Mathematical Literacy in Algebra Content: The Trajectory Of Students Conceptual Cognitive Style

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Article Info

Article history:
Received Jan 08, 2025
Accepted Feb 16, 2025
Published Online Mar 04, 2024

Keywords:
Algebra Content
Mathematical Literacy
Conceptual Cognitive Style
Tempo

ABSTRACT

This study intends to describe the process of students' mathematical literacy in algebra content with a conceptual-tempo cognitive style. We employed a descriptive qualitative research approach. We conducted this research at public high school 23 in Makassar. The MFFT (Matching Familiar Figure Test) helped us choose the people who would be in the study because it finds students with a conceptual tempo cognitive style. The data collection technique uses instruments in the form of mathematical literacy test sheets, interview guidelines, and documentation. This study employs a qualitative data analysis technique. The study's findings showed that students who learned to think quickly and correctly were able to answer level II and IV questions by completing three parts of the literacy process: formulating, using, interpreting, and evaluating. Students with an impulsive cognitive style in solving level II and IV questions were only able to fulfill 1 aspect of the literacy process, namely the aspect of formulating. Students with a reflective cognitive style are capable of addressing three aspects of the literacy process, which include formulating, using, interpreting, and evaluating information. Additionally, students with a slow, inaccurate cognitive style in completing level II and IV questions are only able to fulfill 1 aspect of the literacy process, namely the aspect of formulating.

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Ramadanti, A. V., Rahman, A., & Upu, H. (2025). Mathematical Literacy in Algebra Content: The Trajectory of Students Conceptual Cognitive Style. *Jurnal Riset Dan Inovasi Pembelajaran*, *5*(1). https://doi.org/10.51574/jrip.v5i1.2617

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1. Introduction

Education is a crucial element and a standard for a nation's advancement (Uralovich et al., 2023). The National Education System says that education is a planned and organized effort to create a learning space and method that helps students actively develop their potential. This encompasses the development of intellectual and spiritual strength, self-discipline, character, morals, and skills that are essential for individuals, society, the nation, and the state. In addition, the point of education is to give students the chance to learn in a variety of settings, such as physical, social, and cultural ones, and to have access to a lot of different kinds of educational materials (Broudy, 2017; Juvonen et al., 2019). Educational practices are defined as initiatives aimed at fostering a learning and teaching environment that enables students to actively cultivate their potential. In Indonesia, a prevalent educational technique has been teacher-centered learning (Amiruddin et al., 2023). The instructor imparts knowledge through lectures or expository techniques, while students record the information in notebooks. The new educational paradigm underscores students as individuals capable of learning and growth (Sheninger & Murray, 2017). Students must proactively pursue and cultivate knowledge.

Since learning occurs organically through activities that involve engagement and experience, rather than merely the transmission of knowledge from instructor to student, we anticipate education to be more significant for students. Education enables individuals to acquire knowledge (Masykur et al., 2017; Criollo-C et al., 2021). Fundamentally, learning is a modification in behavior resulting from experience. Behavioral changes may manifest as alterations in abilities, habits, attitudes, knowledge, and appreciation (Setiawati, 2018). Learning experience constitutes an interaction between individuals and their surroundings (Festiawan, 2020). Students learning mathematics must not only perform calculations but also engage in critical, systematic, logical, and creative thinking, as well as collaborate effectively to address diverse life challenges, both within mathematics and across other disciplines. A fundamental understanding of mathematical concepts enables practical application in daily life (Ferreira & Bisognin, 2020; Manfreda Kolar & Hodnik, 2021).

Mathematics is the most employed discipline in daily life (González-Martín et al., 2021). All educational tiers, from elementary school to higher education, have instructed mathematics. We anticipate that this learning will enhance students' capabilities. Students must possess not only numerical skills but also the capacity for logical and critical reasoning in problem-solving within the realm of mathematics (Jurdak, 2016; Abella et al., 2024).

Also, the content standards for all elementary and secondary school math subjects say that the goal of math education in schools is to give students the skills to understand, use reasoning, solve problems, communicate clearly, and develop an interest in math (Daniyati, 2014). The objectives of learning mathematics align with the concept of mathematical literacy. Students who are mathematically literate can build, use, and understand math in a variety of settings and can also evaluate the results of mathematical operations (Ozkale & Ozdemir Erdogan, 2022; Çakıroğlu et al., 2024). This encompasses mathematical thinking and the application of mathematical concepts, methods, data, and tools to characterize, explain, and forecast a phenomenon. This enables an individual to comprehend the significance of mathematics in life, facilitating sound judgments and informed decision-making as a critical thinker.

