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EPI-STEM

Numeracy Meet 1: Introduction to Numeracy

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1. What is numeracy?

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- Numeracy involves ...
- A numerate person can ...
- A numerate person knows ...
- A numerate person is ...



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Numeracy matters for life chances

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- In OECD reports and the UK basic skills reports, **the correlation between poor numeracy and poor health** is clear in the data.
- People with poor numeracy skills are more than twice as likely to be **unemployed**.
- A quarter of **young people in custody** have a numeracy level below that expected of a 7-year-old, and 65% of adult prisoners have numeracy skills at or below the level expected of an 11-year-old.
- Improving one's numeracy contributes to **a larger amount of personal and social confidence**.
- There is also **a wage premium associated with having better numeracy**.



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What is numeracy?

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Some lay views of numeracy:

- numbers (“doing sums”, arithmetic)
- the basic maths people need in order to survive in the real world
- the name for primary school maths
- the name for the vegie maths subject in secondary school



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Distinguishing numeracy from mathematics

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Mathematics climbs the ladder of **abstraction** to see, from sufficient height, common patterns in seemingly different things. Abstraction is what gives mathematics its power; it is what enables methods derived from one context to be applied in others. But abstraction is not the focus of numeracy. Instead, **numeracy** clings to specifics, marshalling all relevant aspects of setting and **context** to reach conclusions.

Steen, 2001



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Early definitions of numeracy

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- The mirror image of literacy, but involving quantitative thinking.

Crowther Report, 1959 (UK)



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Numeracy vs Literacy: The Great Debate

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- Two UK longitudinal studies followed 17,000 babies born in the same week, in either 1958 or 1970, until age 30.
- Poor numeracy, more so than low levels of literacy, severely limited successful transitions from school to work.
- Poor numeracy was also associated with low self-esteem, poor health prospects, lack of interest in social and political participation.
- Women experienced much greater negative impact from poor numeracy than men, regardless of their level of literacy.



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Evolution of the Conceptualisation of Numeracy

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Numeracy =
Basic
(arithmetic)
skills

Numeracy =
Mathematics
integrated with the
cultural, social,
personal, and
emotional

1950

1975

2000

2025

2050

Numeracy =
Mathematics in
contexts of
everyday life



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20th century numeracy

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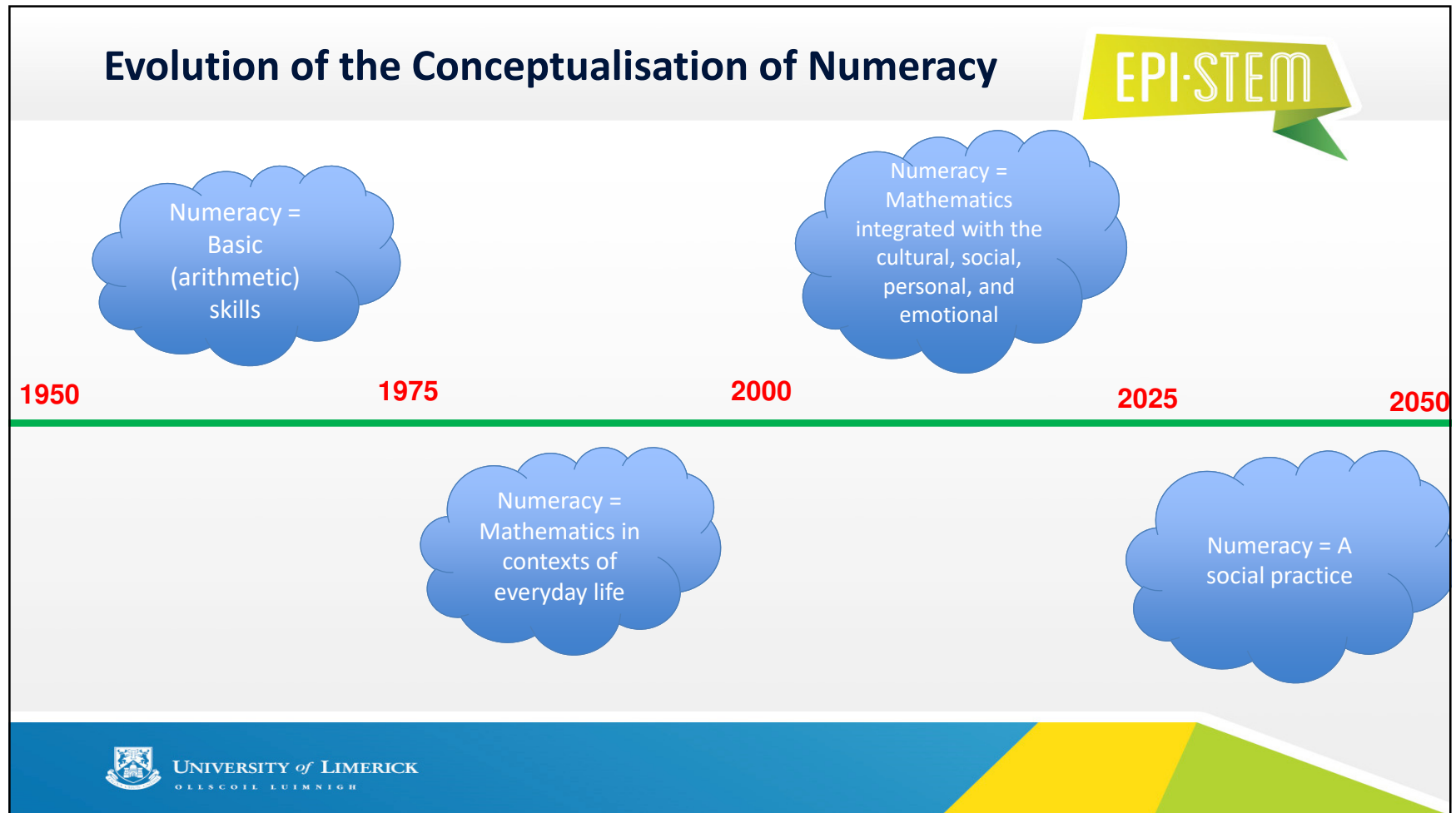


