Higher Order Thinking Skills in Reading Literacy Questions at Vocational High Schools in Indonesia

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Abstract
This research was encouraged by the demand for every student to possess higher order thinking skills (HOTS). This ability can be assessed when the question instruments require high-level thinking skills. Hence, the present study aimed to analyze the fulfilment and percentage of high-level thinking skill indicators in reading literacy questions at Vocational High Schools (SMK) in Pekanbaru City. The research was qualitative and employed a content analysis methodology. Data were collected using documentation techniques involving reading literacy instruments obtained from teachers in vocational high schools throughout Pekanbaru city. The development of HOTS-based reading literacy questions was expected to reflect students' reading literacy abilities. The findings indicated that the reading literacy questions developed by teachers were predominantly not HOTS-based. However, some questions exhibited HOTS characteristics, such as critical thinking, creativity, and problem-solving. Based on Aiken's test conducted by experts on the three teacher-created instruments, it was concluded that over 50% of the questions were not valid. This conclusion was further reinforced by interviews with teachers who encountered challenges in designing reading literacy questions, including difficulty determining operational verbs and a lack of knowledge in developing reading literacy questions, creating HOTS-based questions, and composing answer choices relevant to the provided rules.

Introduction

The reading literacy assessment set by the government is one of the benchmarks for measuring the quality of education in Indonesia. In this regard, the assessment results are considered input for schools to enhance learning. The program replaced the national exam and was scheduled to take place at the end of 2021. The assessment is designed based on the requirements of 21st-century skills, including critical thinking, communication, innovation, and collaboration. This notion is further supported by the perspectives of Pusmenjar (2020), Harsiati (2018), and OECD (2019), who emphasize the indispensability of 21st-century skills for thriving in society and addressing life's challenges. These skills can be evaluated through student assessments, which must employ question instruments that align with their objectives. In this context, reading literacy questions aim to gauge students' foundational skills in solving real-life problems and enhancing the learning process, thereby meeting the demands of 21st-century skills (Pusmenjar, 2020). Gebremariam & Gedamu (2022:128) contend that the assessment is conducted to ascertain students' learning achievements, which can inform future educational strategies. It is crucial that reading literacy questions is classified under the Higher Order Thinking Skills (HOTS) category. However, research by Fischer et al. (2011) revealed that teachers' ability to formulate HOTS questions remained relatively limited. Their analysis of teacher-created midterm exam questions demonstrated that most were categorized as LOTS (Lower Order Thinking Skills). It indicated that teachers possessed a restricted capacity to devise assessment tools stimulating students to engage in higher-level reasoning and thinking. The study by Moore (2008) supported this finding. It highlighted that 55% of questions developed by teachers still belonged to the LOTS category, emphasizing that some teachers were less proficient at preparing HOTS questions that challenged students to think critically and creatively.

According to Jensen et al. (2014), the questions developed by teachers were of relatively poor quality, highlighting the need to identify weaknesses in their development. Additionally, other studies emphasized the significance of HOTS-based assessment, underlining that teachers should possess the skills to create relevant questions. Mantei & Kervin (2018) further recommend that teachers comprehensively understand the concept of HOTS to develop effective reading literacy questions, which can adversely impact the quality, ultimately hindering the assessment of students' reading literacy skills. In this regard, one of the learning goals of HOTS is to ensure that students can analyze, evaluate, and improve their knowledge (Indriyana & Kuswandono, 2019).

Using HOTS questions to stimulate learners' thinking skills is essential to respond to the challenges of the 21st century (Putra & Abdullah, 2019). HOTS is crucial for teaching students in this century, signifying the role of teachers as a critical element in improving students' high-level skills (Ain, 2021). Achieving HOTS requires processes and interactions that establish a strong balance among all educational actors. Therefore, it must be implemented genuinely and meaningfully, starting from the curriculum as the foundational basis of educational activities (Fikri et al., 2021). To address the need to acquire the 21st-century skills, students must be equipped with critical thinking skills. Hence, HOTS has become a highlighted aspect of producing high-quality human capital (Misrom et al., 2020). It involves transfer, problem-solving, critical thinking, and creativity (Brookhart, 2010; King, 2011).

This notion was also reinforced by the results of the Evaluation Program for International Student Assessment (PISA) in 2018, indicating a decline in the reading literacy score of Indonesian students, precisely 371, ranked 72 out of 77 evaluated countries. In the previous PISA results in

2015, Indonesian students' reading literacy score was 397, ranked 64 out of 70 countries. These changes suggested that Indonesian students did not read text information carefully, lacked the utilization of ICT in learning, had insufficient involvement in reading, and encountered text types less frequently than desirable (OECD, 2019).

The results of the PISA have become the basis for the government to initiate changes and draft policies within the education sector. These policies encompass establishing a national assessment at every level of education, containing three key dimensions: a reading literacy assessment, a character survey, and an environmental survey. In this context, the focus of the reading literacy assessment is enclosed within the scope of the national evaluation (Pusmenjar, 2020).

The evaluation of reading literacy in schools engages teachers in its implementation. Therefore, Indonesian language teachers must also be able to craft reading literacy questions that guide students toward developing HOTS. This assertion is corroborated by Widana (2017), indicating that questions requiring HOTS measure an individual's capacity to extrapolate concepts, connect diverse pieces of information, process data, employ information to solve problems, and critically analyze ideas or information.

