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Opinions of Mathematics Teachers about Mathematics Literacy Proficiency Level Table

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Abstract

The aim of this study is to determine the opinions of mathematics teachers about the mathematical literacy proficiency level table and their knowledge about the proficiency levels. In line with the purpose of the research, case study was used as a method. In the sample of the study, there are 201 mathematics teachers working in various secondary and high schools in 56 provinces across Türkiye. The data collection instruments employed in this study encompassed a demographic information questionnaire, a proficiency level opinion form, and proficiency level determination questions. Of the educators who actively engaged in this research, 103 individuals were identified as male participants, while the remaining 98 were designated as female participants. 179 of them work in public schools and 22 of them work in private schools. Again, the working years of the teachers who mainly participated in the research are between 6 and 10 years. These teachers mainly teach 11th graders and work in Anatolian high schools. As a result of the findings obtained from the research, it is seen that although the teachers found the proficiency level table to be understandable in general, they emphasized the need to explain through more examples. In addition, when the teachers asked them to level the questions according to the proficiency level table, it was seen that they could not accurately level the questions according to the table. The research was concluded by giving suggestions to the people who will do similiar ones in this field.

Key Words

Mathematical literacy • Mathematics teacher • Proficiency level table

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Introduction

When literacy is mentioned, basic skills such as reading and writing come to mind first (Özgen & Kutluca, 2013). Turkish Language Association [TLA] (1998) defines literacy as the state of being literate. For society, literacy is being able to read any printed material (newspaper, book, magazine, etc.) (Yore, Pimm & Tuan, 2007). The concept of literacy has assumed a paramount significance across diverse academic disciplines. Proficiency in a given field implies the capacity to adeptly navigate the contextual landscape, discern emerging challenges, possess the requisite literacy competencies to access and appraise information for informed decision-making, locate repositories of pertinent knowledge, and facilitate the seamless utilization of technology (Çapar & Gürdal, 2001). In today's society, efforts are made to raise individuals who can think more creatively and quickly, and who have learned how to access information by increasing in an incremental manner, with an approach that emphasizes personal differences (Umay, 2004). In order to raise individuals in this way, individuals must be literate.

Although it is thought that the concept of literacy emerged with the Programme for International Student Assessment (PISA) implemented by the Organisation for Economic Co-operation and Development (OECD) (Bozkurt, 2019), the truth of the matter is not like this. It is thought that the concept of literacy first and mainly became one of the teaching goals towards the end of the 19th century and emerged due to the order of the changing world with the evolution of the industrial society towards the information society (Yenilmez & Ata, 2013).

Like many other concepts, the concept of literacy has also become specialized in the process, and as one of these specializations, mathematical literacy has taken its place in the literature. The prominence of the mathematical literacy concept has arisen concomitant with the growing disjunction between the mathematical curricula taught in educational settings and its practical applicability in real-life contexts. Indeed, were it not for the somewhat unexpected misalignment between the primary objectives of mathematics and the pedagogical methods employed in its instruction, the emergence of the notion of mathematical literacy would have remained less likely (Altun, 2020). For this reason, the old understanding of mathematics, which was perceived as the use of abstract concepts and the skills to use abstract concepts together, has been replaced by a new understanding of mathematics (Altun, 2020), which includes real-life models, where the person can make sense of and solve the problems he/she encounters, and which has constantly developing skills in this process (De Corte, 2004). When the literature is examined based on this information, it has been seen that different definitions of mathematical literacy have been made. Some of these definitions are as follows:

- Mathematical literacy is one's capacity to formulate, use and interpret mathematics in multiple contexts and contexts. Mathematical literacy is to be able to define existing events, to explain events and to make predictions about events, to reason mathematically and to include mathematical concepts, process steps, verified information and using these tools. Mathematical literacy plays a pivotal role in fostering an enhanced awareness among individuals regarding the multifaceted role that mathematics assumes within the global landscape. Furthermore, it empowers individuals to exercise discernment and make well-informed judgments and decisions, constituting fundamental prerequisites for citizens characterized by their constructive, discerning, and reflective attributes (Organisation for Economic Co-operation and Development [OECD], 2013a).

- Mathematical literacy is not just about dealing with formal mathematics, which is considered high-level, it's about making mathematics understandable for all people, where everyone can engage and use it as an empowering tool. It includes mathematical and non-mathematics situations in daily life (McCrone & Dossey, 2007).

- Mathematical literacy is the competent use of knowledge and skills related to mathematics. The competence mentioned here is the ability to make sense of a problem in which mathematics plays a leading role, to feel the need for mathematics while making the final decision, and to use mathematics related to the aforementioned things correctly (Altun, 2020).

Mathematics plays a very important role in today's world. Mathematics is used as a tool to provide solutions to problems faced by the individual in the real world (Lengnink, 2005). Mathematics and daily life are inseparable. Being mathematically literate is important for life, as mathematics enables students to develop solution methods and thought systems related to problems that are likely to be encountered in daily life (Şefik & Dost, 2016). In addition, it is widely accepted that mathematical literacy is important in a career in any science (Vila & Sanz, 2013). The fact that literacy has become a priority issue in many countries' innovations in education is due to PISA, which is implemented by the OECD and applied in a wide geography (Kabael & Barak, 2016).

PISA uses the term “literacy” to describe the broad focus on the use of knowledge and skills (Institute of Education Sciences [IES], 2010). Over the past decade, the terminology "mathematical literacy" has prominently featured within the discourse of reform literature in the realm of mathematics education. However, it is noteworthy that there exists a conspicuous absence of precise and universally accepted definitions elucidating the parameters of this term (Amit & Fried, 2002).

There is a perception that the term mathematical literacy has emerged with the PISA applications of the OECD (Bozkurt, 2019). However, before mathematical literacy was defined by the OECD, mathematical literacy was presented as one of the visions of mathematics education by the National Council of Teacher of Mathematics (NCTM) in 1989 (Sari & Wijaya, 2017). Mathematical literacy, as delineated by the NCTM commission, is characterized by mathematical proficiency that possesses the functional capacity to be applied across diverse contexts and under varying conditions (Soytürk, 2011). The concept of literacy, which is used by PISA to cover some broad competences dealing with adult life (Anderson, Lin, Treagust, Ross & Yore, 2007), is the ability to use and analyze knowledge and skills in interpreting and solving the problems that students encounter in many situations in the main subject areas, related to the competencies of making logical inferences and communicating effectively (Ministry of National Education [MoNE], 2010b). These identified competences are based on situations where they can be applied and have meaning in the lives of adults who have no special connection with the curriculum of the participating countries. Evaluations focus on students' ability to apply their knowledge and skills to real-life problems and situations (Anderson et al., 2007). Due to the needs in daily life, the term "literacy" has entered the education system of many countries and has become one of the main goals of these education systems (Bekdemir & Duran, 2012). Mathematical literacy, as expounded by Bansilal, Mkhwanazi, and Mahlabela (2012) and subsequently reinforced by Korkmaz (2016), denotes the orientation of an individual's life trajectory through the integration of mathematical applications into their daily existence, with a profound interconnectedness to real-life

contexts. What is aimed in mathematical literacy is not for students to do more mathematics, but for them to make more applications and to use mathematics to make sense of the world while doing these applications (Bansilal et al., 2012).