An international evaluation known as PISA (Programme for International Student Assessment) evaluates students' mathematical literacy. PISA is a triennial survey that evaluates students' reading competencies (Ho & Gan, 2023). The OECD (Organization for Economic Cooperation and Development), a United Nations entity focusing on global economic development and based in Paris, France, conducts the PISA study. Indonesia has engaged in seven iterations of PISA from 2000 to 2018, primarily evaluating mathematical literacy, with nations such as Singapore, China, and England. The findings of the mathematical literacy assessment conducted by PISA indicate that the mathematical abilities of Indonesian students are predominantly inadequate (Siregar et al., 2021). The Indonesian students, during the four PISA cycles from 2000 to 2009, could only respond to PISA levels I, II, and III, with few students capable of answering level IV questions (Edo et al., 2013; Edo & Tasik, 2022). According to Wijaya et al. (2024), Indonesia's PISA results in 2022 declined by 13 points to 366, despite an improvement in ranking. Most students could only respond to PISA questions up to level III, with a mere 0.49% mastering level IV, 0.04% at level V, and none at level VI.

The author's preliminary study in class X at public senior high school 23 Makassar revealed significant findings, specifically that students' insufficient literacy skills influenced their difficulties in comprehending the presented material. Students have been unable to utilize their abilities effectively and remain deficient in analyzing and articulating pertinent arguments in accordance with their understanding of the topics. This occurs because students concentrate solely on the provided examples and neglect to read the assigned content. Furthermore, students' deficiencies in comprehension are evident in their ability to translate a real-world situation into a mathematical expression and to differentiate between similar and dissimilar concepts. The initial analysis indicates that students lack comprehension of variable elimination, often conflating one variable with another intended for removal. Students fail to recognize the distinction between the two concepts, which prevents their amalgamation.

Teachers teach students to solve everyday issues by using three areas of mathematical processing skills (Verschaffel et al., 2020; Vásquez et al., 2022): (1) describing situations mathematically; (2) using ideas, facts, procedures, and reasoning; and (3) using, understanding, and judging mathematical results. Resources introduce non-routine mathematical challenges through narrative difficulties within algebraic content, addressing all three aspects of mathematics. Algebra curriculum introduces contextual challenges, necessitating strong mathematical literacy abilities (Rachmawati et al., 2019; Osei & Agyei, 2024). Mamoh et al.'s research from 2021 shows that even students who are good at math may have trouble with the production stage of HOTS-type questions even though they are good at the analysis and assessment stages. Students with limited mathematical literacy skills can only tackle problems at the analytical level (Hwang & Ham, 2021).

The analysis of these competencies also takes into account student variables that impact their mathematical literacy skills (Holenstein et al., 2021). These characteristics include attitudes toward learning and acquiring new concepts, commonly referred to as cognitive style. This statement is consistent with a study by Herliani and Wardono (2019), which suggests that cognitive style influences mathematical literacy. Alvani (2016), Muzaini et al. (2021), Güner & Erbay (2021), and Hidajat et al. (2024) all talk about cognitive style, which is a person's unique way of learning that includes how they take in, organize, and think about information, as well as their learning habits.An individual's decision-making speed and precision characterize a cognitive style known as a conceptual cognitive style of tempo (Saracho, 2017). It is also said that the conceptual cognitive style of tempo is linked to how quickly and often students make mistakes when they are given a challenge (Diana & Nurmawanti, 2020).

The researcher will elucidate the process of students' mathematical literacy in algebraic subjects, considering their diverse cognitive styles. This is especially true when we consider the differences in accuracy and cognitive processing speed among students when addressing mathematical problems. This study aims to provide schools with informational resources regarding students' mathematical literacy in algebra and the challenges they face in problem-solving through an analysis of conceptual cognitive style tempo.

This study aids teachers in understanding the process of students' mathematical literacy in algebraic content, which is informed by the conceptual cognitive style of pace. It also serves as a foundation for mathematics educators in structuring future instruction. Furthermore, it can enhance researchers' understanding of students' mathematical literacy processes in algebraic subjects and serve as a reference for further studies addressing pertinent issues.

2. Research Methods

This is descriptive research using a qualitative approach. Descriptive research is the process of interpreting an object or topic in relation to problem-solving steps or factual evidence. We conducted this research at public senior high school 23 Makassar. Public senior high school 23 Makassar uses the Merdeka Curriculum, with 36 students in class X MERDEKA. After taking the MFFT cognitive style test, it was found that one student is dominant in the fast, accurate style, another is dominant in the impulsive style, a fifth is dominant in the reflective style, and the sixth is dominant in the slow, inaccurate style.

