



**Do pre-service teachers have the  
necessary numeracy capabilities  
themselves to support their students'  
numeracy development?**

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# Rationale

- At present, governments internationally and in Ireland are encouraging all teachers to teach for numeracy learning across the school curriculum (DES 2011; Australian Curriculum, Assessment, and Reporting Authority [ACARA], 2017; Norwegian Directorate for Education and Training, 2012).
- Most recently, in October 2020, the regulatory body in Ireland for the professional standards in the teaching profession, indicated that all initial teacher education programmes need to support the pre-service teachers in areas of literacy and numeracy (The Teaching Council, 2020)
- In order for teachers to teach numeracy across the curriculum, they first must possess adequate numeracy skills themselves.

# Aim and Research questions

The primary aim of this research study was to investigate pre-service teachers' understanding of the concept of numeracy. Furthermore, the study sought to identify the knowledge domains teachers, in particular pre-service teachers, need to possess in order to teach for numeracy learning in post-primary school settings.

The main research question I will discuss today:

1. How numerate are pre-service teachers? Do factors such as gender; age; university attended and subject specialism impact their numerate abilities?

# Research Methodology

Terms	Description
Research Design	<p>Quantitative Methods assessed pre-service teachers abilities and gave preliminary results for beliefs/ understandings of numeracy</p> <p>Qualitative Methods were used to probe teachers experiences and beliefs/understandings to explain and validate findings from quantitative method</p>
Data instruments	<ul style="list-style-type: none"><li>• Questionnaire which consisted of both open and closed questions</li><li>• Focus Groups and interviews</li></ul>
Data Sample	Purposive sample (PME year 2 pre – service teachers in Uni A, Uni B and Uni C)
Data analysis	<p>SPSS was used to run statistical comparison tests.</p> <p>The data from the focus groups was transcribed and thematic analysis was used to analyse the data collected noting patterns/ themes.</p>
Limitations of study	Only using 3 universities, volunteers for focus groups.

## Numeracy tasks

Time task

## Explanation

This task asked participants to calculate the difference between two Olympic swimmers finishing race times.

Distance task

This task asked participants to calculate a new result time for Joesph Schooling, if the race was 30 metres longer, given that he was travelling at the same average speed as he did in the first race.

Earthquakes task

This task asked participants to use their mathematical knowledge and understanding of statistics to predict an event occurring in a specific context.

Pie-chart task

This task presented participants with a pie-chart and asked them to calculate the percentage of the sector that represented the participants who chose biology as a subject for the leaving certificate.

Car task

This task asked participants to calculate the score of a car given an equation. Participants had to substitute values into the equation and work out the final answer.

