junior Cycle and Leaving Certificate Mathematics?

**14.3** Do you think that an Adaptive Learning System would be a more effective tool than a textbook for teaching Mathematics as a system of connected concepts?

## **Section 15 – New Entrant Mathematics Teachers / PMEs**

**15.1** Do you think that an Adaptive Learning System, with a core Domain Model, could help these new teachers and PMEs to make connections between concepts within and across strands?

**15.2** Do you think that if such an Adaptive Learning System is created that this should be used by the colleges of education that prepare students to be post-primary teachers of Mathematics?

## **Section 16 – Comparison of the 3 Domain Model Artefacts**

- 16.1** Which representation of the domain model did you prefer and why:
- the visual display containing the line and patterns/functions created by the GAM Authoring Tool. (This was the first map type you saw).
  - the three mind maps created with Mindomo containing the coloured learning outcomes/concepts. (This was the second set of map types you saw).
  - the concept maps, by topic and by learning outcome. (This was the last map type you saw).
- 16.2** Do you think that an electronic textbook that mimics the traditional hard copy version, with chapters, topics and sub-topics is preferable to a map-driven digital system that would use some or all of the maps we have explored here today?

## **Section 17 – SEN Students**

- 17.1** Do you think that it is important that a Maths e-Learning system is designed to benefit SEN students?
- 17.2** Do you think that a domain model driven adaptive learning system for post-primary Mathematics that creates individual learning pathways for each student would be desirable and/or beneficial for SEN students who are withdrawn from class for extra Maths and therefore have more than one Maths teacher?

## **Section 18 – eAssessment**

- 18.1** Do you think that there is a role for electronic (summative) assessment of post-primary Mathematics?
- 18.2** Do you think that these should be used in post-primary schools for house examinations in Mathematics at Christmas, Summer, etc?
- 18.3** Do you think that these should be used in post-primary education for State examinations in Mathematics for Junior Cycle, Leaving Certificate, etc?