To be numerate is to use mathematics effectively to meet the general demands of life at home, in paid work, and for participation in community and civic life.

Numeracy, A Priority for All
(DETYA, 2000)



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Theoretical Underpinnings of the CENF

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Numeracy as a Social Practice

- This shift to viewing numeracy as a social practice means that numeracy cannot be fully understood without taking into account the social, cultural and political contexts in which it is embedded. (SOLAS, 2021)
- Viewing numeracy in this way means the focus shifts to the contexts in which numeracy is used and so places a spotlight on numeracy in the workplace, numeracy at home, and numeracy in school. (Street, 1995)
- When numeracy is viewed as a social practice some forms of literacy and numeracy are more visible than others (NALA, 2012)
- Hence, viewing numeracy in this way makes it somewhat easier to distinguish numeracy from mathematics and researchers such as Oughton (2018) suggest that it might even mean that international tests such as PIAAC have underestimated actual levels of adult numeracy.



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Why this shift in viewpoint?

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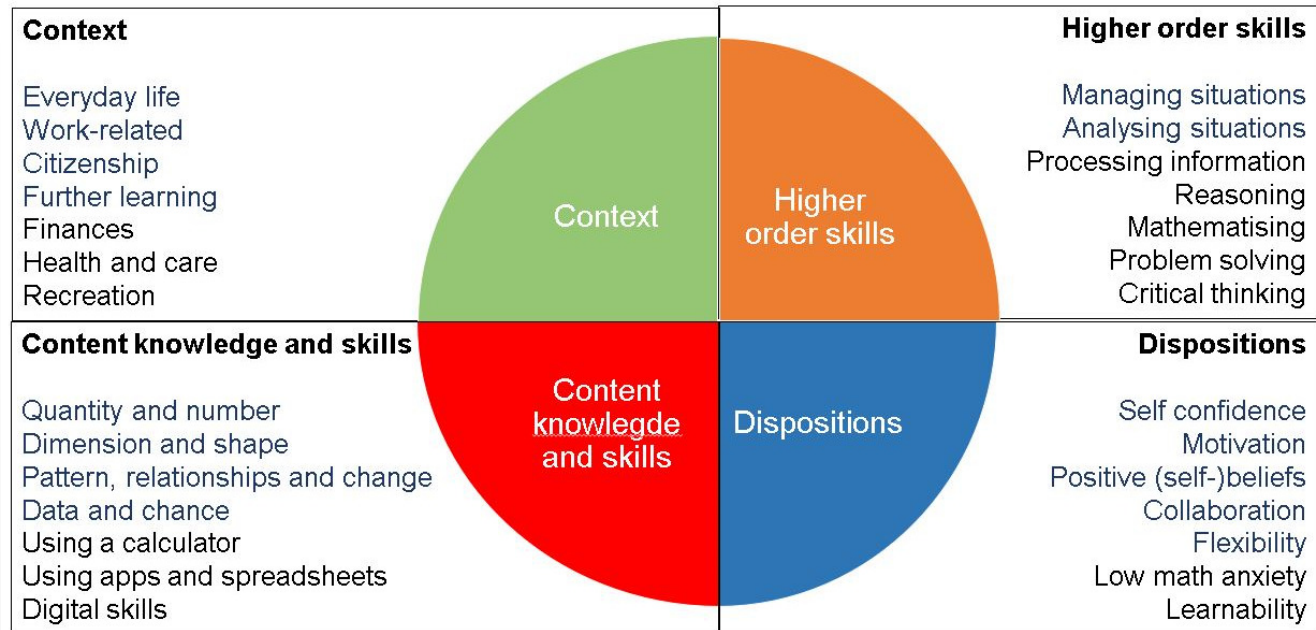
- Consequence of the influence of socio-cultural theories in the field of mathematics education.
- Focuses on what people do with numeracy in different social settings instead of solely focusing on how people engage with numeracy tasks out of context.
- However, viewing numeracy in this way needs to be accompanied by a word of warning – one must ensure that numeracy, when viewed as a social practice, does not become embedded in everyday realities so much so that it becomes “invisible”