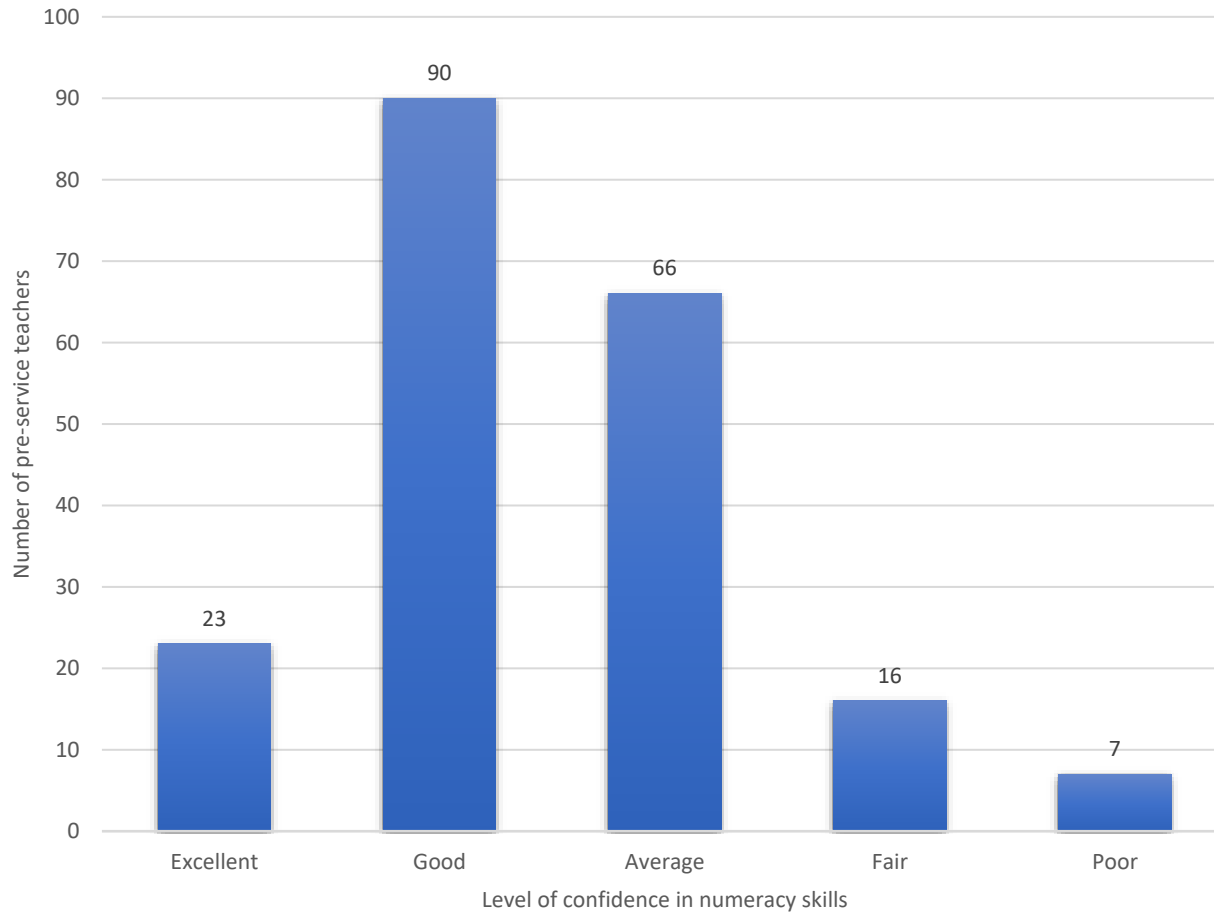
Salad dressing task

This task asked participants to calculate how much salad oil is needed for 150mls of salad dressing, when provided with a recipe for 100mls.

Mobile Phone task