The OECD, which was established in 1961 and was formed by the gathering of 34 countries, including Türkiye, is concerned with education policies as well as economic policies. The reason for this is that education and economy are directly related to each other (Akgündüz, 2018). PISA, which was established by the OECD to determine the success levels of students, started its first studies in 1997 and in 2000, the actual application was made and the literacy levels were evaluated in accordance with an international standard (Aksu, 2019; Anderson, Chiu & Yore, 2010; Chung, 2013). OECD applies the PISA assessment exam in order to obtain education-related data (Akgündüz, 2018). PISA, as noted by Aşkar and Olkun (2005), Karabay, Yıldırım, and Güler (2015), and affirmed by the OECD (2019a), serves as a global assessment tool designed to gauge the proficiency levels of students aged between 15 years 3 months and 16 years 2 months, who have completed a minimum of six years of formal education. Its primary purpose is to ascertain the extent to which these students have acquired foundational knowledge and skills requisite for active engagement in societal and economic spheres, as well as to assess their overall preparedness for the challenges of life ahead. In this exam, each term is evaluated by focusing on a type of literacy such as reading skills, mathematics and science literacy. These levels repeat themselves in every three-year period. The cycle that started in 2000 ended in 2006 and a new cycle started in 2009 (Birbiri, 2014; MoNE, 2010b; OECD, 2014a). Türkiye participated in these exams for the first time in 2003 (Eraslan, 2009; MoNE, 2005). 41 countries, 30 of which were OECD countries, took the exam in 2003. Türkiye ranked 36th among all countries and 28th among OECD countries. 57 countries, 30 of which were OECD countries, participated in the exam in 2006, and Türkiye's place among all countries was 43rd and 29th among OECD countries. In the year 2009, a total of 65 nations, with 33 among them belonging to the OECD consortium, engaged in the examination. In this assessment, Türkiye secured a ranking of 44th on a global scale and occupied the 32nd position within the subset of OECD member countries. Similarly, in the subsequent year of 2012, the examination witnessed the participation of 65 countries, with 34 counted as OECD member states. Türkiye's performance in this iteration also resulted in a global ranking of 44th, while within the OECD context, it held the 31st position. In 2015, 72 countries, 35 of which were OECD countries, took the exam and Türkiye ranked 50th among all countries and 34th among OECD countries. In 2018, 79 countries, 37 of which were OECD countries, participated in the exam and Türkiye ranked 42nd among all countries and 33rd among OECD countries (MoNE, 2005; 2010a; 2010b; 2015a; 2016; 2019). Türkiye showed a performance close to the bottom ranks among OECD countries, and close to the middle ranks in all participating countries. According to PISA reports, it is seen that Türkiye is not a very successful country in the field of mathematical literacy (Bozkurt, 2019). In addition, PISA determines the success status of the countries in line with the answers given by the students to the questions. These success situations are also decided according to their proficiency levels. Conversely, proficiency levels serve the dual purpose of establishing the complexity gradients of posed inquiries and delineating a structured framework for ascertaining students' mathematical literacy proficiencies and competencies (Altun, 2020).

PISA is widely recognized as crucial in the development process of determining proficiency levels (Suna, Tanberkan & Özer, 2020). It is a scale developed by PISA administrators, based on students' responses to questions

in past and future exams, for the purpose of summarizing the data obtained (Kamaliyah, Zulkardi & Darmawijoyo, 2013). OECD has defined seven proficiency levels for mathematical literacy. The descriptions of these levels by OECD are presented in Table 1.

Table 1

Mathematical Proficiency Levels Table

Level	Characteristics of Tasks
6	At Level 6, students can conceptualise, generalize and utilize information based on their inverstigations and modelling complex problem situations, and can use their knowledge in relatively non-standard contexts. They can link different information sources and representations together and flexibly translate amongst them. Students at this level are capable of advanced mathematical thinking and reasoning. These students can apply this insight and understanding, along with a mastery of symbolic and formal mathematical operations and relationships, to develop new approaches and strategies for attacking novel situations. Students at this level can reflect on their actions, and can formulate and precisely communicate their actions and reflections regarding their findings, interpretations, arguments and the appropriateness of these to the original situation.
5	At Level 5, students can develop and work with models for complex situations, identifying constraints and specifying assumptions. They can select, compare and evaluate appropriate problem-solving strategies for dealing with complex problems related to these models. Students at this level can work strategically using broad, well-developed thinking and reasoning skills, appropriate linked representations, symbolic and formal characterisations, and insight pertaining to these situations. Studenst at this level habe begun to develop the ability to reflect on their work and to communicate conclusions and interpretations in written form.
4	At Level 4, students can work effectively with explicit models for complex, concrete situations that may involve constraints or call for making assumptions. They can select and integrate different representations, including symbolic representations, linking them directly to aspects of real-world situations. Students at this level can utilize their limited range of skills and can reason with some insight in straightforward contexts. They can construct and communicate explanations and arguments based on their interpretations, arguments and actions.
3	At Level 3, students can execute clearly described procedures, including those that require sequential decisions. Their interpretations are sufficiently sound to be a base for building a simple model or for selecting and applying simple problem-solving strategies. Students at this level can interpret and use representations based on different information sources amd reason directly from them. They typically show some ability to handle percentages, fractions and decimal numbers, and to work with proportional

	relationships. Their solutions reflect that they have engaged in basic interpretation and reasoning.
2	At Level 2, students can interpret and recognize situations in contexts that require no more than direct inference. They can extract relevant information from a single source and make use of a single representational mode. Students at this level can employ basic algorithms, formulae, procedures or conventions to solve problems involving whole nımbers. They are capable of making literal interpretations of results.
1	At Level 1, students can answer questions involving familiar contexts where all relevant information is present and the questions are clearly defined. They are able to identify information and carry out routine procedures according to direct instructions in explicit situations. They can perform actions that are almost always obvious and follow immediately from the given stimuli.
0	At Level 0, students may have skills such as reading a number in a very clearly stated simple representation and performing some very simple operations with natural numbers.

Retrieved from (MoNE, 2013; OECD, 2019b)

However, as also noted by Altun (2020), the level descriptions provided in the level table do not align with the levels of the questions. Therefore, there is a need to identify the issues experienced by mathematics teachers, who are users of the mathematical literacy proficiency level table, regarding this table. There are many studies in the literature on the level of mathematical literacy proficiency (Aydoğdu-İskenderoğlu & Baki, 2011; Seis, 2011; Aydoğdu-İskenderoğlu, Erkan, &Free, 2013; Karataş, 2019; Retnawati & Wulandari, 2019; Şaban, 2019; Yiğit, 2019; Yıldırım, 2019; Öztürk & Masal, 2020; Sarıkaya, 2022; Şahin, 2022). However, studies containing opinions on the proficiency level table are quite limited (Calp & Kalkan, 2022; Selçuk & Tezbaşaran, 2022). Typically, these investigations are oriented towards the assessment of question complexity found within educational materials, including textbooks and national standardized examinations, or towards the evaluation of students' proficiency levels. That's why, the aim of this study is to determine the opinions of mathematics teachers about the mathematical literacy proficiency level table and their knowledge about the proficiency levels. For this purpose, the problems of the research are:

- What are the opinions of secondary and high school mathematics teachers about the proficiency level table?
- What is the knowledge of secondary and high school mathematics teachers about the proficiency levels of mathematical literacy questions?