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CENF Model

EPI-STEM



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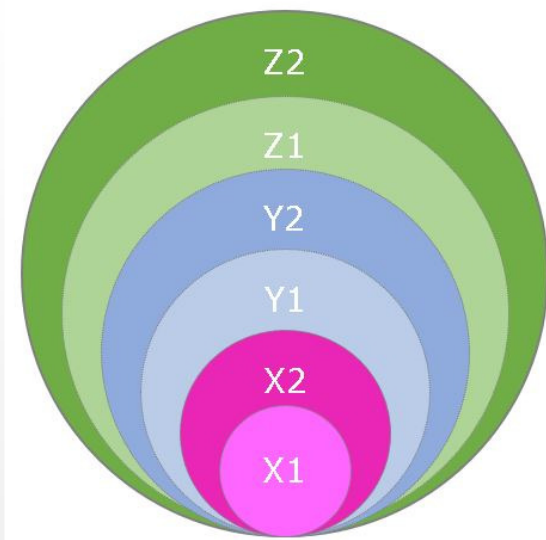
Overall Levels (Categories \neq Thresholds)

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Z: Specialized societal and work situations

Y: Societal and regular work situations

X: Daily-life situations



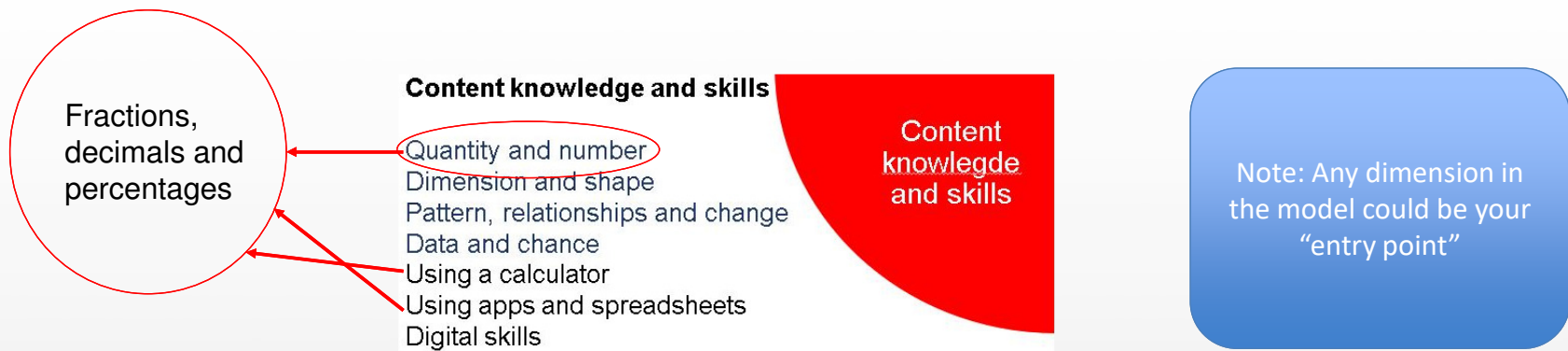
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CENF Model in Action