The selection of prospective subjects involves examining the average tempo of each conceptual cognitive style. These are (1) the fast, accurate cognitive style category, which includes students who answer the MFFT test in less than or equal to the median of the average time of all students; and the average of the students' answer choices on the MFFT test being less than or equal to the median of the average of the students' answer choices. (2) The impulsive cognitive style category refers to students who answer the MFFT test with an average time that is less than the average time of all students and whose average answer choices exceed the median of their answer choices. (3) the reflective cognitive style category, namely students who answer the MFFT test with an average time of more than the median of the average time of all students and for the average of the students' answer choices in answering the MFFT test less than the median of the average of the students' answer choices. (4) MFFT test takers who answer it in more than the average time of all students and have answer choices greater than the average answer choices. This is a slow and inaccurate cognitive style group.

The primary tool in this study is the researcher himself, serving as a human instrument. The supporting instruments in this study include the MFFT test, mathematical literacy test sheets, and interview guidelines. To gather research subjects, we distributed the MFFT cognitive style test sheet to all students of class X MERDEKA. The MFFT task involves searching for one standard image among five varying images, ensuring that only one is similar or identical. The study adapts a mathematical literacy question instrument from PISA to evaluate students' progress in mathematical literacy and the challenges they encounter. A validator completes this process within a predetermined timeframe and validates it. We translated PISA questions into Indonesian to adapt them for this study. We divided the questions into two categories: one for level II questions and another for level IV questions. The interview guideline in this study is also meant to help researchers improve and make clearer pictures of how students learn algebraic content mathematically, using the conceptual cognitive style of the Tempoe. The interview guideline adjusts the questions to the indicators of students' mathematical literacy process. The interview guideline uses the same questions as the written test, but with slight modifications. We employ a semi-structured interview method, where we tailor the question sentences based on the respondents' responses during the interview process, ensuring they maintain the intended content.

This study employs two data collection techniques: the test method and the interview method. The procedure for gathering this data involves distributing the Matching Familiar Figure Test to recruit participants. Each subject receives a mathematical literacy test question sheet, which takes the form of a detailed description. Meanwhile, the researcher conducted semi-structured interviews, conducting them one by one in turn to facilitate a more straightforward analysis of the students' mathematical literacy processes as they answered each given question. This study also uses interactive analysis technique, a qualitative data analysis method that involves three activity flows running at the same time: condensing data, presenting data, and drawing conclusions or verifying them.

3. Results and Discussion

Results

The finding of the students' cognitive style test showed that there were 8 students with a fast, accurate cognitive style, 9 students with an impulsive cognitive style, 7 students with a reflective cognitive style, and 7 students with a slow, inaccurate cognitive style. We then selected 4 students as research subjects, each comprising 1 student with a fast, accurate cognitive style, 1 student with an impulsive cognitive style, 1 student with a reflective cognitive style, and 1 student with a slow, inaccurate cognitive style. The following is the coding of research subjects presented in Table 1.

Table 1. Research Subject Coding

No.	Subject	Category
1	*Fast accurate*	SFA
2	Impulsive	SI
3	Reflective	SR
4	*Slow inaccurate*	SI

Mathematical Literacy Process Subjects with Fast Accurate (SFA) Cognitive Style

The findings of the SFA test on level II mathematical literacy questions are presented in Figure 1.

