

THE PRESENTATION OF LINEAR FUNCTIONS IN CHINESE SCHOOL MATHEMATICS TEXTBOOKS

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BACKGROUND

- Students in China (Beijing-Shanghai-Jiangsu-Zhejiang) who participated in PISA 2018 ranked top in the world in mathematics.
- School mathematics textbooks play an important role in mathematics teaching and learning in China
- The topic of linear functions is the first time for students to learn functions in China

RESEARCH QUESTIONS

- How is the topic of linear functions presented in the selected Chinese school mathematics textbooks?
- What are the similarities and differences in the presentation of the topic of linear functions across them?

RESEARCH METHODS

Textbook selection

Four series of Chinese mathematics textbooks including the topic of linear functions are published by

- People's Education Press (PEP)
- Shanghai Education Publishing House (SEPH)
- Phoenix Science Press (PSP)
- Zhejiang Education Publishing Group (ZEPG)

Procedures

- Methods: Content analysis and comparison
- Contents: The chapters of the topic of linear functions
 - The sequence of the contents
 - The representation of the worked examples
 - The contexts of the worked examples
 - The mathematics literacy focusing on problem solving targeted through the worked examples

The last three aspects are in accordance with the *PISA 2021 Mathematics Framework (Draft)*

RESULTS

Sequence/Content

Table 1 The sequence of the contents in the chapters of the topic of linear functions

Version	PEP	SEPH	PSP	ZEPG
Grade	8	8	8	8
Semester	2 nd	1 st & 2 nd	1 st	1 st
Content	Chapter 19 Linear functions 19.1 Functions 19.1.1 Variables and functions 19.1.2 Graphs of functions Reading and Thinking: How do scientists calculate the age of rocks? 19.2 Linear functions 19.2.1 Proportional functions 19.2.2 Linear functions 19.2.3 Linear functions and equations, inequalities Information Technology Applications: Use computers to draw function graphs 19.3 Subject Study: Selection Plan Mathematics activity Summary Review questions	Chapter 18 Proportional and inverse proportional functions 18.1 The concept of functions 18.2 Proportional functions 18.4 Representation of functions Chapter 20 linear Functions 20.1 The concept of linear functions 20.2 Graphs of linear functions 20.3 Properties of linear functions 20.4 Application of linear functions Summary of the chapter Reading material: Linear empirical formula	Chapter 6 Linear functions 6.1 Functions 6.2 Linear functions 6.3 Graphs of linear functions 6.4 Solving problems with linear functions 6.5 Linear functions and linear equations with two unknowns 6.6 Linear functions, linear equations with one unknown and linear inequalities with one unknown Mathematics activity: The linear function on the thermometer Summary and thoughts Review questions	Chapter 5 Linear functions 5.1 Constants and variables 5.2 Functions 5.3 Linear functions 5.4 Graphs and properties of linear functions 5.5 Simple application of linear functions Subject learning: How to choose a better solution Summary Goals and assessments