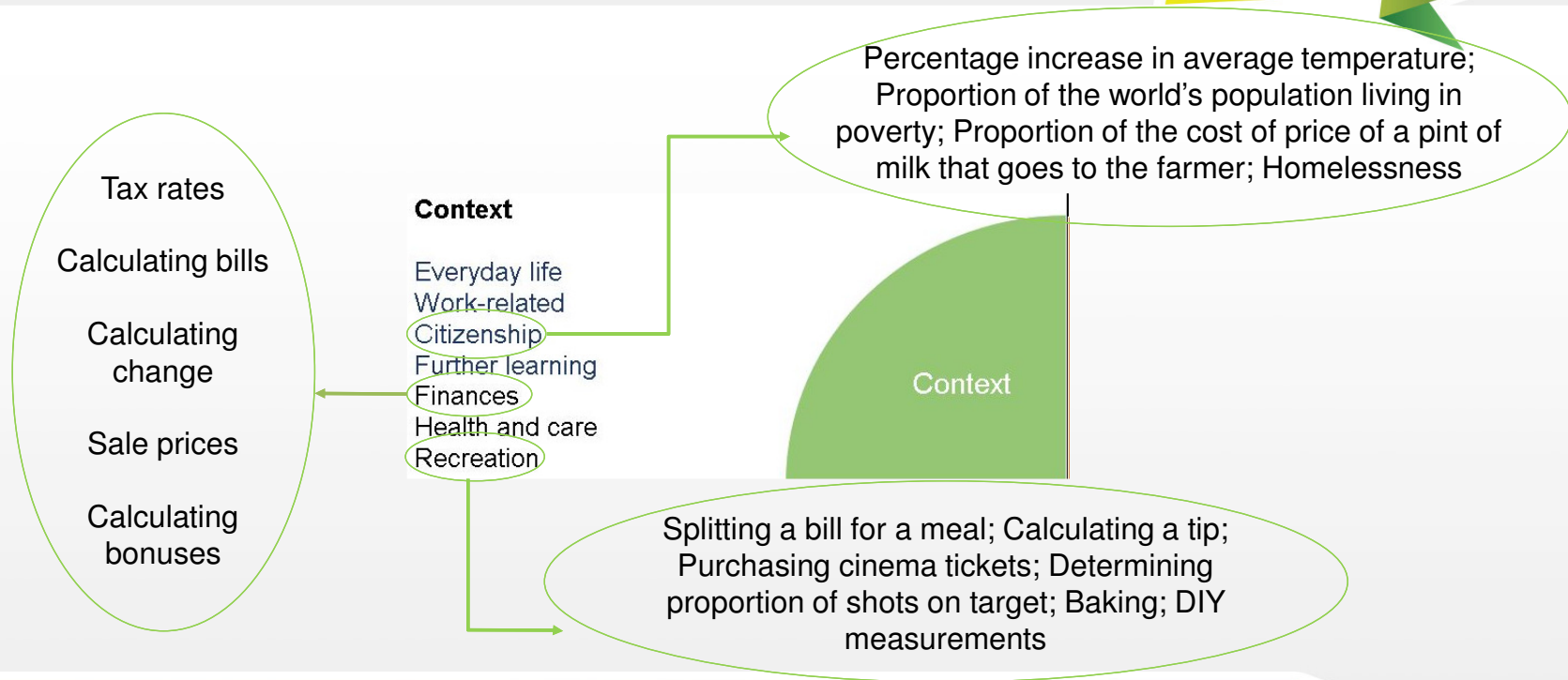
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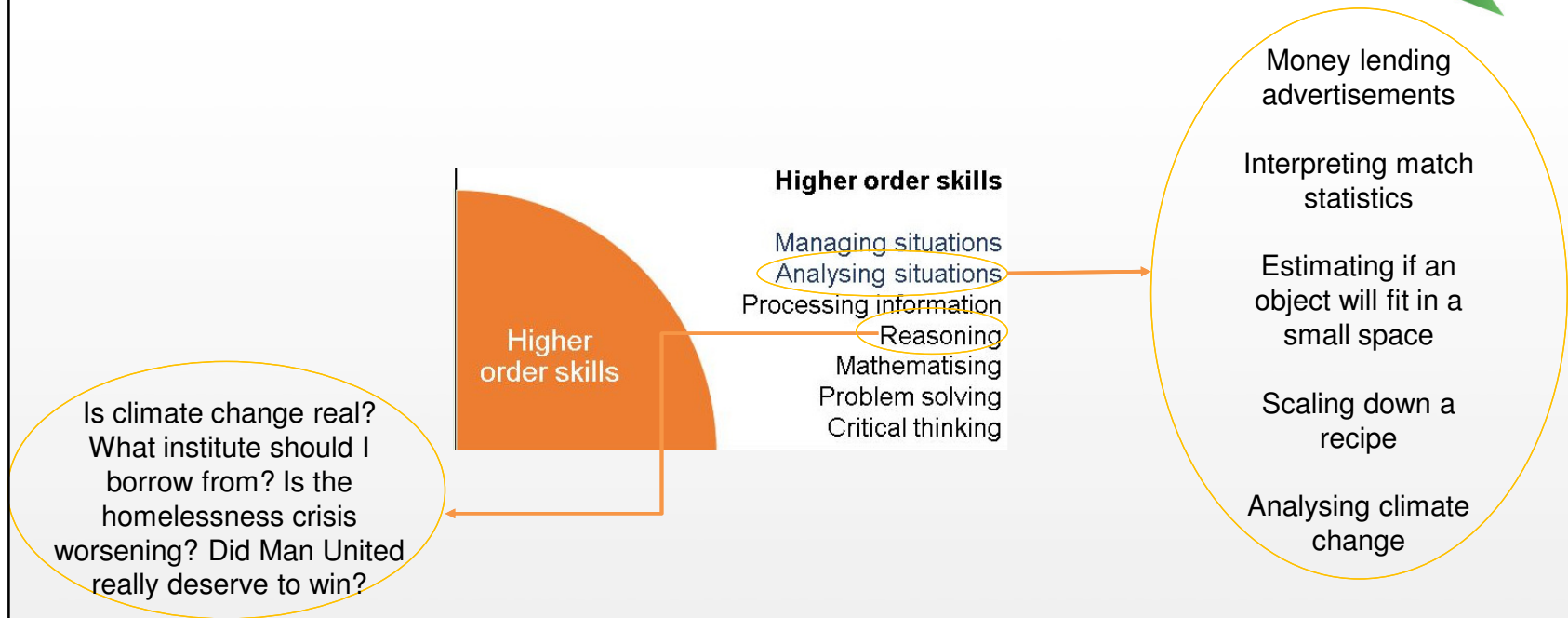
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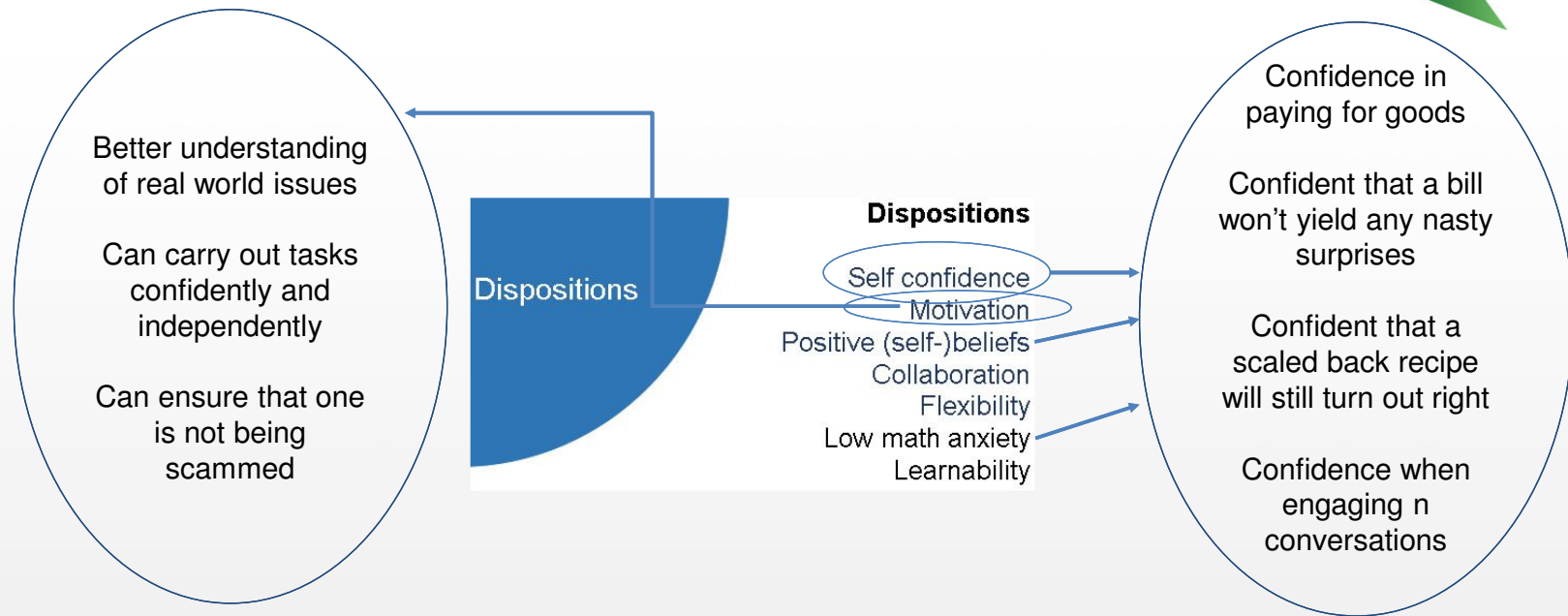