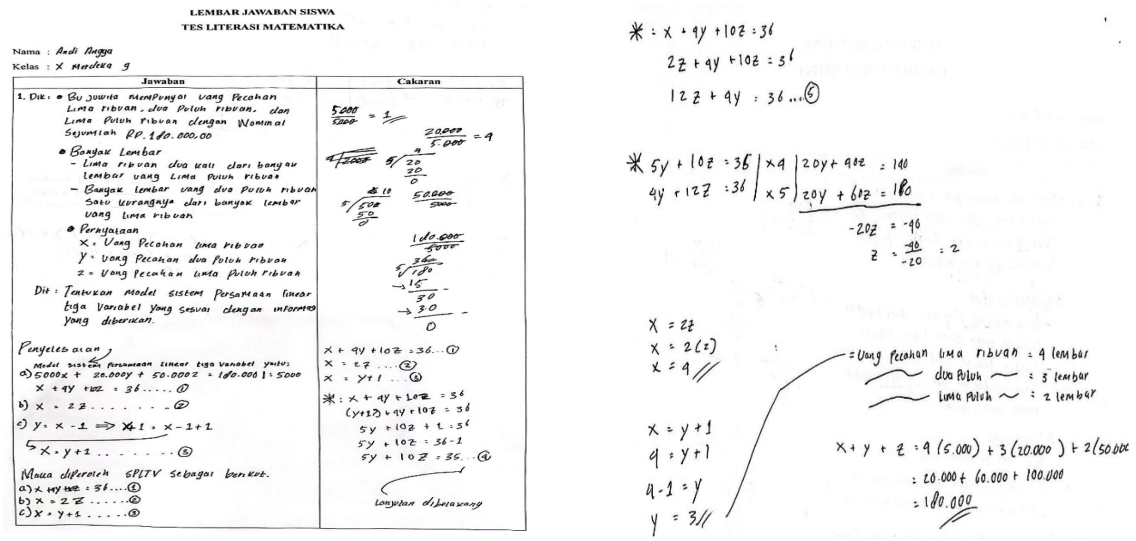

Figure 1. SFA Test Results

The results of Figure 1 show that SFA can write down known and asked information; SFA can change real problems into mathematical models by writing x + 4y + 10z = 36 as equation (1), x = 2z as equation (2), and x = y + 1 as equation (3); SFA does the calculations correctly and uses his mathematical knowledge well to obtain the final results: x + 4y + 10z = 36, x = 2z, and x = y + 1. Furthermore, the results of the interview show that SFA can answer all questions correctly based on the arguments and concepts he understands.SFA could solve and interpret problems in accordance with their context, and he can recheck these solutions within a 30-minute time frame. In the aspect of formulating, SFA can understand the problem well; namely, SFA can explain what is known and asked in the problem. SFA is also able to change real problems into mathematical models. The subject can provide an example of a known problem. In the aspect of use, SFA is seen to be able to provide the right solution in answering questions; this can be seen in the test results of the subject who wrote the right way to work so that he was able to get the correct result. When it comes to interpreting and evaluating, SFA demonstrates the ability to reframe the mathematical results into the context of the given problem. Additionally, SFA assesses the rationality of the solution within the given context. SFA demonstrates his ability to read and recheck the answers. And SFA can explain whether the answers obtained make sense or not. SFA explains in question number 1 that the correct calculation made the obtained answer make sense.

After triangulating the test and interview results, we concluded that SFA can solve level II mathematical literacy questions by formulating problems mathematically, effectively using his mathematical abilities, and interpreting and evaluating solutions.

Mathematical Literacy Process of Subjects with Impulsive Cognitive Style (SI)

The findings of the SI test on level II mathematical literacy questions are presented in

Figure 2.

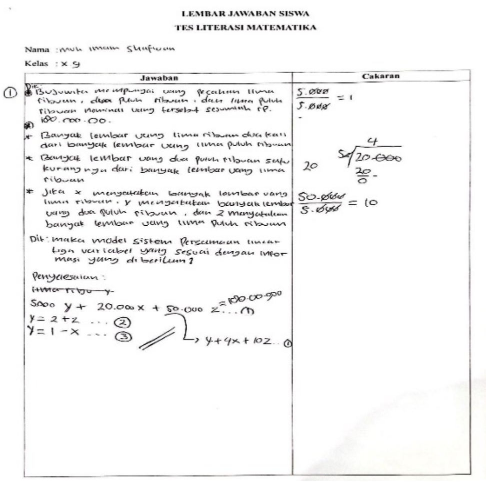

Figure 2. SI Test Results

Figure 2 shows the results, which show that SI can record both known and requested information. It can turn real-world problems into mathematical models by writing 5,000y + 20,000x + 50,000z = 180,000 as equation (1), y = 2 + z as equation (2), and y = 1 - x as equation (3). However, SI performs these calculations incorrectly and fails to apply his mathematical knowledge effectively, leading to the results of 5,000y + 20,000x + 50,000z = 180,000, y = 2 + z, and y = 1 - x. Meanwhile, the interview results show that SI can answer all questions incorrectly based on the arguments and concepts he understands. SI can solve and interpret solutions, but not in a manner that aligns with the problem's context. He is unable to double-check the solutions provided, even after spending approximately 45 minutes on the problem. In terms of formulation, SI demonstrates a thorough understanding of the problem, as evidenced; specifically, SI can articulate the knowledge and questions posed in the problem effectively. SI can change real problems into mathematical models. By allowing the subject to illustrate a known problem.