Representation

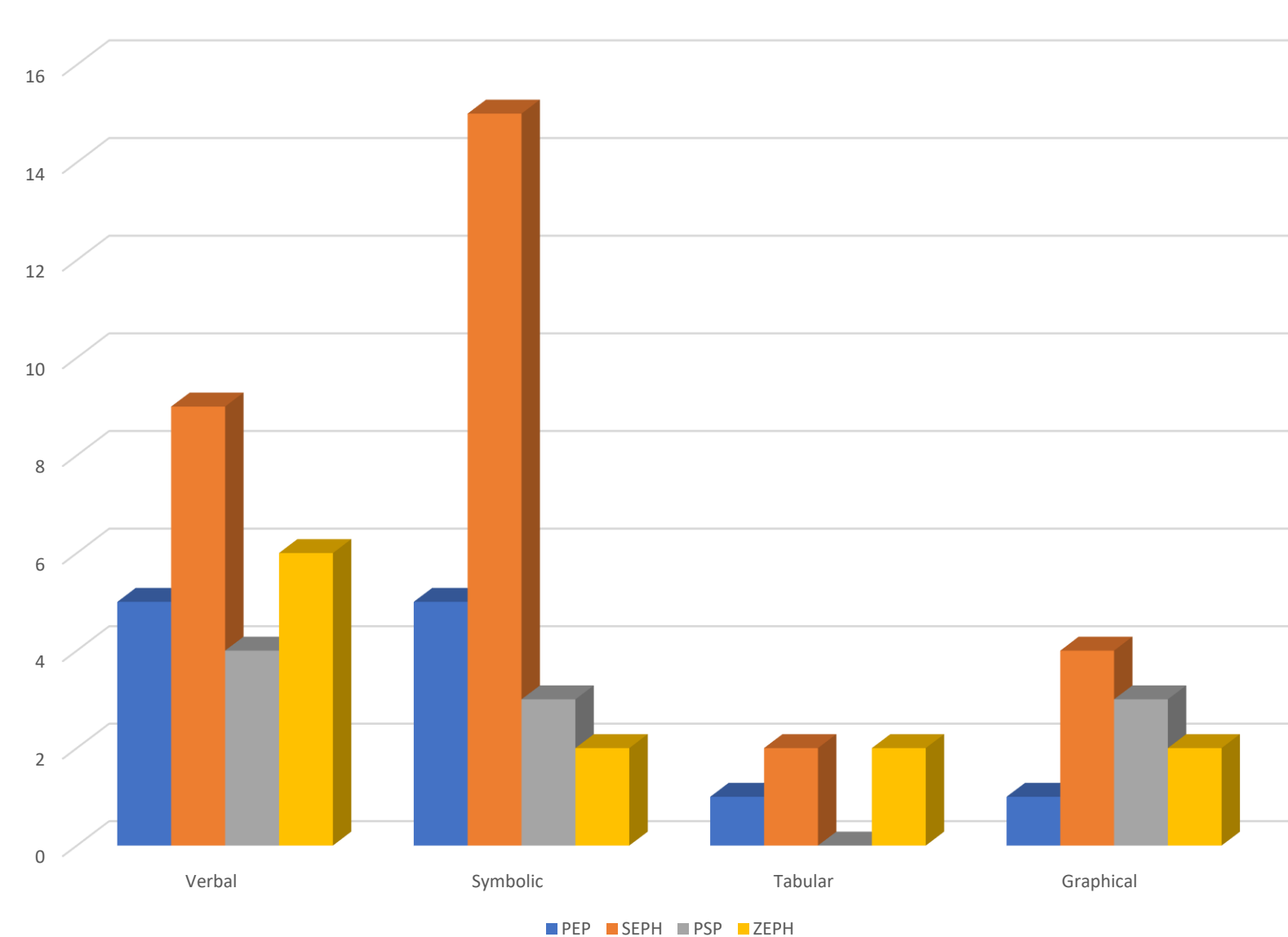


Figure 1 The distribution of the representation of the worked examples

Context

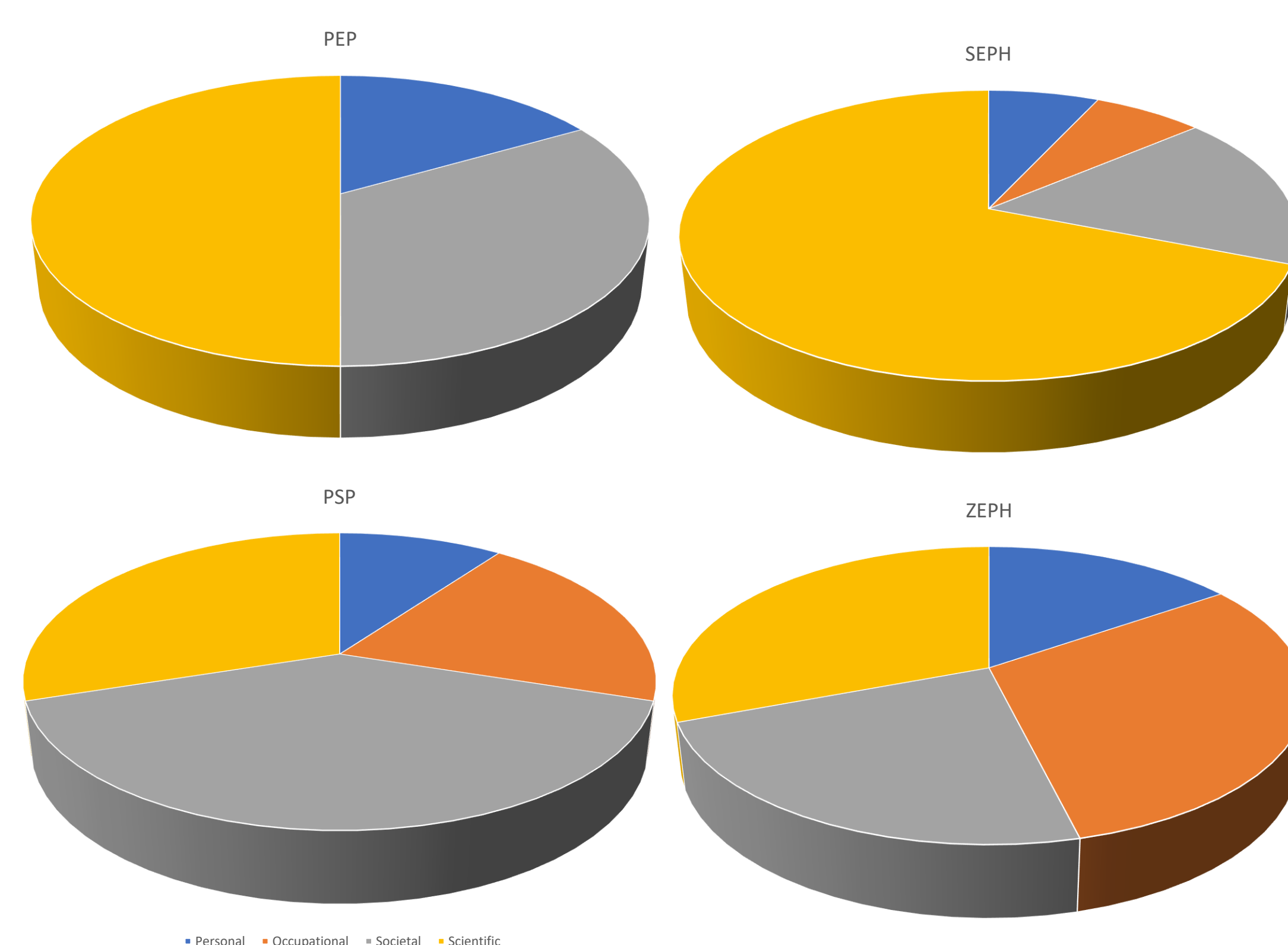


