



Students' understanding of question-level difficulty in thematic unit a textbooks in secondary education

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Abstract: *This study aims to examine students' understanding in solving questions presented in the additional questions section of the Grade II chemistry textbook, as well as to identify the distribution of questioning levels contained in that section. The research was conducted at a general secondary school, involving 52 Grade II science-track (TC) students as the research participants. Data were collected using multiple techniques and instruments, including documentation, observation, questionnaires, and interviews. The findings indicate that the cognitive questions in the additional questions section are predominantly categorized at the processing level, accounting for 53%. Based on the questionnaire analysis, students' level of understanding of input-level questions is classified as high (61%), while their understanding of processing-level questions falls within the sufficient category (48%), and output-level questions are also categorized as sufficient (49%). Furthermore, from the 15 questions administered to the students, 5.8% of students demonstrated a lack of understanding in answering the questions, 76.9% provided neutral responses, and 17.3% showed adequate understanding in their answers. Overall, the results suggest that students' level of understanding can be classified as sufficient. Interview findings further reveal that several factors contribute to this condition, including students' tendency to forget the subject content, lack of note-taking, and limited concentration during learning. Therefore, it is recommended that teachers provide additional questions as part of daily exercises or homework to enhance students' understanding and learning outcomes.*

Keywords: *Understanding Analysis, Question Level*

Abstrack: Penelitian ini bertujuan untuk menganalisis pemahaman siswa dalam menyelesaikan soal-soal yang terdapat pada bagian pertanyaan tambahan dalam buku teks kimia kelas XI, serta mengidentifikasi distribusi tingkat pertanyaan yang terkandung dalam bagian tersebut. Penelitian ini dilaksanakan pada salah satu sekolah menengah atas dengan melibatkan 52 siswa kelas XI program ilmu pengetahuan alam (TC) sebagai subjek penelitian. Teknik dan instrumen pengumpulan data yang digunakan meliputi dokumentasi, observasi, angket, dan wawancara. Hasil penelitian menunjukkan bahwa soal-soal kognitif pada bagian pertanyaan tambahan didominasi oleh tingkat pemrosesan, yaitu sebesar 53%. Berdasarkan analisis data angket, tingkat pemahaman siswa terhadap soal tingkat input termasuk dalam kategori tinggi (61%), sedangkan pemahaman terhadap soal tingkat pemrosesan berada pada kategori cukup (48%), dan tingkat output juga berada pada kategori cukup (49%). Selain itu, dari 15 soal yang diberikan kepada siswa, sebanyak 5,8% siswa tidak memahami cara menjawab soal, 76,9% siswa memberikan jawaban netral, dan 17,3% siswa menunjukkan pemahaman dalam memberikan jawaban. Secara keseluruhan, hasil penelitian ini menunjukkan bahwa tingkat pemahaman siswa berada dalam kategori cukup. Hasil wawancara juga mengungkapkan beberapa faktor yang memengaruhi kondisi tersebut, antara lain siswa cenderung melupakan materi pelajaran, tidak memiliki catatan yang memadai, serta kurangnya konsentrasi dalam proses pembelajaran. Oleh karena itu, disarankan kepada guru untuk memberikan soal-soal tambahan sebagai latihan harian atau pekerjaan rumah guna meningkatkan pemahaman dan hasil belajar siswa.

Kata Kunci: Analisis Pemahaman, Tingkat Pertanyaan

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INTRODUCTION

The learning process in education is designed to be interactive, inspirational, and motivational, enabling students to participate actively, creatively, and independently while developing their talents, interests, and both physical and psychological capacities. Consequently, the teaching and learning process holds a critical role in education.

This study also emphasizes question levels, which are integral to the assessment system and play an essential role in teaching and learning. School assessments serve as a primary component at all levels of education, providing information on the outcomes of the teaching and learning process. Assessments also measure students' comprehension of the subjects studied, particularly through written and oral tests administered by teachers throughout the instructional period until the students complete their studies (Melo sousa E., (2012) cited from Haydt (1988, p.7.). Therefore, assessments are embedded in school

routines, and it is the teacher's responsibility to continuously enhance their assessment techniques. In this context, students construct knowledge based on their understanding, while teachers act as mediators.