In terms of using SI, it seems unable to provide the right solution in answering the problem; this can be seen in the test results of the subject who wrote in an inappropriate way of working so that SI is unable to get the correct result. When it involves interpreting and evaluating, SI appears incapable of reinterpreting the mathematical results within the context of the given problem. Furthermore, SI fails to assess the reasonableness of the solution within the given context. SI explains that he lacks the knowledge to verify the answer. And because he lacks the knowledge to verify the answer obtained, SI is unable to clarify whether it makes sense or not.

After conducting tests and interviews, the triangulation process yielded consistent results, indicating that while SI can formulate problems mathematically, he struggles to apply his mathematical skills effectively and struggles to interpret and evaluate solutions in problem-solving at level II.

Mathematical Literacy Process of Subjects with Reflective Cognitive Style (SR)

The findings of the SR test on level II mathematical literacy questions are presented in Figure 3.

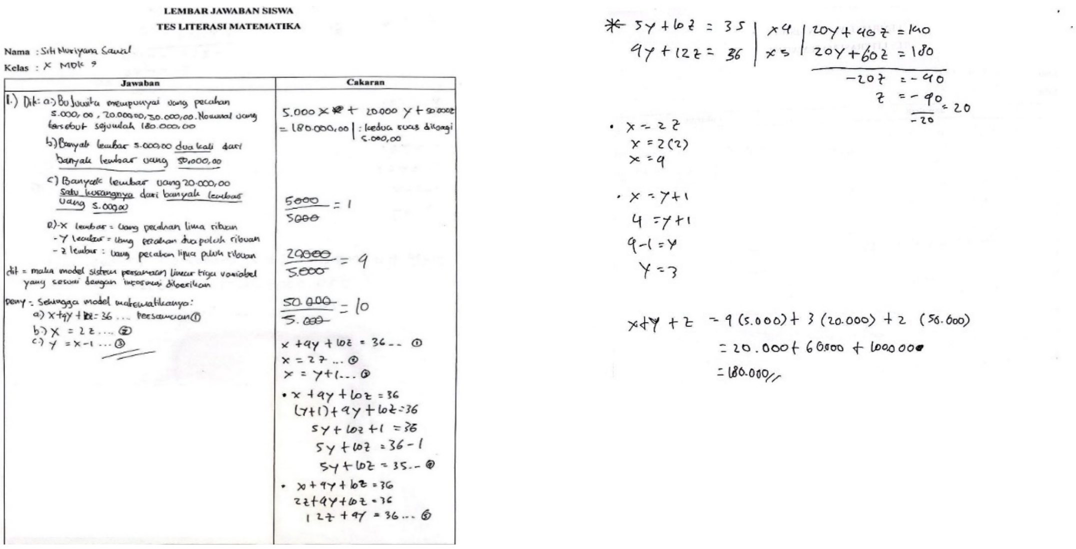

Figure 3. SR Test Results

Figure 3's results demonstrate that SR is capable of recording both known and requested information. He can transform real-world problems into mathematical models by expressing x + 4y + 10z = 36 as equation (1), x = 2z as equation (2), and y = x - 1 as equation (3). SR performs the calculations accurately and effectively applies his mathematical knowledge to arrive at the results: x + 4y + 10z = 36, x = 2z, and y = x - 1. Furthermore, based on the interview results, SR can answer all questions correctly based on the arguments and concepts he understands. SR can complete and interpret solutions in accordance with the problem's context, and he can recheck these solutions within an hour of problem-solving time.

In the aspect of formulating, SR can understand the problem well; namely, SR can explain what is known and asked in the problem. SR is also able to change real problems into mathematical models. The subject can offer an example of a recognized problem. SR can respond to questions correctly, as shown by the test results of the person who wrote the right way to work to get the right answer. In the aspect of interpreting and evaluating, SR is seen to be able to reinterpret the mathematical results obtained into the context of the problem given. SR also assesses the rationality of the solution within the given problem's context. SR demonstrates his ability to read and recheck the answers. SR can clarify whether the obtained answer makes sense or not. In response to question number 1, SR explains that the correct calculation ensures the obtained answer makes sense.

After conducting the test and interview, the results aligned with the triangulation results, indicating that SR is proficient in solving level II mathematical literacy questions. He can formulate problems mathematically, effectively utilize his mathematical abilities, and interpret and evaluate solutions effectively.

Mathematical Literacy Process of Subject Slow Inaccurate (SSI) Cognitive Style

The findings of the SSI test on level II mathematical literacy questions are presented in Figure 4.