Figure 2 The percentage of the contexts of the worked examples

Mathematics literacy

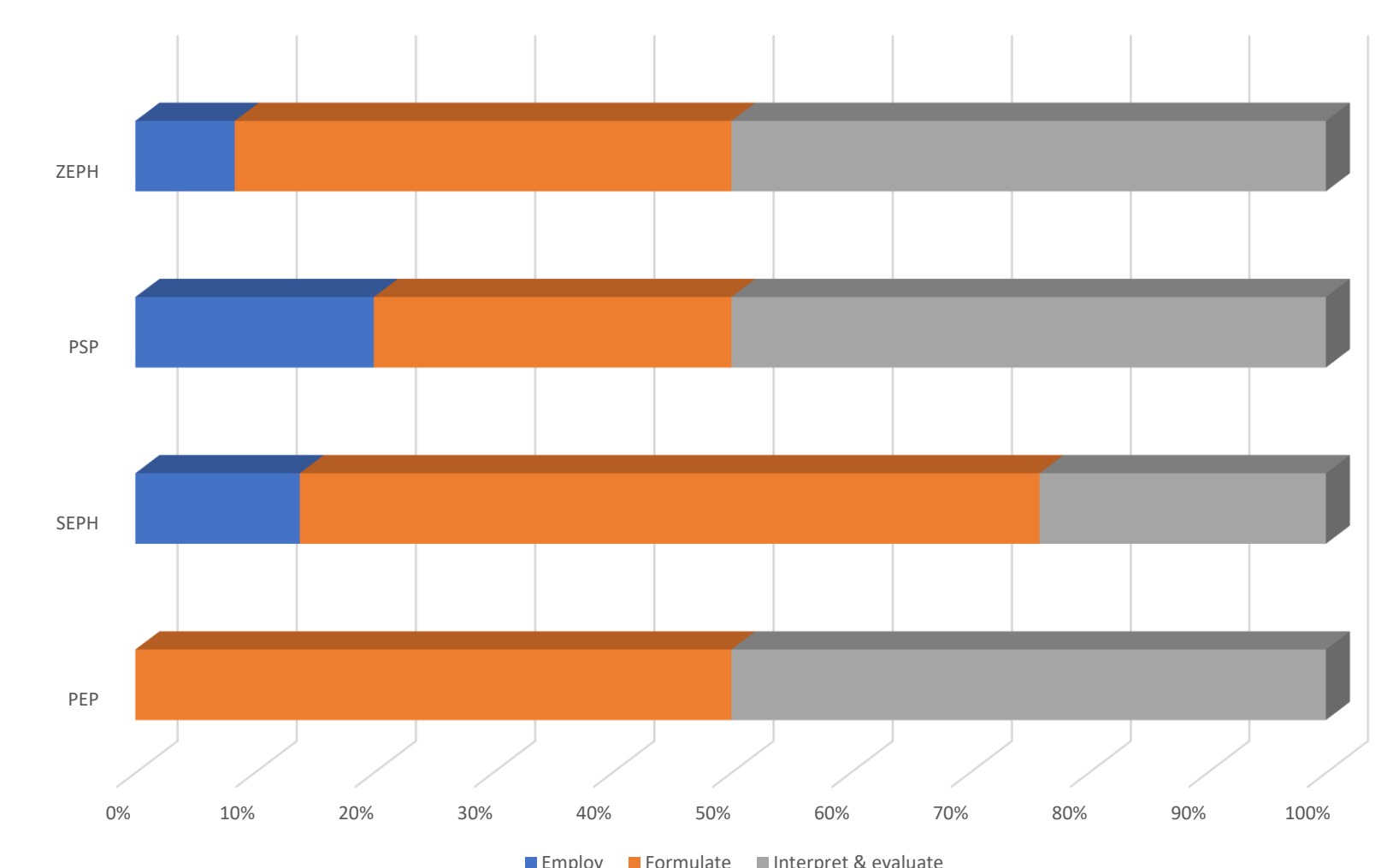


Figure 3 The percentage of the mathematics literacy focusing on problem solving targeted through the worked examples