In practice, many secondary schools have yet to systematically provide these questions for students to solve during learning activities. This situation raises concerns that questions in student handbooks may be either too easy or excessively difficult. However, the difficulty of questions depends largely on the creativity of teachers and the capabilities of students.

To address these issues, it is necessary to conduct a comprehension analysis, which measures students' understanding of a topic or subtopic in a subject. In educational contexts, student comprehension is assessed through tests, practical tasks, questioning and answering sessions, classroom discussions, and other forms of interaction. The purpose of such analysis is to obtain detailed insight into a situation, gather relevant information, and identify solutions. In relation to this study, comprehension analysis is applied to evaluate students' ability to solve questions provided in the student handbook.

THEORETICAL FOUNDATION

According to Porwadarmint (1991) in Moreira et al., (2024), comprehension originates from the concept of "understanding," which implies knowing or being aware of something. Fundamentally, comprehension is the capacity to understand, know, and consider information as part of the cognitive process, which individuals employ to interpret texts, questions, and critical ideas.

Comprehension analysis serves as a method to assess an individual's understanding of various situations and their problem-solving abilities. It also forms the foundation of students' basic abilities, which are crucial at the beginning of the learning process. Through initial assessment, teachers can determine each student's capacity and later compare pre-test and post-test results to identify areas of strong understanding. Pre-tests are connected to instructional objectives established by the teacher, and the alignment between students' basic abilities and these objectives ensures effective learning (Popham, 1982, in Wiendiarti A, (2015).

Research in international education journals emphasizes that understanding the question level is both important and complex for teachers. When effectively applied, appropriate questioning can enhance students' performance and create a dynamic, engaging learning environment (EeeAh Meng, 1989, in Shanmugavelu et al., (2020).

Technically, the process of creating and posing questions is divided into three components: question techniques, distribution of questions, and question levels (Shanmugavelu et al., 2020). According to Chambliss and Calfee (1998, in Mudzakir AS, 2013), textbooks serve as tools that facilitate students' learning and comprehension, helping them expand their cognitive capacity. Textbooks have a significant influence on students' cognitive development and can positively affect both knowledge acquisition and values.

Imran (2014, in Rosita E, et al., 2022) explains that student handbooks function as references for both teachers and students. For teachers, they guide the planning and execution of learning activities, including the competencies required for instruction. For students, handbooks serve as indicators of learning processes and as guides for acquiring competence.

Generally, questions in textbooks are designed according to curriculum standards, ensuring that students can solve them following instructional activities. However, students' abilities after instruction are expected to reach higher-order thinking skills, including critical thinking, creative thinking, problem-solving, and decision-making (Anderson et al., 2001, in Milama et al., 2022). In this study, the focus is on critical thinking.

According to Cahyono (2017, in Milama et al., 2022), students require critical thinking skills to solve real-life problems. In the classroom, students apply critical thinking to answer textbook questions or tasks assigned by teachers, whether in group work, individual assignments, mini-projects, daily tests, or semester assessments.

To cultivate students' critical thinking, textbook questions must align with students' abilities. Milama et al., (2022), citing Ennis (2011), explain that effective critical thinking development requires questions that target five aspects: providing simple explanations, developing basic abilities, drawing conclusions, offering detailed explanations, and defining strategies and tactics. These aspects serve as references for teachers when designing questions to train students' critical thinking.

RESEARCH METHODOLOGY

Research methodology refers to a systematic process for collecting and evaluating data relevant to the research topic or theme (Saefuddin teguh M et al., 2023). In scientific research, methods are generally classified into three categories: quantitative, qualitative, and mixed methods, which combine both quantitative and qualitative approaches.

This study was conducted at a general secondary school. Data collection took place over two days, Wednesday, February 8, and Thursday, February 9, 2026.

Population and Sample

1. Population

According to Sugiyono (2019, p.126), as cited by Ajijah & Selvi (2021), a population is a generalization area or a large group of objects or subjects that have specific characteristics and quantities, which can be determined by the researcher to draw conclusions. In this study, the population consisted of 456 Grade II Science and Technology students, comprising 261 female and 195 male students.