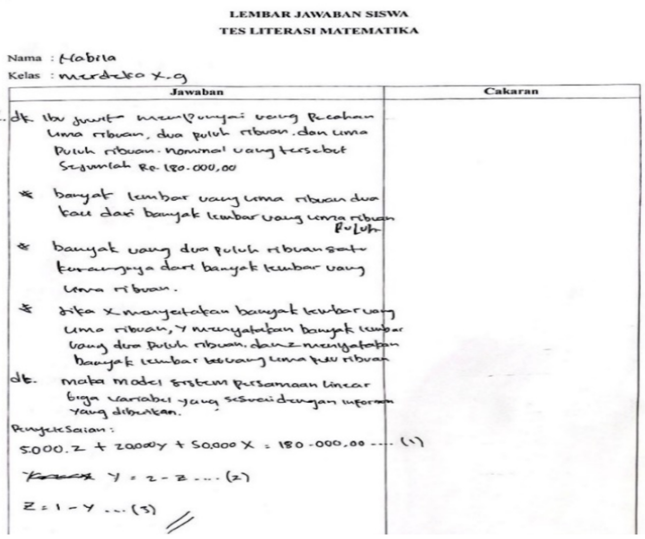

Figure 4. SSI Test Results

The findings of Figure 4 show that SSI can write down known and asked information; SSI can change real problems into mathematical models by writing 5,000z + 20,000y + 50,000 x = 180,000 as equation (1), y = 2 - z as equation (2), and z = 1 - y as equation (3). SSI performs the calculation incorrectly and fails to apply his mathematical knowledge correctly, leading to the results of 5,000z + 20,000y + 50,000x = 180,000, y = 2 - z, and z = 1 - y. Furthermore, the interview results reveal that SSI consistently provides incorrect answers to all questions, despite understanding the arguments and concepts. SSI consistently solves and interprets solutions incorrectly. The time it takes to solve the problem, approximately one hour and thirty minutes, prevents SSI from verifying the solution provided. In terms of formulation, SSI demonstrates a high level of understanding of the questions and can articulate the knowledge and questions presented. SSI can change real problems into mathematical models.

When it comes to answering questions, SSI appears unable to provide the correct answer; this is evident in the test results of the subjects who wrote incorrectly, preventing SSI from obtaining the correct result. SSI doesn't seem to be able to reinterpret the mathematical results that were found in the context of the given problem, and he also doesn't seem to be able to judge how reasonable the solution that was found in the same context of the problem is. This is evident in SSI's explanation of his inability to verify the answer. SI struggles to clarify if the answer he received is logical, as he lacks the knowledge to verify its accuracy.

The triangulation results indicate that while SSI can formulate problems mathematically, SSI struggles to effectively apply his mathematical abilities and struggles to interpret and evaluate solutions in problem solving.

Figure 5 presents the trajectory or process of mathematical literacy for students with fast, accurate cognitive styles, impulsive cognitive styles, reflective cognitive styles, and slow, inaccurate cognitive styles.