Method

In this study, case study, one of the qualitative research methods, was used. Case study is a research method frequently used in the social sciences (Heale & Twycross, 2018). A case study research is a qualitative approach in which the researcher gains detailed and in-depth knowledge by using multiple sources of information about real-life situations and various bounded systems, describing a case or revealing case themes (Creswell, 2013). The utilization

of a case study approach serves as a valuable means to elucidate comprehensive and insightful explanatory insights pertaining to the specific subject of inquiry (Kaleli-Yılmaz, 2019). In the case study “How?”, “Why?” and what?" questions are sought (Çepni, 2018). In this research, a case study research method is employed because the aim is to uncover the opinions and knowledge of mathematics teachers regarding the mathematical literacy proficiency level table.

Research Sample

Teachers working in 56 provinces and different types of schools in Türkiye were asked to estimate the level of the questions in the mathematical literacy test according to the mathematical literacy proficiency level table. 201 secondary and high school mathematics teachers working throughout Türkiye participated in the research. Although the range determined by PISA as the age group coincides with the high school level, it was important to get the opinions of the teachers working in secondary schools. Given that the Ministry of National Education (MoNE) oversees the participation of secondary school students in the PISA examination (MoNE, 2019), and concurrently, secondary school mathematics educators assume a pivotal role during the transitional phase from secondary to high school, this confluence of factors underscores their collective significance within the educational milieu. For these reasons, secondary school mathematics teachers, another group likely to use the proficiency level table, were also included in the sample of this study. Mathematics teachers participated in the research in 103 male (51%), 98 female (49%). 179 (89%) of the teachers who participated in the research work in public schools and 22 (11%) in private schools. When the working years of the participating teachers in the profession are examined, 30 teachers from 0-5 years participated in 15%, 56 teachers from 6-10 years in 28%, 45 teachers from 11-15 years in 22%, 30 teachers from 16-20 years in 15%, 20 teachers from 21-25 years in 10%, 26 -14 teachers from 30 years in 7%, 3 teachers from 31-35 years in 1.5%, 1 teacher from 36-40 years in 0.5%, 1 from 41-45 years in 0.5% and 1 teacher in 46-50 years in 0.5%. Out of the teachers participating in the research, 28 of them work in middle schools, 151 in high schools, and 22 in both types of schools. It is seen that teachers who have worked in the profession for a maximum of 6-10 years participated in the research. In addition to these, it is noteworthy that the teachers participating in the research mainly teach 11th grade students and they work in Anatolian high schools.

Data Collection Tools

Within the scope of this research, 3 data collection tools were used. Details of the data collection tools used are presented below.

Demographic information questionnaire: This questionnaire was applied to find out the gender of the teachers participating in the study, the types of their institutions, types of their schools, the grade levels they teach, the years of work in the profession and the province they work in. Thanks to this survey, it will be possible to draw a general profile of the teachers participating in the study.

Proficiency levels opinion form: As stated by Altun (2020), there are areas in the proficiency table that are not understood. For this reason, an opinion form was created in order to determine the problems experienced by the teachers in the mathematical literacy table. This created opinion form was shown to 2 mathematics educators who

are experts in their field. With the arrangements made in line with the opinions received from the experts, the opinion form was made ready for application. According to the opinions of the experts, the points that the teachers were asked to pay attention to in the table were added as explanations to the side of the questions.

Questions for determining proficiency levels: To assess the precision of teachers' ability to forecast question difficulty levels utilizing the mathematical literacy table, a 7-question instrument was devised, drawing upon mathematical literacy inquiries expounded by PISA, encompassing one representative question from each proficiency level. This form was shown to 2 mathematics educators who are experts in their field. With the arrangements made through the opinions of the experts, the form was made ready for application. With the opinions of the experts, an option has been added so that the teachers can decide more easily on the levels to be given to the questions.

In Table 2, the questions asked to mathematics teachers and the proficiency levels provided by PISA for these questions are presented. The questions used were selected from the questions released by the OECD's PISA assessment.

Table 2

Asked Questions and Their Proficiency Levels

Category	**Level**	**Question**
Low	Level 0	Which Car?
Low	Level 1	Charts
Low	Level 2	Staircase
Intermediate	Level 3	Internet Relay Chat
Intermediate	Level 4	Coloured Candies
High	Level 5	Test Scores
High	Level 6	Carpenter

Retreived from (OECD, 2006; OECD, 2013b; Bezek-Güre, Kayri & Erdoğan, 2020; Sönmez, 2022)

Data Analysis

Within the scope of the research, a mathematics literacy proficiency level table was given to the mathematics teacher working in various secondary schools and high schools, and the teachers were expected to level the questions according to this table, and at the same time, the teachers' opinions about the table were taken. Following the systematic elimination of erroneous data entries, a total of 201 datasets remained for comprehensive evaluation.

Teachers were systematically assigned unique codes ranging from A1 to A201, and their corresponding comments were subsequently rendered in a coded format for presentation and analysis. First of all, the demographic data obtained from the teachers were examined and tabulated. As the next step, the levels given by the teachers to the mathematical literacy questions were examined with a frequency table. In the last step, teachers' views on the proficiency level table were tabulated and examined. Content analysis has been used for organizing the views of mathematics teachers about the mathematical literacy proficiency level table. Content analysis was used in the analysis of such qualitative findings. The main purpose of content analysis is to guide the academic studies aimed to be carried out in the content of the subject discussed and afterwards, and to determine the general trend related to the subject examined (Ültay, Akyurt, & Ültay, 2021). In addition, a frequency table has been used to reveal the answers provided by mathematics teachers to mathematical literacy questions according to the proficiency level table.

Validity and Reliability

No time limit was given for the teachers to respond to the form and they were allowed to think comfortably. Thus, they had enough time to evaluate the opinion form and questions. In addition, the answers of the teachers who answered all the questions as the levels given by PISA were eliminated in case the teachers had seen the questions anywhere before and knew their level. Furthermore, the answers provided by the teachers to the questions were coded by both researchers, and the reliability of the data was calculated using the formula 'Reliability = Agreement / (Agreement + Disagreement)' (Miles & Huberman, 1994). Upon computation, the analysis yielded a notable (87%) concurrence rate among the codings. Subsequently, consensus was diligently attained through collaborative deliberation between the two researchers with respect to discrepant codings, thus culminating in the establishment of the definitive coding framework. Furthermore, to fortify the rigor of the coding process, the codings were subjected to scrutiny by two eminent mathematics educators distinguished in the field.

Results

Firstly, mathematics teachers working in middle and high schools were provided with the mathematical literacy proficiency table created by PISA. They were then asked to examine the level descriptions. Teachers were instructed to look into aspects such as the clarity and comprehensibility of the level table. In the second stage, teachers were presented with seven questions, one from each level, and they were asked to assign levels to these questions using the proficiency level table. Consequently, the viewpoints of the teachers pertaining to the proficiency level table underwent coding procedures and were subsequently organized into tabular format for systematic presentation and analysis. Finally, the levels assigned by the teachers to the questions were organized using a frequency table. In Table 3, the opinions of mathematics teachers regarding the language of the mathematical literacy proficiency level table are presented.

Table 3

The Opinions of Mathematics Teachers About The Language of The Mathematics Literacy Proficiency Table

Teacher Opinions	**Number of Teachers**	**Percentage**
Understandable	156	78%
It should be simpler	27	13%
Academic language is used	2	1%
An example should be given	2	1%
Boring	2	1%
No opinion stated	12	6%
Total	201	100%

When Table 3 was examined, 156 teachers (78%) stated that the language of the mathematics literacy proficiency table was understandable. 27 teachers (13%) said that it should be simpler. 2 teachers (1%) stated that an academic language was used. 2 teachers (1%) confirmed that an example should be given, and 2 teachers (1%) stated that it was boring. 12 teachers (6%) did not express their opinions.