This task asked participants to recommend the best mobile phone plan for David given price tariffs for 3 mobile phone companies.

### Rate your numeracy skills



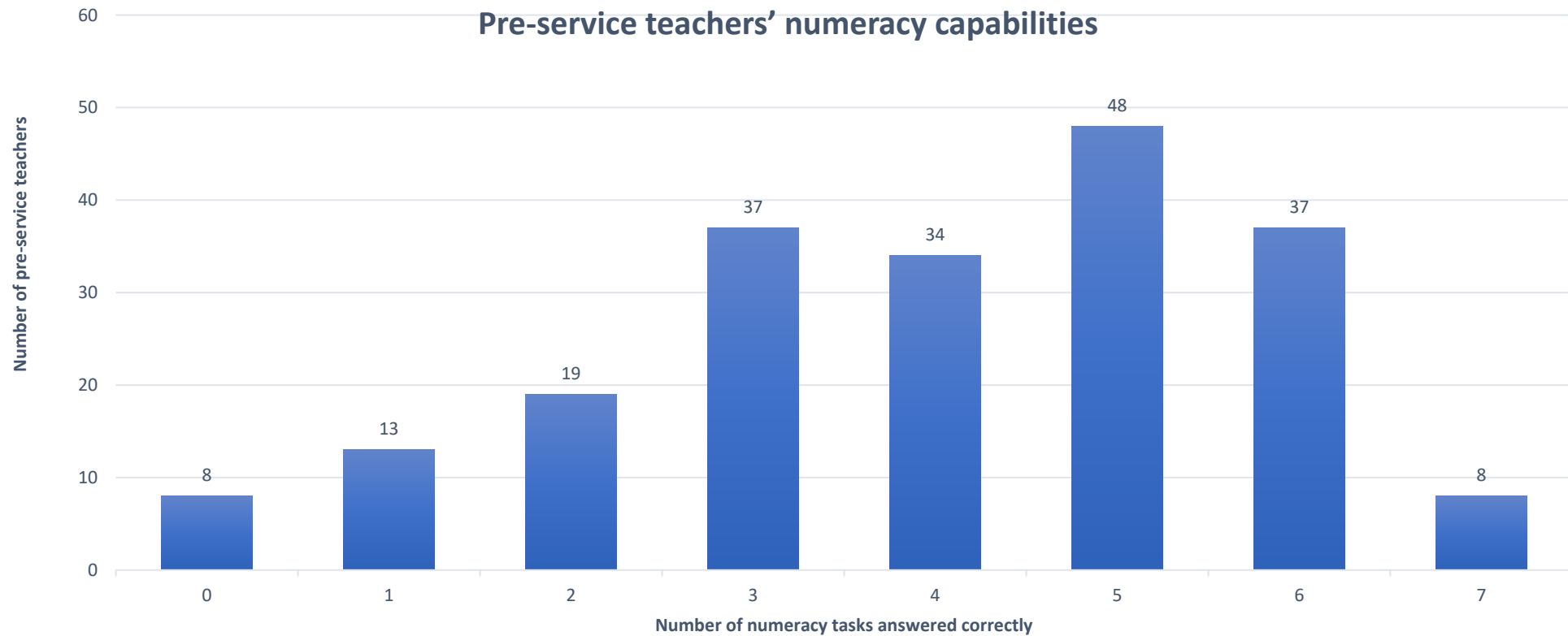
204 pre-service teachers completed this questionnaire