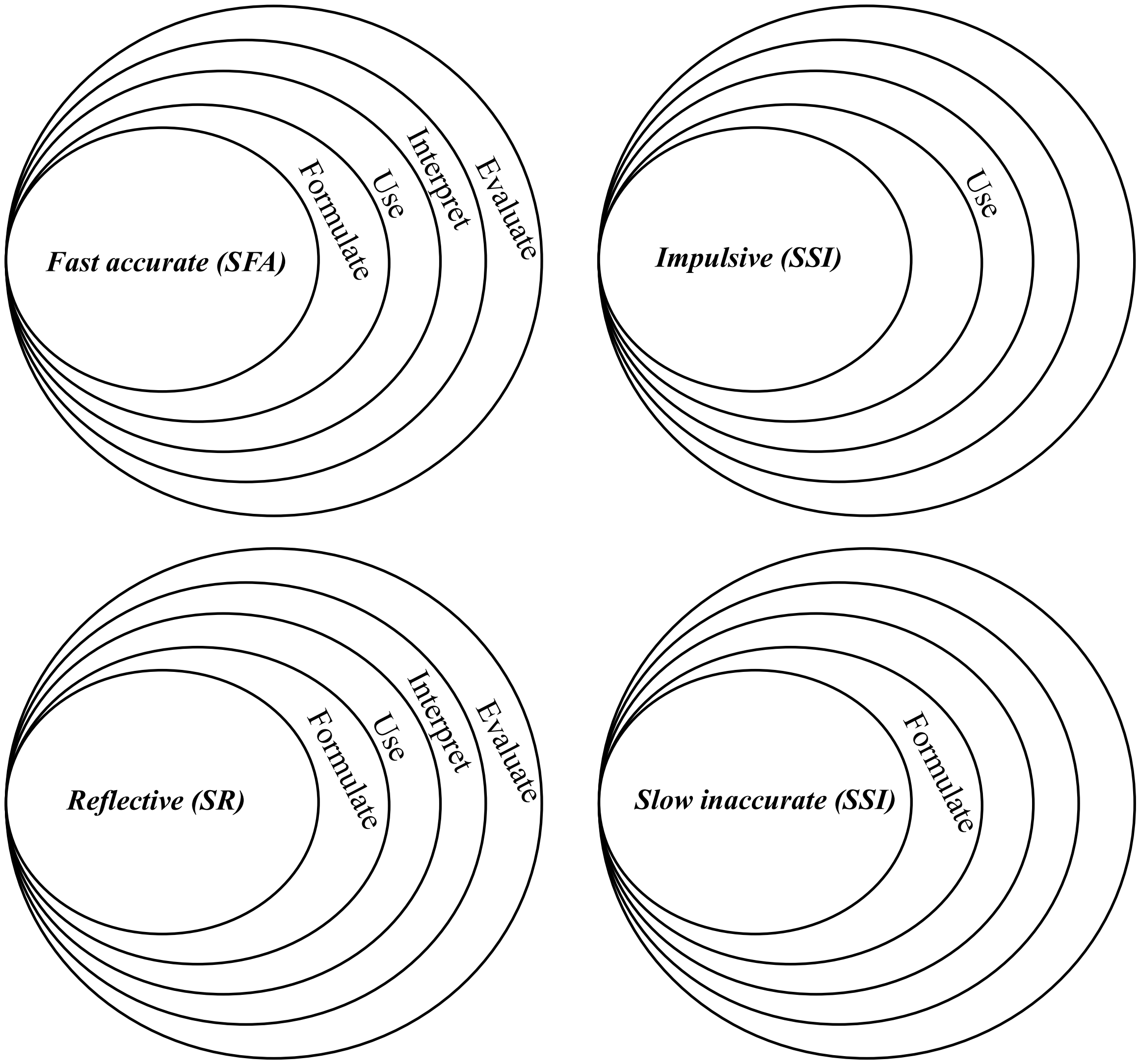

Figure 5. The Trajectory or Process of Mathematical Literacy for Students

Discussion

In this study, the researcher did not use grades to determine the subjects' level of mathematical literacy, instead focusing on revealing the aspects they fulfilled or did not fulfill when answering questions. According to the researcher, it is not possible to measure the level of mathematical literacy of students by grades but rather by revealing the aspects they fulfill when answering mathematical literacy questions. The data analysis yielded several findings relevant to this study. This discussion is presented by linking the research findings with theories that discuss students' mathematical literacy in algebraic content and relevant research.

Fast Accurate Subject Mathematics Literacy Process

It was found that the fast and accurate (SFA) students who solved algebraic problems related to PISA level II and IV questions in questions 1 were able to plan, use, interpret, and evaluate. This means that they met three literacy process requirements.

During the formulation phase, SFA successfully formulated questions 1 using complete and accurate information that was both known and asked for. They then used this information to make examples and turn the problem into a viable mathematical model. Research (Ramadanti et al., 2022) indicates that students who are fast and accurate can identify questions and accurately record their knowledge and answers. In the use aspect, SFA was able to formulate and articulate question number 1 by identifying the strategy for problem-solving, accurately calculating based on the chosen solution, and effectively applying his mathematical knowledge to answer the questions with precision and detail. This is supported with research (Fajriyah et al., 2019) which states that students who have a fast, accurate cognitive style do not experience many obstacles in solving problems. When it comes to interpreting and evaluating, SFA is capable of writing and mentioning question number 1, interpreting the solution in accordance with the problem at hand, drawing accurate conclusions, rechecking the provided solution using specific methods to rectify any errors, and verifying that the results obtained are reasonable due to accurate calculations. Research (Ulutas Keskinkılıc et al., 2022) confirms that students who are quick and accurate during the evaluation stage can verify the accuracy of the provided answers.

Impulsive Subject Mathematical Literacy Process

The results of the data analysis show that the mathematical literacy test and the results of the impulsive subject (SI) interview can only cover one part of the literacy process. That part is the formulation indicator. This section pertains to the solution of algebraic content problems associated with PISA level II and IV questions found in question number 1.

In the formulating aspect, SI can write, and mention question number 1 based on complete and accurate information, both known and asked, then create an example and transform the problem into a mathematical model. However, in certain situations, SI's precision may suffer due to carelessness in writing. Research (Ningsih et al., 2020) confirms that impulsive subjects, despite only reading the question once, can articulate the questions' known and asked elements and convey their understanding of the problem through their own sentences. SI can write and mention question 1 by determining the strategy to solve the problem, but not correctly; they cannot do calculations correctly according to the solution used, and they cannot use their mathematical knowledge properly to solve the question in detail and accurately on the answer sheet.