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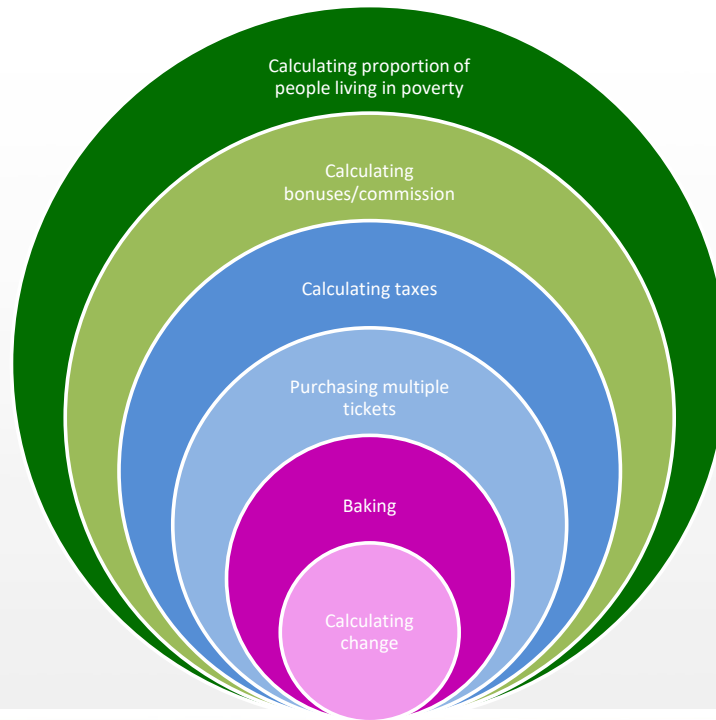
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CENF Model in Practice