The views on the language of the mathematics literacy proficiency level table given to the mathematics teachers are presented in Table 1. Upon scrutiny of Table 1, it becomes evident that the majority of teachers concur on the overall comprehensibility of the mathematical literacy proficiency level table. In terms of comprehensibility, Teacher A28 provided feedback in the form of, "It is articulated in a lucid manner, and I perceive no notable issues," while Teacher A46 expressed, "It exhibits an adequate level of clarity through its expression in fluent Turkish." However, with respect to simplicity, Teacher A35 opined, "I discern an excess of protracted sentences, some of which bear similarity to each other," and Teacher A38 commented, "There exists a certain verbosity in the text, warranting potential simplification." Regarding the use of an academic language, the teacher with the code A16 said, “An academic language was used too much. What is meant to be explained can be explained in simpler words and in a shorter way”. The teacher with the code A64 about the subject of “An example should be given” said “It needs to give a more detailed explanation in the process from level 0 to level 3. It can be exemplified”, The teacher coded A189 said, “I think that the difference between the 6th and 5th levels is not very different from the ones given. It will be more understandable if examples are made for both levels.”, Teacher coded A20 stated their views about boringness as “It looks boring so I didn't want to read it”, and teacher coded A100 stated that “There are too many repetitions and it can be boring to read the same things”. In addition, some teachers did not want to express any opinions. In Table 4, the opinions of mathematics teachers regarding the levels in the mathematical literacy proficiency level table are presented.

Table 4

Opinions of Mathematics Teachers About The Levels in The Mathematics Literacy Proficiency Table

Teacher Opinions	Number of Teachers	Percentage
Understandable	142	71%
It is not clear	23	11%
Levels nested	10	5%
Not understood	8	4%
Requires detailed reading	2	1%
Written in academic language	1	0,5%
Examples of levels should be given	1	0,5%
No opinion stated	14	7%
Total	201	100%

When Table 4 was examined, 142 teachers (71%) stated that the language of the mathematics literacy proficiency table was understandable. 23 teachers (11%) said that it was not clear. 10 teachers (5%) stated that the levels were intertwined. 8 teachers (4%) confirmed that it was not understandable, 2 teachers (1%) stated that it needed detailed reading. 1 teacher (0.5%) stated that academic language was used. 1 teacher (0.5%) stated that an example should be given about the levels. 14 teachers (7%) did not express their opinions.

The opinions about the levels in the mathematics literacy proficiency level table given to the mathematics teachers are presented in Table 2. When Table 2 is examined, it is seen that the teachers find the levels in the mathematical literacy proficiency level table to be generally understandable. On the other hand, the teachers' comments about the table were as follows: "It is understood" by the teacher with the code A3 and as "understandable" by the teacher with the code A21. While A97 coded teacher said, "I think some situations are intertwined", A105 coded teacher replied, "Although the transitions are not sharp, there are intertwined transitions." Regarding the text written in an academic language, the teacher with the code A77 replied, “Anyone who has a good command of the academic language can understand it”. While the teacher coded A75 said "There are no clear distinctions between the levels", the teacher coded A139 used the statement "The expected behaviors at some levels are quite close to each other, it can be difficult to distinguish". A124 coded teacher about reading in detail stated " It can be understood when read in detail". Regarding the statement about "not understood", A10 coded teacher said, “Simple operations at level 0 can be more explanatory. While non-decimal subtraction is easy, decimal subtraction can be difficult. The same applies to the 1st level”; on the other hand, the teacher coded A31 said, “It is noticed that it is written only from highly talented to less talented. Regarding the statement concerning content comprehension, the teacher designated as S55 remarked, "The content is challenging to apprehend." In relation to the suggestion regarding the provision of exemplars for each proficiency level, Teacher S55 articulated, "I posit that incorporating

illustrative questions or scenarios alongside each proficiency level would enhance the table's overall clarity and comprehensibility." As the stages rise, it would be appropriate to state that ..... can do it, but ..... cannot. Thus, it will be easier for the reader and the researcher to distinguish the levels from each other". In addition, some teachers did not want to express any opinions. Mathematics teachers were given a proficiency level table and asked to give a level to mathematical literacy questions. In the second stage, the questions posed to teachers to determine the question levels were presented before the answers given for each level. The question used for Which Car?-Level 0 is presented below.

Figure 1

Which Car?-Level 0

Chris has just received her car driving licence and wants to buy her first car.

This table below shows the details of four cars she finds at a local car dealer.

Model:	**Alpha**	**Bolte**	**Castel**	**Dezal**
Year	2003	2000	2001	1999
Advertised price (zeds)	4800	4450	4250	3990
Distance travelled (kilometres)	105 000	115 000	128 000	109 000
Engine capacity (litres)	1.79	1.796	1.82	1.783

Chris wants a car that meets **all** of these conditions:

- The distance travelled is **not** higher than 120 000 kilometres.
- It was made in the year 2000 or a later year.
- The advertised price is **not** higher than 4500 zeds.

Which car meets Chris's conditions?

A Alpha
B Bolte
C Castel
D Dezal

The Level 0 question in Figure 1 is the easiest question asked by PISA. In this study, the question "Which Car?" was used. The solution to this question involves interpreting the table according to the given criteria. The levels assigned by the teachers to this question are presented in Table 5.