Research by Patta et al. (2021) suggests that students with impulsive tendencies often rush through their answers and make mistakes. In terms of interpreting and judging, SI can write and mention question number 1 by judging the solution used, which doesn't fit the problem, but they can't come to the right conclusions, check the solution again using certain methods, or fix mistakes if they find them. Additionally, they cannot confirm the validity of the results without considering Sari and Wulan's (2024) study, which demonstrates that students with an impulsive cognitive style can successfully pass the mathematical literacy ability test. The results may be inaccurate due to calculation errors.

Reflective Subject Mathematical Literacy Skills

We looked at data from mathematical literacy tests and reflective subject interviews (SR) to see how well students solved algebraic content problems related to PISA level II and IV questions in question number 1. The students were able to meet three literacy process requirements: formulating, using, and interpreting.

In the formulation phase, SR successfully formulated and articulated question number 1 based on comprehensive and precise information, both known and asked. Subsequently, he created examples and transformed the problem into a suitable mathematical model. This is relevant to research (Fajriyah et al., 2019), which states that reflective students tend to be attentive in their thinking and need more time to work on problems. In the use aspect, SR was able to formulate and articulate question number 1, identifying the strategy for problem-solving, accurately calculating based on the chosen solution, and effectively applying his mathematical knowledge to solve the question with precision and detail on the answer sheet. Research (Happy, 2023) supports this, stating that reflective students can apply concepts with mathematical facts and procedures. When it comes to interpreting and evaluating, SR is capable of writing and mentioning question number 1, interpreting the solution in accordance with the problem at hand, drawing accurate conclusions, rechecking the provided solution using specific methods to rectify any errors, and verifying the reasonableness of the obtained results through accurate calculations. Ramadanti et al.'s (2022) research, which suggests reflective students can verify the validity of their answers, aligns with this.

Subject Mathematics Literacy Process Slow Inaccurate

The student, despite being slow and inaccurate, only fulfills one aspect of the literacy process: the formulation indicator. This is based on the results of the math literacy test and interviews with SSI students who were slow and wrong when solving algebraic content problems related to PISA level II and IV questions in question number 1.

When it comes to formulating, SSI is capable of writing and mentioning question number 1 based on complete and accurate information, both known and asked. It can then create examples and transform problems into mathematical models, albeit with less precision in certain situations. This is due to SSI's tendency to connect various aspects of the given problem with less care. Research (Fajriyah et al., 2019) supports this, showing that students with a slow, inaccurate cognitive style require more time to think and make decisions, yet they often exhibit less care. SSI can write and mention question 1 by determining the strategy to solve the problem, but he lacks precision, is unable to calculate correctly according to the solution, and is unable to use his mathematical knowledge properly. As a result, he cannot solve the question in detail and accurately. Research (Hairani et al., 2023) suggests that while students with a slow, inaccurate cognitive style can determine formulas, they frequently make mistakes. When it comes to interpreting and evaluating, students with a slow, inaccurate cognitive style can write and mention question 1, but they often interpret the solutions incorrectly, fail to draw correct conclusions, fail to recheck the provided solutions using specific methods, fail to correct any errors they find, and struggle to determine if the results obtained are reasonable due to incorrect calculations. This is relevant to research (Chan et al., 2022; Safadi & Hawa, 2024), which also states that in solving problems, slow, inaccurate students take a long time, but the answers given tend to be incorrect.

4. Conclusion and Suggestions

Students with a fast, accurate cognitive style who solve level II and level IV mathematical literacy problems can fulfill three aspects of the literacy process: formulating, using, interpreting, and evaluating. When solving level II and level IV mathematical literacy problems, students with an impulsive cognitive style can only satisfy one aspect of the literacy process, which is the formulation indicator. When solving level II and level IV mathematical literacy problems, students with a reflective cognitive style can address three aspects of the literacy process: formulating, using, interpreting, and evaluating. When it comes to solving level II and level IV mathematical literacy problems, students with a slow and inaccurate cognitive style can only satisfy one aspect of the literacy process, specifically the formulating indicator.

This study suggests that educators should focus more on students' mathematical literacy in solving algebraic content problems, particularly in the context of PISA questions. Further research is necessary to identify students' difficulties in solving existing problems, whether through other materials or PISA level I, III, V, and VI questions.

5. Conflict of Interest

The author declares no conflict of interest.

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