2. Sample

The sample size was calculated using the formula:

$$n = \frac{N}{N(d)^2 + 1}$$

Where:

- n = Total of sample;
- N = Total population
- d² = Percentage need

For this study, the population $N = 456$ and $d^2 = 13\%$. Substituting the values:

$$n = \frac{N}{N(d)^2 + 1} = \frac{456}{456\left(\frac{13}{100}\right)^2 + 1} = \frac{456}{456(0,0169) + 1} = \frac{456}{8,7064} = 52$$

Additionally, the sample for cognitive question levels was selected proportionally: 13% for input-level questions, 10% for processing-level questions, and 68% for output-level questions. The distribution is shown in Table I.

Table I. Method take the sample of cognitive question level

Question level	Population	%	Sample	Data
Input	38	4,94 %	5,2	
Processing	50	5%	5,2	
Output	7	4,76%	5,0	
Total	95		15,4	

Collection Instruments (Quantitative and Qualitative)

Based on the research objectives, data were collected using the following instruments: observation, documentation, questionnaires, and interviews. The scoring for student responses was as follows:

Option	Score	Mix Method
Incomplete	1	
Less Complete	2	
Sufficient	3	
Understand	4	
More Understand	5	

According to Cohen L., Manion L., (2018), mixed-method research combines quantitative and qualitative data to provide a comprehensive understanding of the research problem.

Data Analysis Techniques

I. Quantitative Data Analysis

Quantitative data analysis in this study involved three stages: analyzing the content of the textbook questions, analyzing test results, and analyzing interview data.

Content analysis is a systematic approach applied to written materials such as textbooks or documents (Cohen L., Manion L., 2018). For this study, the researcher used the method of Costa (1985, in Edward et al., 1992) to classify questions into three levels: input, processing, and output. The sample consisted of additional questions from the Grade II student handbook, Thematic Unit A. Descriptive analysis was used for the data. After content analysis, the questions were administered as a test to the selected sample.

Descriptive analysis was conducted using the formula:

$$DP = \frac{n}{N} \times 100\%$$

Where:

DP = Descriptive Percentage

n = Values obtained

N = Total values that we hope

The student comprehension categories for cognitive question levels were defined as follows:

P value (% Student Comprehension)	Category
0–20%	Very Low
21–40%	Low
41–60%	Sufficient
61–80%	High
81–100%	Very High

2. Qualitative Data Analysis

After quantitative analysis, students from each sample category were selected for interviews. Qualitative data were analyzed through interpretation, assessment, and drawing conclusions (Cohen & Manion, 2018).

3. Mixed Data Analysis

Mixed-method analysis can be conducted using either independent or sequential approaches. In this study, a sequential explanatory approach was employed: quantitative data were collected and analyzed first, followed by qualitative data to explain and elaborate on the quantitative findings. This approach allows qualitative data to clarify patterns and insights observed in the quantitative results.

RESEARCH RESULTS

Quantitative Analysis Results

I. Content Analysis and Comprehension Category of Cognitive Questions (Mais Questões)

The total number of additional questions in the Grade II chemistry textbook was 80. After identifying the cognitive level of each question, some questions encompassed two or three cognitive levels, resulting in a total of 95 cognitive questions. The majority of these questions fall under the input and processing levels. Although the questions in the additional section were designed according to the cognitive question level analysis method, they did not fully achieve their objective. Most questions focus on input and processing levels, with fewer questions addressing the output level. Ideally, the distribution of questions should be balanced across all cognitive levels.

No	Question Level	Quantity of Questions	Percentage (%)
1	Input	38	40
2	Processing	50	53
3	Output	7	7
4	Total	95	100

From the table above, it is evident that the majority of questions are at the cognitive processing level, followed by input, while output questions are minimal. This indicates that the question levels are unbalanced. The textbook heavily emphasizes processing, classification, and memorization questions, with very few opportunities for students to express their own ideas.