Table 5

Level Estimations of Mathematics Teachers for Which Car-Level 0 Question

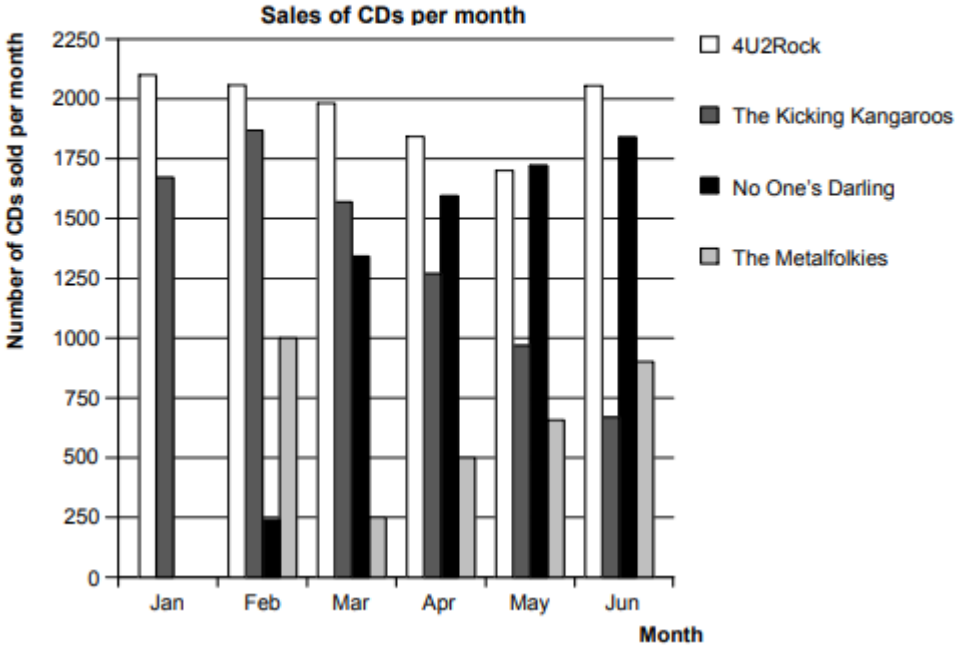
Level	Teacher Categories	Frequency
Level 0	A4, A19, A72, A90, A101, A163	6
Level 1	A16, A17, A27, A35, A52, A77, A80, A82, A89, A111, A116, A118, A121, A123, A126, A127, A139, A142, A148, A153, A166, A168, A177, A182, A192, A195	26
Level 2	A10, A24, A30, A31, A34, A38, A42, A45, A53, A55, A64, A75, A92, A97, A99, A112, A128, A133, A151, A152, A156, A161, A171, A179, A180, A184, A191, A193	28
Level 3	A1, A22, A23, A28, A32, A40, A54, A63, A69, A73, A86, A104, A105, A115, A117, A122, A125, A129, A132, A137, A141, A143, A145, A155, A162, A165, A170, A172, A173, A186, A189, A200	32
Level 4	A14, A33, A41, A44, A46, A50, A51, A56, A62, A76, A78, A83, A85, A93, A94, A102, A106, A107, 109, A120, A130, A135, A144, A149, A150, A164, A169, A174, A178, A187, A196, A198, A201	33
Level 5	A3, A5, A6, A7, A8, A9, A13, A18, A20, A21, A29, A36, A37, A43, A48, A59, A61, A66, A70, A74, A88, A96, A103, A114, A124, A147, A158, A183, A185, A188, A190, A197, A199	33
Level 6	A2, A12, A15, A25, A26, A39, A47, A49, A57, A58, A65, A67, A68, A71, A79, A84, A87, A95, A98, A108, A110, A119, A131, A136, A146, A157, A159, A167, A175, A176, A194	31
Indecisive	A11, A60, A81, A91, A100, A113, A134, A138, A140, A154, A160, A181	12
Total		201

As can be seen from the table, out of the 201 mathematics teachers participating in the research, only 6 of them were able to correctly determine the level of the "Which Car - Level 0" question. 26 teachers as level 1, 28 teachers as level 2, 32 teachers as level 3, 33 teachers as level 4, 33 teachers as level 5, 31 teachers as level 6. 12 teachers were indecisive. Teachers gathered at Level 3, 4, 5 and 6 on this question. The question used for Charts-Level 1 is presented below.

Figure 2

Charts-Level 1

In January, the new CDs of the bands *4U2Rock* and *The Kicking Kangaroos* were released. In February, the CDs of the bands *No One's Darling* and *The Metalfolkies* followed. The following graph shows the sales of the bands' CDs from January to June.



In which month did the band *No One's Darling* sell more CDs than the band *The Kicking Kangaroos* for the first time?

A No month
B March
C April
D May

Level 1 is one of the easy level questions asked by PISA. In this study, the question "Charts" was used. When answering this question, it is necessary to interpret the given column charts. The proficiency levels ascribed by the teachers to this particular inquiry are delineated and presented in Table 6.

Table 6

Level Estimations of Mathematics Teachers for The Question of Charts-Level 1

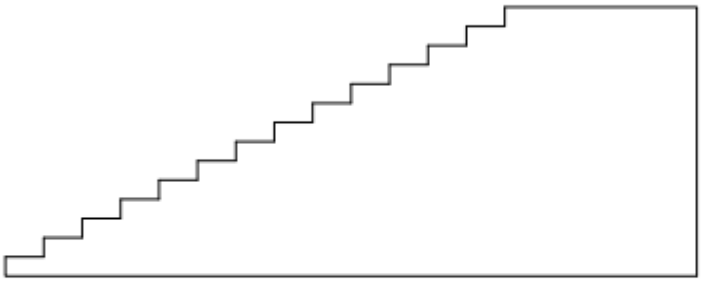
Level	Teacher Categories	Frequency
Level 0	A16, A17, A19, A72, A73, A90, A108, A111, A142, A163, A166, A168, A177, A182	14
Level 1	A12, A24, A25, A32, A34, A35, A40, A46, A47, A53, A63, A64, A75, A77, A78, A89, A112, A118, A121, A126, A139, A143, A185	23
Level 2	A4, A10, A23, A26, A31, A41, A45, A54, A55, A56, A62, A65, A79, A86, A98, A101, A117, A129, A134, A137, A141, A145, A19, A151, A152, A153, A156, A162, A171, A179, A180, A186, A192	33
Level 3	A1, A8, A9, A14, A22, A30, A42, A49, A50, A60, A70, A74, A82, A92, A97, A99, A105, A109, A120, A122, A124, A125, A128, A132, A133, 135, A148, A150, A155, A161, A165, A173, A184, A189, A190, A191, A194, A197, A198	40
Level 4	A15, A21, A28, A33, A48, A52, A69, A80, A85, A87, A88, A102, A103, A104, A115, A123, A127, A130, A146, A147, A170, A172, A188, A193, A195, A200, A201	27
Level 5	A2, A5, A18, A20, A29, A36, A39, A43, A44, A51, A59, A61, A71, A76, A83, A95, A106, A107, A110, A116, A144, A158, A159, A164, A169, A178, A183, A187	28
Level 6	A3, A7, A13, A27, A37, A57, A58, A66, A67, A68, A93, A96, A114, A119, A131, A136, A157, A167, A175, A176, A196, A199	22
Indecisive	A6, A11, A38, A81, A91, A94, A100, A113, A138, A140, A154, A160, A174, A181	14
Total		201

As delineated in the table, a discernible trend emerges from the responses of the 201 mathematics educators who participated in this research. Specifically, only 23 of them demonstrated an accurate proficiency level determination for the question titled "Charts - Level 1." Among the respondents, 14 teachers classified it as Level 0, 33 teachers adjudged it as Level 2, 40 teachers categorized it as Level 3, 27 teachers assessed it as Level 4, 28 teachers ascribed it to Level 5, and 22 teachers attributed it to Level 6, while 14 teachers remained uncertain in their evaluation. Notably, the consensus among the teachers converged predominantly toward Level 3 for this particular question, which pertains to the "Charts - Level 1" category.

Figure 3

Staircase-Level 2

The diagram below illustrates a staircase with 14 steps and a total height of 252 cm:



Total depth 400 cm

What is the height of each of the 14 steps?

Height: .....cm.

Level 2 is one of the questions asked by PISA, which is described as easy. In this study, the question "Staircase" was used. The correct answer to this question is to discover that the height is evenly distributed to each step. The levels assigned by the teachers to this question are presented in Table 7.