113 (55.4%) pre-service teachers rated themselves as possessing either excellent or good numeracy skills,

66 (32.4%) pre-service teachers rated themselves as having average numeracy skills, and

23 (11.2%) pre-service teachers thought they had a below average or poor numeracy skills

# Number of numeracy tasks answered correctly by pre-service teachers



## Breakdown of correct/ incorrect and blank answers for each numeracy task

	Correct	Incorrect	Blank
<b>Time</b>	112 (54.9%)	89 (43.6%)	3 (1.5%)
<b>Distance</b>	99 (48.5%)	68 (33.4%)	37 (18.1%)
<b>Earthquake</b>	165 (80.9%)	36 (17.6%)	3 (1.5%)
<b>Pie chart</b>	117 (57.4%)	71 (34.8%)	16 (7.8%)
<b>Car Score</b>	160 (78.4%)	22 (10.8%)	22 (10.8%)
<b>Salad dressing</b>	118 (57.8%)	59 (29%)	27 (13.2%)
<b>Mobile Phone</b>	48 (23.5%)	94 (46%)	62 (30.5%)



# So is there a difference?

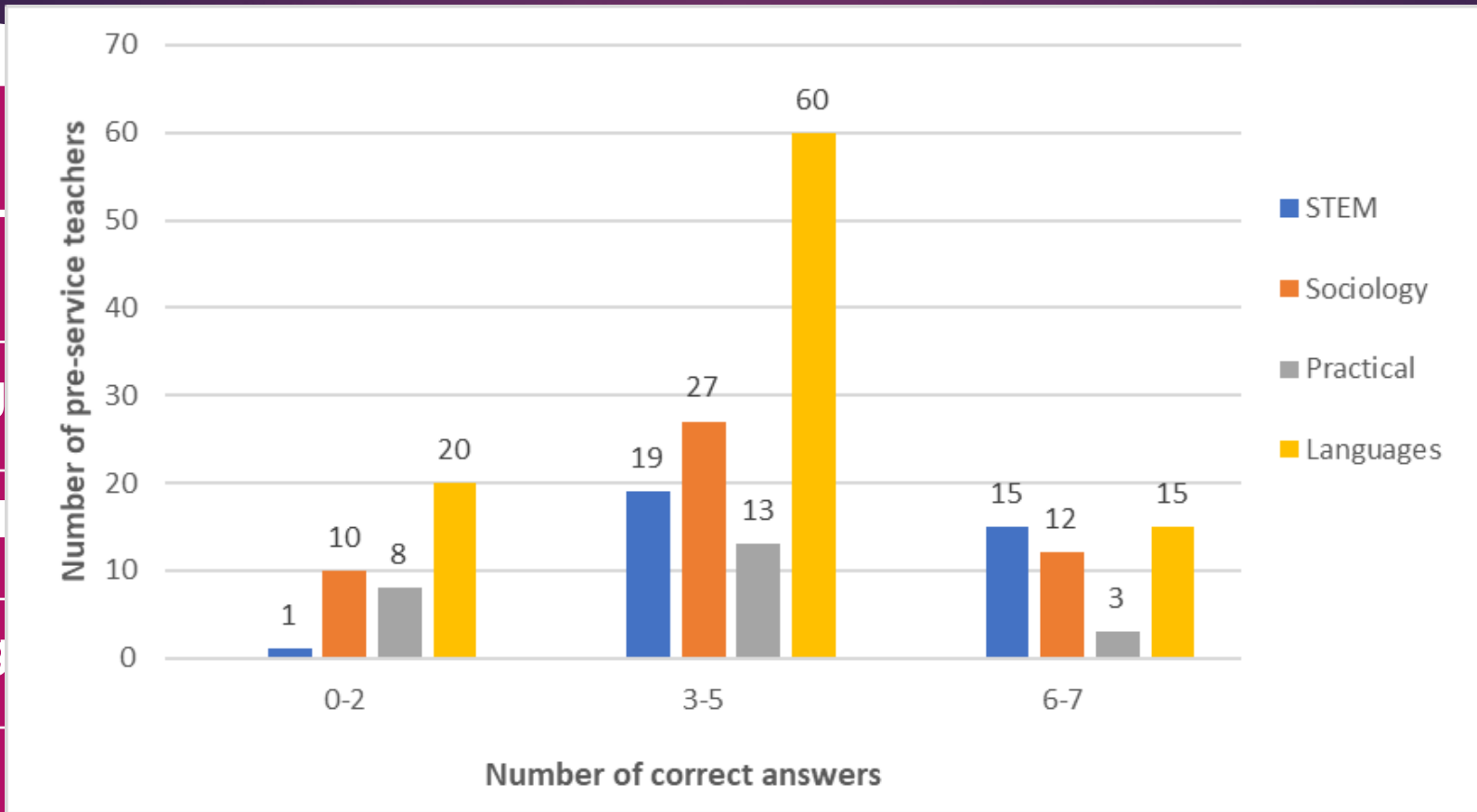
Group	Subjects	Total number
STEM	Science, Technology, and Mathematics	35 (17%)
Sociology	History, Geography and Business Studies	49 (24%)
Arts and Practical subjects	Music, Art and Physical Education	24 (12%)
Languages	English, and Languages	95 (47%)

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# Ability to complete tasks based on subject

Subject
STEM
Sociology
Practical
Language
Total



Total
35
49
24
95
203

# Level of difficulty

<b>Numeracy questions</b>	<b>N (%)</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>Time and Distance question</b>	188 (92.2%)	3.20	.982
<b>Earthquake question</b>	199 (97.5%)	2.65	.908
<b>Pie-chart question</b>	187 (91.7%)	2.91	1.153
<b>Car Score question</b>	188 (92.2%)	2.42	1.059
<b>Salad dressing question</b>	179 (87.7%)	2.79	1.022
<b>Mobile Phone Plan question</b>	134 (65.7%)	3.86	1.020