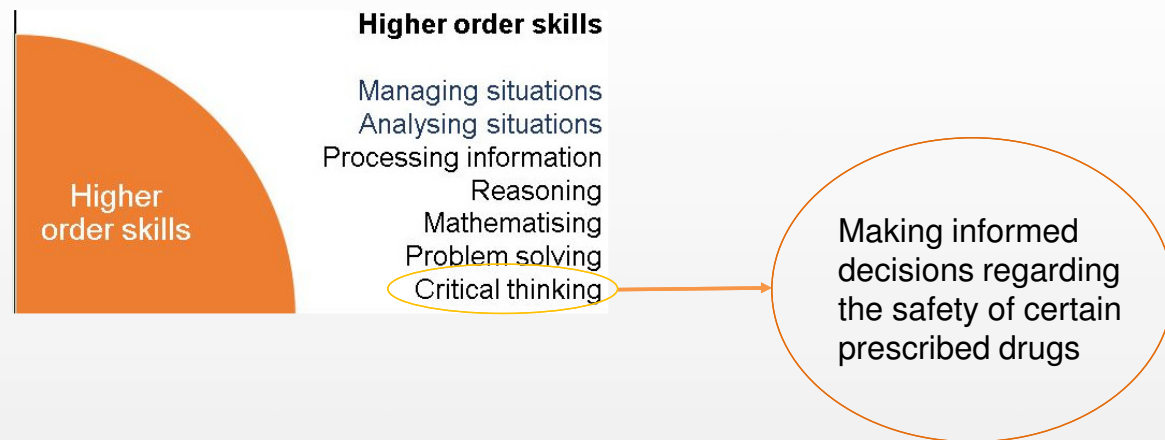
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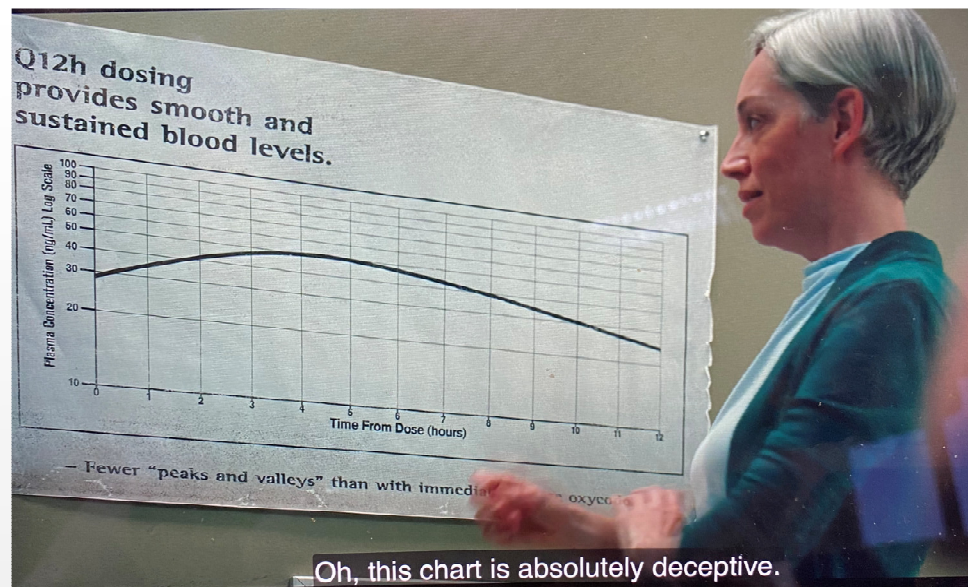
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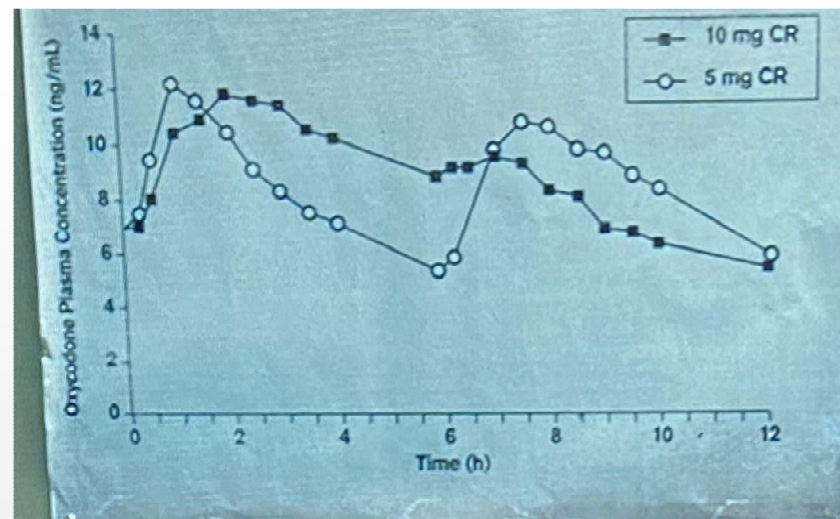
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CENF Model in Action