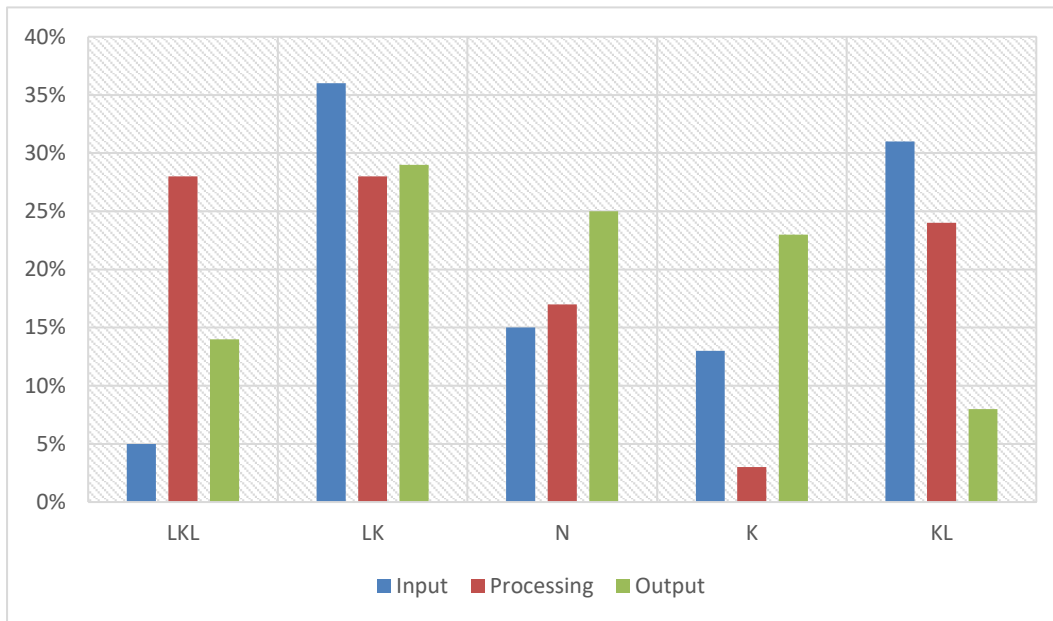
In the questionnaire, questions were divided into three sections: numbers 1–5 for input-level cognitive questions, 6–10 for processing-level, and 11–15 for output-level questions.

Table 2. Student Comprehension (SC) and Percentage (%) by Cognitive Question Level

CQL	SC	Question	X	Fb	F%	Mean (AC)	%	Category
Input	DNVC	I-5	8	8	5%	15,33 15,33	61%	High
	DNC	I-5	131	52	36%			
	S	I-5	29	22	15%			
	U	I-5	20	19	13%			
	MU	I-5	72	44	31%			
Total			260	145	100%			
Processing	DNVC	6-10	100	39	28%	12,06	48%	Sufficient
	DNC	6-10	74	38	28%			
	S	6-10	24	23	17%			
	U	6-10	5	4	3%			
	MU	6-10	58	33	24%			
Total			260	137	100%			
Output	DNVC	11-15	55	23	14,3%	12,25	49%	Sufficient
	DNC	11-15	97	47	29,2%			
	S	11-15	57	41	25,5%			
	U	11-15	38	37	23%			
	MU	11-15	13	13	8%			
Total			260	161	100%			

NB: AC (accumulative)

The table shows that students' comprehension is highest in input-level questions (61%), sufficient in processing (48%), and sufficient in output (49%). This indicates that students primarily understand questions that require memorization.



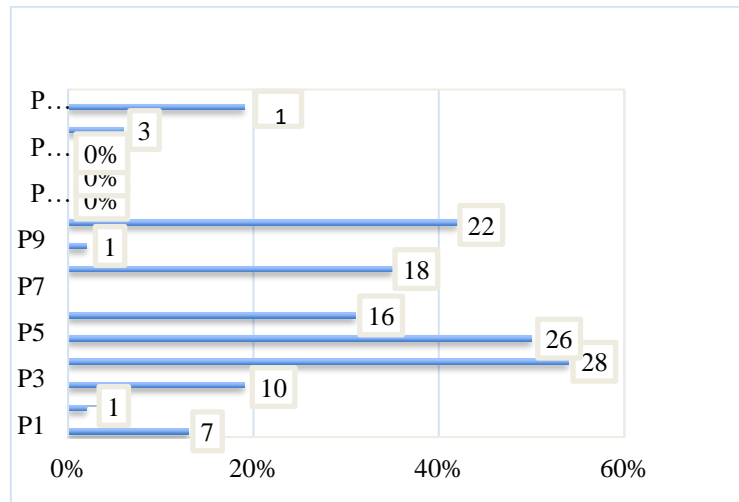
The analysis of specific questions shows:

- **Input-level:** Questions 4 and 5 were easiest; question 2 was most difficult.
- **Processing-level:** Questions 8 and 10 were easiest; questions 7 and 9 were most difficult.
- **Output-level:** Question 14 was easiest; questions 11 and 12 were most difficult.