Table 7

Level Estimations of Mathematics Teachers for Staircase-Level 2 Question

Level	Teacher Categories	Frequency
Level 0	A17, A27, A70, A72, A82, A90, A110, A116, A143, A168, A185, A189, A197	13
Level 1	A4, A10, A26, A30, A54, A64, A77, A86, A89, A102, A121, A123, A142, A145, A151, A152, A159, A165, A179	19
Level 2	A13, A14, A22, A23, A24, A31, A32, A35, A40, A41, A43, A46, A47, A50, A53, A62, A63, A69, A74, A75, A78, A87, A111, A112, A117, A120, A126, A127, A128, A137, A141, A149, A153, A156, A161, A162, A166, A170, A182, A186, A192, A193	42
Level 3	A1, A2, A16, A19, A20, A21, A28, A29, A33, A34, A42, A45, A49, A52, A56, A73, A76, A79, A80, A84, A97, A98, A99, A101, A103, A104, A105, A106, A115, A118, A122, A124, A125, A129, A133, A134, A139, A146, A148, A163, A167, A171, A172, A175, A178, A200, A201	47
Level 4	A3, A15, A25, A38, A51, A55, A61, A83, A88, A92, A94, A95, A107, A130, A132, A147, A150, A155, A157, A158, A164, A169, A180, A183, A184, A190, A191, A195, A198	29
Level 5	A5, A9, A39, A44, A48, A59, A60, A67, A85, A93, A96, A109, A114, A144, A173, A174, A176, A177, A187, A194, A196	21
Level 6	A7, A8, A12, A18, A36, A37, A57, A58, A65, A66, A68, A71, A108, A119, A131, A135, A136, A199	18
Indecisive	A6, A11, A81, A91, A100, A113, A138, A140, A154, A160, A181, A188	12
Total		201

As can be seen from the table, out of the 201 mathematics teachers participating in the research, only 42 of them were able to correctly determine the level of the "Staircase - Level 2" question. 13 teachers answered the question as Level 0, 19 teachers as level 1, 47 teachers as level 3, 29 teachers as level 4, 21 teachers as level 5, 18 teachers as level 6. 12 teachers were indecisive. Teachers gathered at Level 2 and 3 on this question. The question used for Internet Relay Chat-Level 3 is presented below.

Figure 4

Internet Relay Chat-Level 3

Mark (from Sydney, Australia) and Hans (from Berlin, Germany) often communicate with each other using "chat" on the Internet. They have to log on to the Internet at the same time to be able to chat.

To find a suitable time to chat, Mark looked up a chart of world times and found the following:

At 7:00 PM in Sydney, what time is it in Berlin?

Answer: .....

Level 3 is one of the intermediate-level questions asked by PISA. In this study, the question "Internet Relay Chat" was used. To find the correct answer within the scope of this question, it is necessary to calculate the time differences between countries and select the appropriate operation. The levels assigned by the teachers to this question are presented in Table 8.

Table 8

Level Estimations of Mathematics Teachers for Internet Relay Chat-Level 3 Question

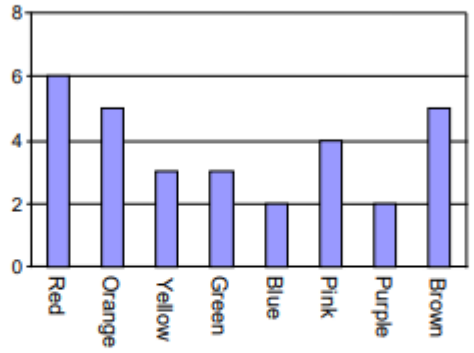
Level	Teacher Categories	Frequency
Level 0	A20, A22, A53, A80, A90, A101, A163	7
Level 1	A12, A19, A24, A30, A52, A54, A62, A70, A71, A77, A82, A127, A138, A139, A142, A155, A161, A166, A174, A175, A189	21
Level 2	A3, A15, A16, A27, A32, A35, A38, A43, A64, A69, A86, A89, A92, A93, A94, A102, A117, A120, A123, A126, A129, A143, A148, A150, A156, A165, A172, A177, A179, A182, A186, A188	32
Level 3	A1, A10, A18, A29, A31, A34, A44, A45, A46, A50, A56, A63, A72, A75, A76, A78, A87, A97, A98, A103, A106, A107, A110, A111, A118, A121, A128, A130, A133, A137, A141, A144, A145, A147, A149, A151, A152, A162, A167, A168, A169, A170, A171, A180, A183, A184, A185, A190, A192, A193, A200, A201	52
Level 4	A4, A6, A8, A14, A17, A21, A23, A28, A33, A39, A40, A41, A42, A47, A48, A49, A55, A59, A60, A67, A73, A74, A84, A85, A88, A96, A99, A104, A105, A109, A112, A115, A116, A124, A125, A135, A157, A158, A159, A164, A173, A187, A197, A198	44
Level 5	A5, A7, A9, A25, A26, A36, A37, A51, A57, A58, A61, A79, A83, A95, A122, A131, A134, A136, A146, A153, A176, A191, A194, A196	24
Level 6	A13, A65, A66, A68, A108, A114, A119, A132, A178, A199	10
Indecisive	A2, A11, A81, A91, A100, A113, A140, A154, A160, A181, A195	11
Total		201

Evident in the tabulated data, within the cohort of 201 mathematics educators engaged in the research, a mere 52 of them exhibited the capacity to accurately ascertain the proficiency level of the "Internet Relay Chat - Level 3" question. Notably, 7 teachers categorized it as Level 0, 21 teachers attributed it to Level 1, 32 teachers assigned it to Level 2, while 44 teachers elevated it to Level 4. Moreover, 24 teachers designated it as Level 5, and 10 teachers positioned it at Level 6. Concurrently, 11 teachers remained ambivalent in their determination of the question's proficiency level. This discernible distribution of responses highlights a predominant consensus among teachers, primarily clustering around Level 3 for the "Internet Relay Chat - Level 3" question. Teachers gathered at Level 3 on this question. The question used for Coloured Candies-Level 4 is presented below.

Figure 5

Coloured Candies-Level 4

Robert's mother lets him pick one candy from a bag. He can't see the candies. The number of candies of each colour in the bag is shown in the following graph.



What is the probability that Robert will pick a red candy?

A 10%
B 20%
C 25%
D 50%

Level 4 is one of the questions asked by PISA, which is described as intermediate. In this study, the question "Coloured Candies" was used. To find the correct answer to this question, it is necessary to interpret the graph correctly and perform the percentage calculation accurately. The levels assigned by the teachers to this question are presented in Table 9.

Table 9

Level Predictions Made by Mathematics Teachers for The Coloured Candies-Level 4 Question

Level	Teacher Categories	Frequency
Level 0	A17, A64, A82, A90, A110	5
Level 1	A54, A62, A72, A77, A102, A193, A197	7
Level 2	A4, A10, A19, A22, A23, A24, A25, A27, A31, A34, A46, A47, A50, A52, A53, A75, A78, A80, A86, A92, A111, A112, A116, A121, A123, A126, A128, A134, A142, A145, A149, A152, A156, A162, A172, A173, A182, A192	38
Level 3	A1, A12, A14, A26, A30, A33, A35, A38, A41, A42, A45, A55, A56, A59, A69, A73, A84, A88, A94, A98, A101, A103, A104, A107, A115, A117, A118, A130, A133, A137, A139, A143, A147, A148, A155, A161, A163, A171, A177, A179, A183, A184, A195, A198, A200	45
Level 4	A2, A9, A16, A20, A21, A28, A29, A32, A40, A51, A63, A65, A66, A70, A79, A89, A95, A96, A97, A105, A106, A109, A120, A124, A127, A132, A141, A144, A151, A153, A157, A158, A159, A164, A165, A169, A170, A174, A175, A178, A180, A185, A186, A188, A189, A190, A194	47
Level 5	A3, A15, A18, A39, A43, A44, A48, A49, A61, A67, A76, A83, A85, A93, A99, A122, A125, A129, A135, A146, A150, A166, A168, A187, A201	25
Level 6	A5, A7, A8, A36, A37, A57, A58, A68, A71, A74, A87, A108, A114, A119, A131, A136, A167, A176, A191, A196, A199	21
Indecisive	A6, A11, A13, A60, A81, A91, A100, A113, A138, A140, A154, A160, A181	13
Total		201