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CENF Model in Action

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Graphing data,
relationship
between
variables,
functions

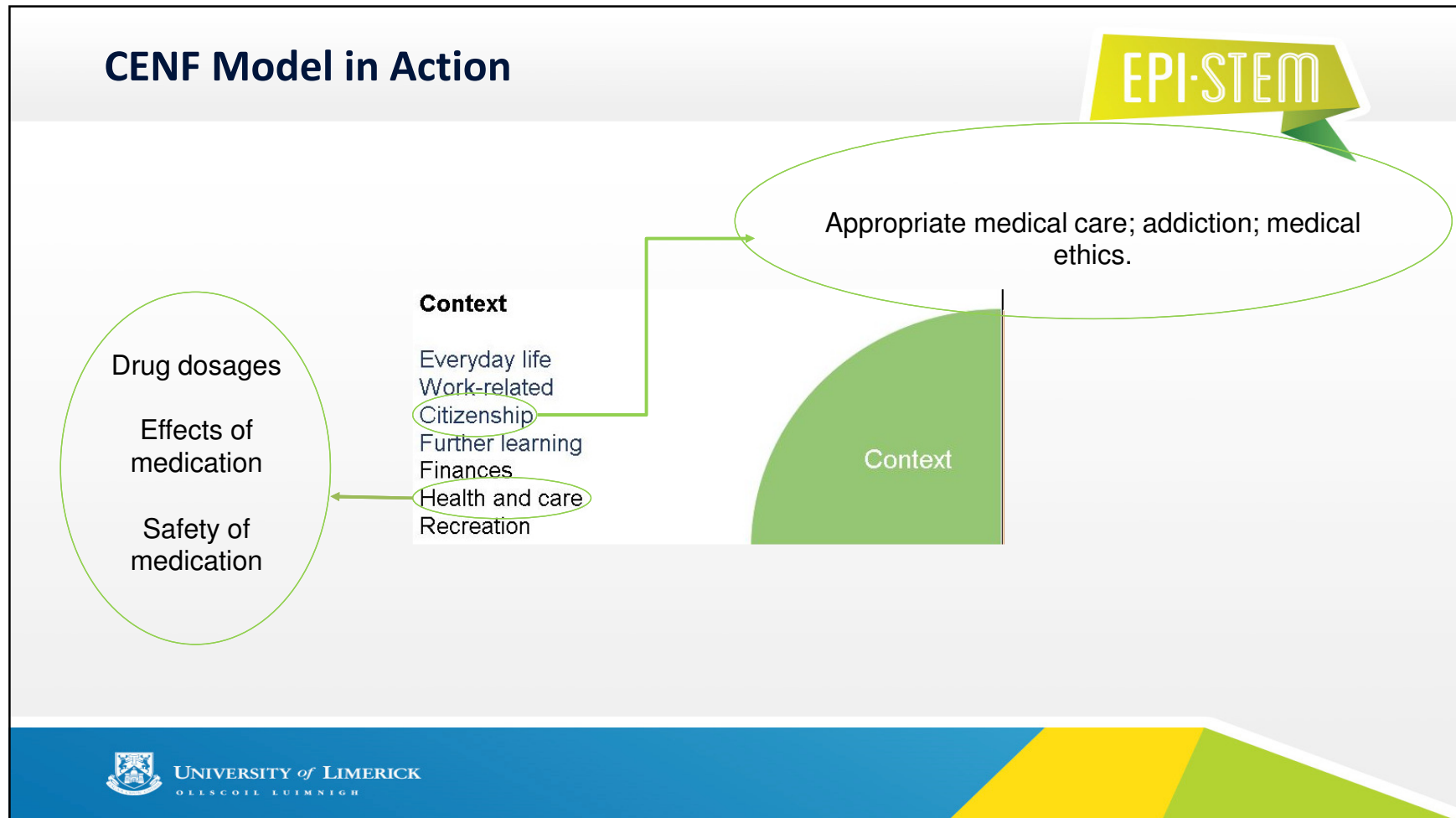
Content knowledge and skills

Quantity and number
Dimension and shape
Pattern, relationships and change
Data and chance
Using a calculator
Using apps and spreadsheets
Digital skills