Student Comprehension by Question

Q	DNVC		DNC		S		U		MU	
	Fb	F%	Fb	F%	Fb	F%	Fb	F%	Fb	F%
1	0	0	45	86	0	0	0	0	7	13
2	6	1	30	58	13	25	2	4	1	2
3	1	2	41	79	0	0	0	0	10	19
4	1	2	3	6	15	29	5	10	28	54
5	0	0	12	23	1	2	13	25	26	50
6	18	35	7	13	10	19	1	2	16	31
7	29	56	23	44	0	0	0	0	0	0
8	14	27	10	19	7	13	3	6	18	35
9	36	69	8	15	7	13	0	0	1	2
10	3	6	26	50	0	0	1	2	22	42
11	15	29	37	71	0	0	0	0	0	0
12	7	13	18	35	27	52	0	0	0	0
13	8	15	21	40	23	44	0	0	0	0
14	10	19	10	19	1	2	28	54	3	6
15	15	29	11	21	6	11	10	19	10	19
MV	10,8	6,0%	20,1	11,1%	2,1	4,0%	1,2	2,3%	2,7	4,5%

The data indicate that the majority of students fall into the “Neutral” category. The mean value shows that comprehension is generally sufficient, with a high understanding in a few specific questions.



The graph indicates that students found questions number 4 and 5 easiest to answer, followed by questions number 8 and 10. In contrast, questions number 7, 11, 12, and 13 were very difficult. For question number 1, 7 students (13%) demonstrated a very high level of understanding. Question 2, 1 student (2%) very well understood. Question 3, 10 students (19%) very well understood. Question 4, 28 students (54%) very well understood. Question 5, 26 students (50%) very well understood; question 6, 16 students (31%) very well understood; question 7, no students understood; question 8, 18 students (35%) very well understood; question 9, only 1 student (2%) very well understood; question 10, 22 students (42%) very well understood; questions 11–13, no students understood; question 14, 3 students (6%) very well understood; question 15, 10 students (19%) very well understood.

The following section analyzes students' comprehension based on each distributed question. The student comprehension scale is as follows:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Did not Understand	3	5,8	5,8	5,8
	Neutral	40	76,9	76,9	82,7
	Understand	9	17,3	17,3	100,0

Based on the table, the majority of 11th-grade students fall into the neutral comprehension category. This suggests that the additional questions are at a level that students can sufficiently comprehend.

Overall Student Comprehension Based on Questionnaire

VM		%P	Category
N	Valid	52	Sufficient
	Missing	0	
Mean		39,63	

This table shows that the mean score of students' comprehension for the 15 additional questions was 39.63. After summing the data and calculating comprehension levels, the overall category was 53%, falling into the "sufficient" range (41%–60%). Therefore, it can be interpreted that the students' comprehension of the 15 questions is considered sufficient.

Qualitative Analysis Results

Interviews with students provided the following information:

- Student E31 was in the high comprehension category with a score of 75.
- Student E33 was in the sufficient category with a score of 60.
- Student E48 was in the low comprehension category.

Interviews aimed to explore students' understanding based on the cognitive levels of the additional questions (mais questões) used in the questionnaire.

Students' Perspectives on Comprehension

Category	Sub Category	Answer
	Perspective	The answer from number 1 and 2: I. "[...] base on the question that I fill, I feel easy and the others are difficult, easy because I dominate that subject and I like that subject [...]". E31 age 16.