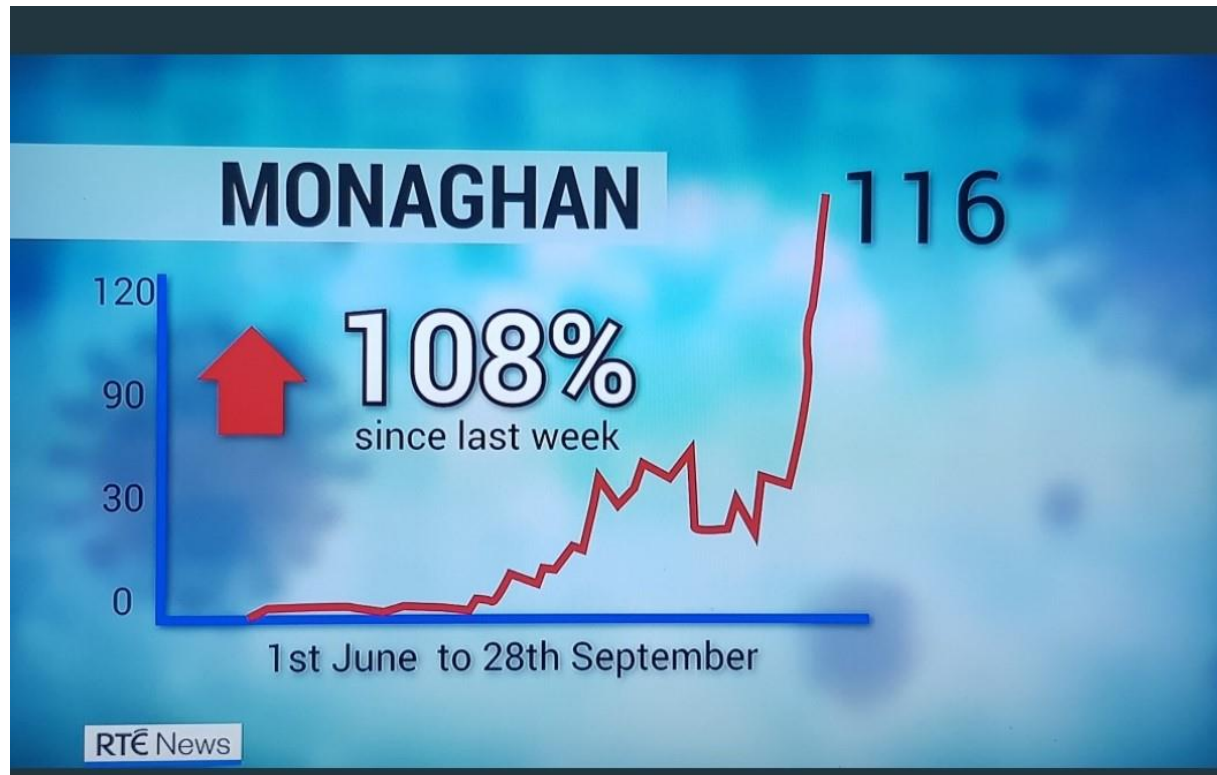
# Pre-service teachers confidence

<b>Numeracy tasks</b>	<b>Confident N(%)</b>	<b>Not Confident N(%)</b>	<b>Unsure N (%)</b>	<b>Blank N(%)</b>
<b>Time task</b>	161 (78.9%)	23 (11.3%)	19 (9.3%)	1 (0.5%)
<b>Distance task</b>	75 (36.8%)	63 (30.9%)	38 (18.6%)	28 (13.7%)
<b>Earthquakes task</b>	141 (69.1%)	31 (15.2%)	27 (13.2%)	5 (2.5%)
<b>Pie-chart task</b>	115 (56.4%)	47 (23%)	22 (10.8%)	20 (9.8%)
<b>Car task</b>	134 (65.7%)	31 (15.2%)	20 (9.8%)	19 (9.3%)
<b>Salad dressing task</b>	101 (49.5%)	45 (22.1%)	30 (14.7%)	28 (13.7%)
<b>Mobile Phone task</b>	28 (13.7%)	56 (27.5%)	37 (18.1%)	83 (40.7%)

# Findings discussed

- ▶ More non-STEM pre-service teachers answering incorrectly than pre-service teachers in STEM disciplines
- ▶ The results showed, that for the most part, pre-service teachers thought the numeracy tasks were moderate to easy with the exception of the mobile phone task which was rated as moderate to difficult.
- ▶ Finally, pre-service teachers demonstrated an over-confidence in their answers

# Moral of the story



# Conclusions and Recommendations

- ▶ Pre-service teachers need to learn how to teach for numeracy and also have the opportunity to develop their own numeracy skills
- ▶ A specific module for teaching and learning about literacy and numeracy within subject disciplines
- ▶ Support for pedagogists and methodologists to further support their subject specific pedagogy



Thank you for  
listening

ANY QUESTIONS?