Content
knowlegde
and skills

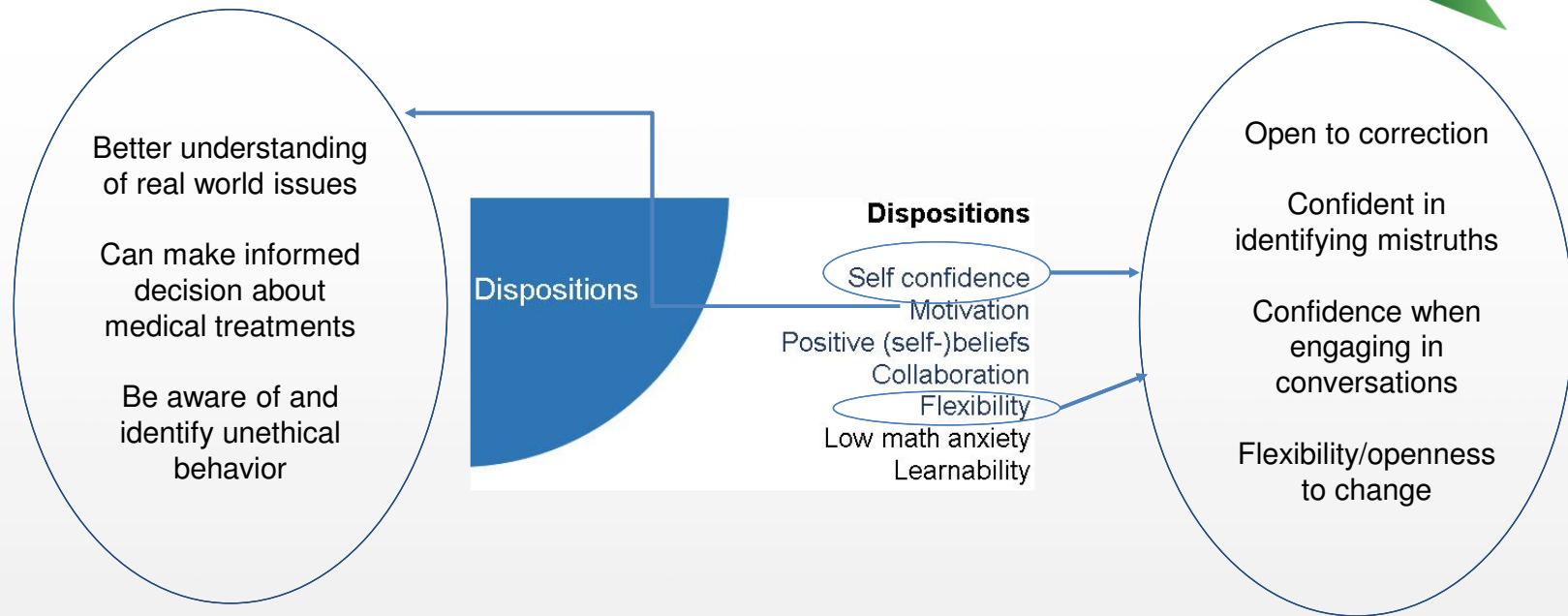


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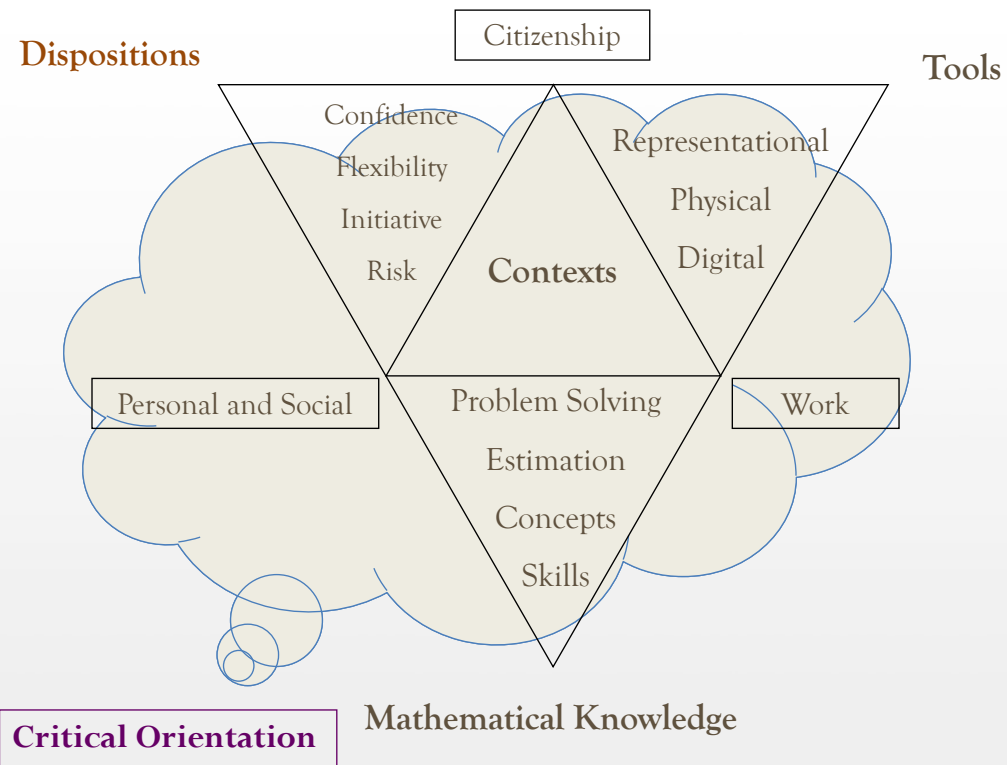
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Concluding Thoughts

The slide features a background image of three students (two men and one woman) smiling and looking at a laptop screen. The image is partially covered by a large blue diagonal overlay on the left and a yellow and green geometric shape on the right. The text 'Concluding Thoughts' is written in white on the blue overlay. The University of Limerick logo and name are in the top right, and the 'EPI-STEM' logo is on the yellow and green shape.

21st century numeracy

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Numeracy messages

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- Numeracy is more than number; its foundations encompass all areas of mathematics.
- Numeracy is more than “the basics”; it involves problem solving, reasoning, and a critical orientation to mathematics and how it is used in the world.
- Innumeracy has dire consequences for an individual’s life chances.



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