	<p>Comprehension or Understanding</p>	<p>2. “[...] a little difficult but I understand some, and some subject I did not understand, the questions easy are 4,5,6 because the teacher gave examples and we are very understand to fill [...]”. E33 age I6.</p> <p>3. “[...] Feel like it’s not very easy and it’s not very difficult, because there is any subject that we did not understand to fill. And only one question that easy, because the question that sister gave, is like with the subject where we received from the examples that teacher’s gave. [...]”. E48 age I6.</p> <p>I. Student’s perspective with the code E31 relationated to the question in interview questionnaire declare that base on the questionnaire of the test, any was difficult but any was easy, easy to answer was the question that they like, its mean that this student can only answer the questionnaire <i>additional questions</i> base on the subject (any sub-topic in thematic unit A) where they like to learn in teaching learning process.</p> <p>2. Perspective of student with code E33 relationated to the question in questionnaire interview declare that base on the questionnaire in <i>additional questions</i> that were given to him to fill, he sufficiently understood and he felt little difficult, because he did not understand well that subject, it’s mean the students can only answer for any subject that they understood</p> <p>3. The perspective of students with the code E48, all of the questions he did not understood to give answer, many of the questions was difficult, and only a question was easy because the same of the teacher’s giving examples in teaching learning activity, so that he still capture this answer. Its mean that the students can only answer the question that they solved together with their teacher, and if the question is the same, but had different in number and some words, it was difficult for them to answer.</p>
	<p>Barrier</p>	<p>The answer from the question number 3:</p> <p>I. “[...] Question number 7, because our lesson until there but he did not learn and the questions I, II, I2, I3 were very difficult because I did not feel like to learn” [...] E31 age I6.</p> <p>2. “[...] Questions 7-13, because our lesson until there, last week before we filled these questions, I could not only understand its explanation, because did not heard the teacher’s explanation;” [...] E33 age I6.</p> <p>3. “[...] For 6,9,I4 and I5 were difficult because we did not understand, and the other side we did not understand because we had not copy of subject;” [...] E48 age I6.</p> <p>The Barrier that prevent the student with the code E31 is to resolve the <i>additional questions</i>, where the researcher gave in the moment of questionnaire test, indicated that the students was forgetting the formula in questionnaire number 7, included forgot to identify <i>atomic mass unit</i>, and they justified that the plastic reaction did not study it at home, because they did not like it. But the others questionnaire they understand very good</p> <p>2. The barrier that make the students with the code E33 sufficiently understand and give his answer for <i>additional questions</i> and gave his reason that at the moment answer the questionnaire he still did not understand the explanation for this topic, because he did not concentrate to the teacher’s</p>

		<p>explanation, so that he had difficult to solve <i>additional questions</i> in the student's text- book</p> <p>3. The barrier that made the students with the code E48 difficult to solve and develop the question in additional questions that he has difficult to capture the teacher explanation, include has not note along the teaching and learning process.</p>
	Learning Assessment	<p>Answer the questions number 5:</p> <p>1. "[...] 5, Our teacher teach and explain well and we understand. We learnt at home about the formulas, "[...]". E31 age I6</p> <p>2. "[...] Because the teacher was explained and we also understand so that we can answer the question number I3 "[...]". E33 age I6.</p> <p>3. "[...] The question number 9 where calculate the material quantity (n) we less understand, meanwhile the teacher explained but we did not understand and capture quickly the subject that teacher explained "[...]". E48 age I6.</p> <p>Base on the 3 student's comment on the teacher's teaching along the teaching and learning process, at the time of writing interview in relation with the question in additional questions, the student with the code E3I tell that The teacher teaches very good, the explanation also good and clear, sometimes also gives questions to them as an daily exercises and home work. Student with the code E33 also comments similar with the E3I that the teacher explanation to the subject in relation to the <i>additional questions</i> was good, this student also declare that the problem is in himself because did not concentrate maximum to the teacher explanation, while student with the code E48 tell that the teacher explains and gives the examples of the subject where relationated to question clearly. The student's answer to the questions in interview indicated that the problem is not in the teacher's personal but in the student's willingness.</p>
	Skill Answer	<p>Answer the question number 4:</p> <p>1. "[...] 4, 5 Because our teacher teaches well and we understand, teacher usually gives homework and exercise, "[...]". E31 idade I6.</p> <p>2. "[...] For the question number I2 I know because we study until there and we also understand "[...]". E33 age I6.</p> <p>3. "[...] Question number 7 Volume Molar calculation, we know because this subject was explained by the teacher but we did not understand, "[...]". E48 age I6.</p> <p>Relation to the I5 questions in <i>additional questions</i> for the test, where the students was filled, students of the high category E3I said that it was difficult for him to solve like the questions number I, 7, II and I3 and it was very easy to solve like the question number 4 and 5 like to give name to the saturated structure and write the molecular formula, and all of the other questions, he understand and give answer.</p> <p>If relate to the cognitive questions, its means that the student's skill analyst questions very strong is in <i>low level cognitive questions</i>, and Less skill analyses questions in the <i>high level cognitive question</i></p> <p>The student with the code E33 is difficult to answer the questions number 7, 8, 9, 10 no II, for the questions number</p>