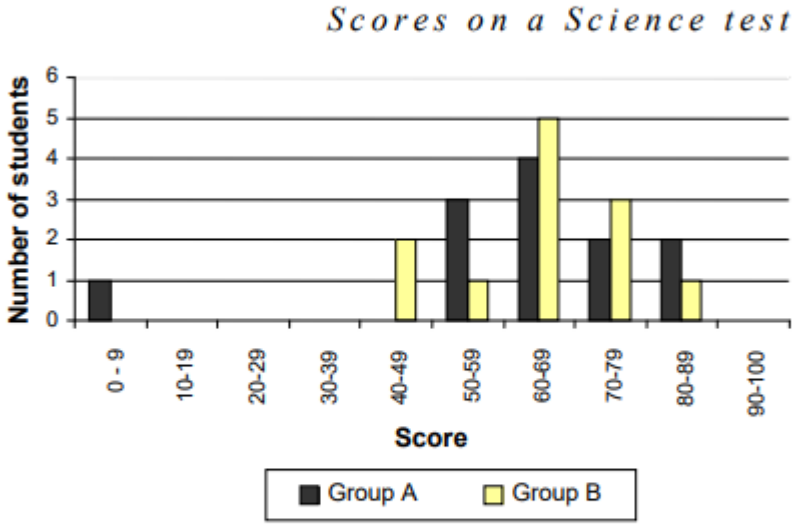
As can be seen from the table, out of the 201 mathematics teachers participating in the research, only 47 of them were able to correctly determine the level of the “Coloured Candies - Level 4” question. 5 teachers answered the question as Level 0, 7 teachers as level 1, 38 teachers as level 2, 45 teachers as level 3, 25 teachers as level 5, 21 teachers as level 6. A notable observation arises from the dataset, indicating that 13 teachers exhibited indecision in their proficiency level assignments for this specific question. Remarkably, a discernible convergence among teachers was discerned, with the majority gravitating towards Level 3 and Level 4 in their assessment of the "Internet Relay Chat - Level 3" question. The question used for Test Scores-Level 5 is presented below.

Figure 6

Test Scores-Level 5

The diagram below shows the results on a Science test for two groups, labelled as Group A and Group B.

The mean score for Group A is 62.0 and the mean for Group B is 64.5. Students pass this test when their score is 50 or above.



Looking at the diagram, the teacher claims that Group B did better than Group A in this test.

The students in Group A don't agree with their teacher. They try to convince the teacher that Group B may not necessarily have done better.

Give one mathematical argument, using the graph, that the students in Group A could use.

Level 5 is one of the difficult questions asked by PISA. In this study, the question 'Test Scores' was used. To find the correct answer to this question, it is necessary to first interpret the graphs correctly and make accurate decisions about the evidence to be used (other than the arithmetic mean). The levels assigned by the teachers to this question are presented in Table 10.

Table 10

Level Estimations of Mathematics Teachers for The Question of Test Scores-Level 5

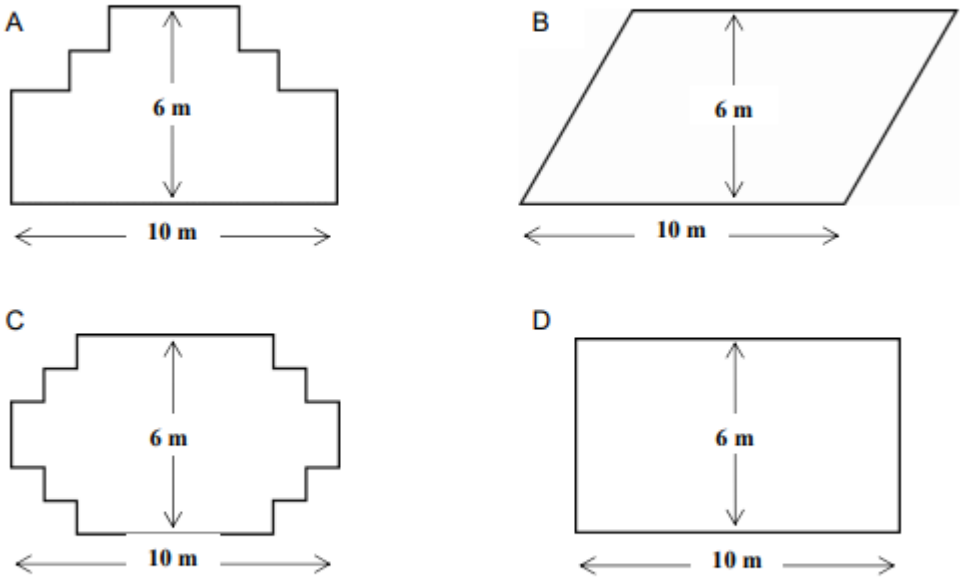
Level	Teacher Categories	Frequency
Level 0	A90, A108	2
Level 1	---	0
Level 2	A30, A82, A87, A92, A99, A112, A179, A196	8
Level 3	A1, A17, A19, A22, A31, A32, A38, A53, A54, A60, A88, A89, A94, A129, A137, A146, A151, A198	18
Level 4	A3, A9, A13, A24, A33, A34, A35, A40, A42, A44, A45, A46, A49, A63, A69, A72, A73, A74, A75, A77, A80, A83, A84, A85, A86, A95, A96, A101, A103, A104, A107, A110, A111, A115, A177, A122, A123, A126, A128, A130, A132, A135, A139, A142, AA143, A144, A150, A152, A155, A162, A163, A164, A166, A169, A172, A173, A178, A190, A192, A195, A200	61
Level 5	A2, A8, A10, A15, A20, A23, A25, A27, A36, A37, A41, A43, A47, A48, A50, A55, A56, A57, A58, A61, A62, A64, A67, A71, A78, A93, A97, A102, A106, A120, A121, A133, A141, A145, A148, A149, A153, A158, A159, A161, A165, A170, A171, A180, A182, A183, A186, A187, A188, A189, A193, A201	52
Level 6	A4, A5, A7, A12, A14, A16, A18, A21, A26, A28, A29, A39, A51, A52, A59, A65, A66, A68, A70, A76, A79, A98, A105, A109, A114, A116, A118, A119, A124, A125, A127, A131, A134, A136, A147, A156, A157, A167, A168, A174, A175, A176, A177, A184, A185, A191, A194, A197, A199	49
Indecisive	A6, A11, A81, A91, A100, A113, A138, A140, A154, A160, A181	11
Total		201

As can be seen from the table, out of the 201 mathematics teachers participating in the research, only 52 of them were able to correctly determine the level of the “Test Scores - Level 5” question. 2 teachers answered the question as Level 0, 8 teachers as level 2, 18 teachers as level 3, 61 teachers as level 4, 49 teachers as level 6 and no teachers as level 1. 11 teachers were indecisive. Teachers gathered at Level 4 and 5 on this question. The question used for Carpenter-Level 6 is presented below.

Figure 7

Carpenter-Level 6

A carpenter has 32 metres of timber and wants to make a border around a garden bed. He is considering the following designs for the garden bed.



Circle either "Yes" or "No" for each design to indicate whether the garden bed can be made with 32 metres of timber.