		<p>4, 5 no 6 easy for him and the others questions he sufficiently understand to give answer, If related to the cognitive questions, means that the student's skill analyses to the questions mostly weak in high level of cognitive questions and stronger in <i>low level cognitive question</i></p> <p>While the student code E48 said in her interviews that from the 15 questions, he only answer or fill one question, because only this question easy for him to answer, it is question number 5 where write the molecular formula, all the others questions was very difficult for him to solve, it means that his skill analyses to the questions is lowest both in high and low cognitive questions.</p>
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Mixed-Method Result Analysis

In this section, the researcher discusses the findings obtained through the combination of qualitative and quantitative methods.

The results of the quantitative analysis indicated that, among the students, three students (5.8%) were classified as having low understanding, forty students (76.9%) were classified as having moderate understanding, and nine students (17.3%) were classified as having high understanding in relation to the additional questions.

To complement these findings, qualitative interviews were conducted with three students representing different levels of comprehension. The student with code E48, categorized as having low understanding, reported that the questions were difficult to answer because he did not take notes during lessons and had difficulty following the teacher's explanations. Only one question was considered easy by this student, as it closely resembled examples provided by the teacher.

The student with code E33, categorized as having moderate understanding, explained that she understood some of the questions but found others challenging. She attributed this difficulty to not studying at home and occasionally not concentrating during lessons, which limited her ability to fully comprehend the content.

In contrast, the student with code E31, who demonstrated a higher level of understanding, reported that some questions were easy while others were challenging. The easy questions were those for which he had a better grasp of the teacher's explanations and consistent practice through exercises. Conversely, he struggled with certain questions due to forgetting specific formulas.

These results indicate that students' understanding of the additional questions varies depending on their prior preparation, attention during lessons, and engagement with exercises provided by the teacher. The mixed-method approach allowed the researcher to identify both the overall comprehension levels and the underlying factors influencing student performance.

CONCLUSION

Based on the results of the research analysis regarding the cognitive level of additional questions in the student textbook, it was found that 53% of the questions were classified at the processing cognitive level, 40% at the input cognitive level aimed at enhancing students' memorization, and 7% at the output cognitive level, which provides students with the opportunity to express their ideas.

The results of the study on students' understanding of the cognitive questions indicate that students' comprehension of input-level questions falls into the high category (61%), processing-level questions into the sufficient category (48%), and output-level questions also into the sufficient category (49%).

With regard to the 15 questions administered to the 52 sampled students, their understanding can be summarized as follows: 3 students (5.8%) did not understand, 40 students (76.9%) demonstrated sufficient understanding, and 9 students (17.3%) demonstrated high understanding. Overall, 53% of students were classified as understanding, indicating that the students' comprehension falls within the sufficient range.

The qualitative interviews further revealed that students in the low understanding category often did not take notes and had difficulty following the teacher's explanations. Students in the sufficient understanding category occasionally did not study at home and sometimes lacked concentration during lessons, resulting in responses based primarily on prior knowledge. Students in the high understanding category demonstrated a clear comprehension of the subject matter, attributing their success to consistent exercises provided by the teacher and well-structured explanations. Challenges for these students were primarily associated with recalling formulas.

SUGGESTIONS

This study focused specifically on analyzing students' understanding of cognitive levels in the additional questions section of the chemistry textbook. The results indicate that the majority of students fall within the sufficient understanding category. Therefore, teachers are encouraged to assign the additional questions as daily exercises or homework to reinforce students' learning and ensure that explanations of the subject matter are clear, structured, and fully understood. Providing

balanced and varied questions is also important, as it prevents repetitive formats and stimulates different levels of cognitive engagement.

From the students' perspective, active participation during the teaching and learning process is essential. Students should maintain full attention during lessons to respond effectively to tests and exercises. They are also encouraged to develop critical thinking skills by identifying problems, proposing solutions, and generating ideas for questions that are not directly answered in the textbook.

Additionally, students must consistently take comprehensive notes during lessons. Maintaining accurate records of the subject matter facilitates better understanding, provides a reliable reference for review, and supports independent study. By implementing these strategies, both teachers and students can enhance the teaching and learning process, improve comprehension, and promote higher-order thinking skills in the context of chemistry education.

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