Garden bed design	Using this design, can the garden bed be made with 32 metres of timber?
Design A	Yes / No
Design B	Yes / No
Design C	Yes / No
Design D	Yes / No

Level 6 is the most difficult question asked by PISA. In this study, the question 'Carpenter' was used. To solve this question correctly, it is necessary to know and apply the geometric properties of shapes (perimeter, Pythagorean relationship). The levels assigned by the teachers to this question are presented in Table 11.

Table 11

Level Estimations of Mathematics Teachers for The Question of Carpenter-Level 6

Level	Teacher Categories	Frequency
Level 0	A90	1
Level 1	A53, A82, A163	3
Level 2	A17, A22, A30, A46, A62, A80, A87, A89, A101, A111, A124, A127, A132, A142, A152, A159, A164, A179, A189, A192, A197	21
Level 3	A4, A12, A14, A19, A24, A32, A34, A38, A40, A41, A44, A47, A54, A56, A69, AA70, A72, A75, A77, A86, A88, A93, A94, A99, A102, A104, A107, A112, A116, A117, A120, A123, A129, A139, A147, A150, A156, A161, A162, A165, A166, A169, A170, A172, A174, A175, A182, A186, A188	49
Level 4	A1, A2A8, A10, A18, A23, 27, 29, A31, A33, A35, A42, A43, A45, A50, A55, A59, A60, A61, A63, A64, A73, A74, A76, A79, A84, A85, A95, A97, A103, A115, A121, A122, A125, A128, A134, A137, A141, A143, A145, A146, A148, A149, A151, A153, A155, A158, A168, A171, A173, A177, A180, A183, A184, A190, A194, A198, A200, A201	59
Level 5	A3, A6, A15, A16, A21, A25, A28, A36, A39, A48, A49, A51, A52, A57, A58, A66, A67, A78, A83, A92, A96, A98, A105, A106, A109, A110, A118, A126, A130, A133, A135, A144, A157, A167, A178, A185, A187, A193, A199	39
Level 6	A5, A7, A9, A13, A26, A37, A65, A68, A71, A108, A114, A119, A131, A136, A176, A191, A195, A196	18
Indecisive	A11, A20, A81, A91, A100, A113, A138, A140, A154, A160, A181	11
Total		201

As can be seen from the table, out of the 201 mathematics teachers participating in the research, only 18 of them were able to correctly determine the level of the 'Carpenter - Level 6' question. 1 teacher answered the question as Level 0, 3 teachers as level 1, 21 teachers as level 2, 49 teachers as level 3, 59 teachers as level 4, 39 teachers as level 5. 11 teachers were indecisive. Teachers gathered at Level 4 on this question.

In addition, in the question of "Internet Relay Chat-Level 3", the teachers stated that there are spelling forms that are not suitable for Turkish and expressions that are not in Turkish are used. In Turkish time writing, "." instead of ":" is preferred between hours. Again, there is no such time as "24.00" in Turkish. In lieu of an alternative, the expression "00.00" is employed to delineate the specific temporal reference under consideration.

Discussion, Conclusion & Suggestions

According to the teachers' opinions about the proficiency level table, although the teachers expressed that they understood the table, they stated that the language of the table should be simplified. In addition, some teachers did not want to express their opinions about the language of the table. Teachers were tasked with assigning proficiency levels to the questions in accordance with the provided proficiency level table. Although the teachers stated that they understood the table, they could not decide, although they had problems in assigning levels to the questions. As also stated by Sönmez and Kaleli-Yılmaz (2021), middle school teachers were unable to assign levels to the questions. However, mathematics literacy is emphasized in undergraduate and graduate education. But as seen in the results of this study, the concepts taught in classes remain theoretical for teachers. This circumstance may be construed as indicative of a deficiency in experiential familiarity. These situations have led to the idea that teachers do not have an idea about mathematical literacy. As emphasized by Kozaklı-Ülger, Bozkurt, and Altun (2022), one of the reasons why teachers have problems in mathematical literacy is their lack of experience related to mathematical literacy. The result obtained from this study led to the thought that the problems experienced by teachers in mathematical literacy may be due to their lack of experience in mathematical literacy.

As discerned within the findings, it becomes evident that educators encountered substantial challenges in the process of assigning proficiency levels to the questions, guided by the mathematical literacy proficiency level table disseminated by PISA, which delineated explicit proficiency levels for the respective questions. The number of teachers who could accurately determine the levels of the questions is quite low. To give an example, in a study involving 201 mathematics teachers, only 6 teachers could correctly match the Level 0 question with Level 0. This is a very concerning situation. As the levels of the questions increase, the number of mathematics teachers making correct predictions also increases. However, the number of mathematics teachers who can make accurate predictions is still not sufficient. All of this indicates that the proficiency level table is not fully fulfilling its purpose. This circumstance, as duly underscored by Altun (2020), implies that the proficiency level table may not effectively or faithfully encapsulate the precise proficiency levels associated with the individual questions in question. At the same time, this situation raises the thought that students' proficiency levels may not be accurately determined either. In light of these results, there is a need for a serious revision of the proficiency level table. As stated by Dilekçi and Çiçekçi (2022), the most important factor in the PISA assessment is the ability to read and understand correctly and apply what is read.

This study was conducted in 2022, and the data was collected in the same year. As seen in the results of this study, the levels are not fully understood and cannot be accurately determined. PISA administrators are aware of this situation, which is why in the most recent assessment, they have added new levels to the mathematical literacy table. Level 0, which is practical but not visible in theory, has gained more importance. In response to this observation, it has been deemed necessary to subdivide Level 1 into three discrete tiers, namely Level 1a, Level 1b, and Level 1c, thereby introducing an additional proficiency level to the existing table. Consequently, the total number of proficiency levels has been augmented to encompass eight, as documented in OECD's recent report (OECD, 2023).

Teachers also stated that there are spelling forms in the questions that do not comply with the Turkish spelling rules. As elucidated by Asar (2019), it is noteworthy that the presence of measurement invariance remains notably absent among participants representing diverse linguistic backgrounds who partake in the administration of the PISA examination. In light of this result, it is possible to encounter spelling errors in the translations of the PISA exams. As also stated by Kıbrıslıoğlu (2015), there is also no measurement invariance across cultures in PISA exams. However, in an international practice like PISA, it is surprising that questions are written without paying attention to the spelling rules of the participating countries.

According to all the results obtained, it was found appropriate to make the following recommendations.

- While translating the PISA application, which is an international exam, interdisciplinary studies should be carried out and translations should be shown to experts in both Turkish and English.
- Turkish spelling and grammar rules should be observed in the translations of the PISA application.
- More work should be done on issues related to teachers' views on mathematical literacy.
- Teachers should be given in-service training to increase their knowledge about mathematical literacy.
- Teachers should improve themselves about PISA application and mathematical literacy questions.

Ethic

In this study, all the rules specified to be followed within the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive" were complied with. None of the actions specified under the heading "Actions Contrary to Scientific Research and Publication Ethics", which is the second part of the directive, were not taken. Before starting the research, Bursa Uludağ University Social and Human Sciences Research and Publication Ethics Committee was applied and the necessary ethics committee approval was obtained with the date of 26.03.2021, session 2021-03 and document number E-20585590-302.08.01-1480.

Author Contributions

All authors contributed to the manuscript equally.

Conflict of Interest

The authors have disclosed no conflict of interest.

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