Literature review
Higher Order Thinking Skills

According to McLoughlin & Luca (2000), Higher Order Thinking Skills (HOTS) encompass the capacity to exceed the provided information and involve critical thinking, application, metacognitive awareness, and problem-solving. Anderson & Karthwohl (2001) also present a similar perspective, stating that the ability to engage in high-level thinking entails analyzing, evaluating, and creating. Per expert arguments, Rofiah et al. (2013) argue that HOTS constitutes a complex, reflective, and creative cognitive process carried out consciously to attain goals by acquiring knowledge of analytical, synthetic, and evaluative thinking levels.

In this regard, HOTS-type questions are considered measurement instruments to assess higher-order thinking skills, specifically those that go beyond mere recalling, restating, or surface-level understanding (Widana, 2017). It implies that relying solely on memorization and recollection is insufficient to address the previously mentioned type of questions. Anderson & Krathwohl (2010:139) contend that if assessments aim to gauge advanced abilities, they must transcend the taxonomy of remembering and encompass analysis, evaluation, and creation.

Widana (2017) asserts that HOTS questions evaluate a person's capability to transfer concepts across contexts, establish connections between diverse pieces of information, process information, utilize information for problem-solving, and critically analyze ideas or information. Within the cognitive framework of the revised Bloom's taxonomy, HOTS questions predominantly appraise competencies related to analysis, evaluation, and creation. As Lewy et al. (2013) indicate, the indicators of HOTS questions at the three cognitive levels are as follows.

First, analyzing, which requires readers to analyze information by structuring it into smaller parts to recognize patterns or other elements. They must also be able to distinguish between the causes and effects presented in a text. Furthermore, they should be capable of identifying and formulating questions. *Second*, evaluating, which demands individuals to assess solutions, ideas, and methodologies using appropriate criteria or established standards to ensure the benefits. Additionally, they should be able to generate hypotheses, offer criticism, and conduct testing. In the final stage, they can accept or reject a statement based on predetermined criteria. *Third*, being creative. At this level, individuals can make generalizations about an idea or perspective,

demonstrating the ability to design approaches or techniques for solving various problems. Furthermore, they can organize elements into new structures that have not existed before.

HOTS questions possess specific characteristics in their presentation, which, according to Widana (2017), can be divided into three categories. *Firstly*, they measure the ability to think at a high level. *Secondly*, they are problem-based and contextual, suggesting that HOTS questions are designed around real-life situations to assess whether students can apply learned concepts to solve problems. *Thirdly*, they encompass a variety of question forms as diverse as those administered in the PISA. This diversity aims to offer more comprehensive insights into test takers' abilities. Moreover, with various question formats, students' capabilities can be accurately determined based on authentic situations.

Van den Berg (2004) suggests an effective way to introduce HOTS is through formative and summative assessments. Correspondingly, HOTS assessment through written tests can employ various formats such as descriptions, choices, and explanations. King et al. (1998) state that the selection of items can include matched items, multiple-choicequestions, or multilevel-choice items. Description tests can be essays, short entries, and performance evaluations. Meanwhile, explanation items assess the ability to provide reasons for items in options or descriptions. Furthermore, the development of assessments for measuring higher-order thinking skills can be categorized in various ways (Brookhart, 2010; Marzano & Kendall, 2007). The questions that help determine HOTS abilities can be classified into five aspects: 1) Utilizing the top tiers of Bloom's taxonomy (the ability to analyze, evaluate, and create); 2) Critical thinking; 3) Logical reasoning; 4) Creative thinking; 5) Problem-solving. These five aspects are complex, as they involve the cognitive levels of Bloom's taxonomy and require the capacity to reason, solve problems, think critically, and think creatively (Brookhart, 2010: 14).

Reading literacy assessment

Literacy competencies are essential for students to keep pace with the demands of the Industrial Revolution 4.0 (Fauzan et al., 2023). They are a significant aspect of education that strengthens 21st-century skills, which are expected to be applied in the real world. Literacy enhances language skills and contributes to knowledge (Winarni et al., 2020:214). Similarly, Harsiati (2018: 91) emphasizes that literacy involves a person's capacity to comprehend, utilize, and reflect upon reading to achieve the expected objectives. Furthermore, reading literacy is an individual's ability to understand, utilize, evaluate, and contemplate written texts essential to society. Proficient reading literacy skills enable people to extract meaning from text, fostering knowledge development and participation at national and international levels (OECD, 2019). Thus, reading literacy assessment includes questions about critical thinking, while reading literacy activities demand higher-order cognitive skills (Nurhayati et al., 2023). Modern research highlights reading literacy as a pivotal competency in contemporary society, drawing increasing attention (Lan & Yu, 2023). It is crucial in personal growth, professional advancement, education, and national development (Rintaningrum, 2019).

It is also closely connected to the ability to think, reason, and be creative, which is essential for thriving in the information era. Individuals can be considered literate in reading when they comprehend and act upon what they read (Cook, 2009). Accordingly, reading literacy involves applying written texts by comprehending their features, keywords, and meanings to predict, interpret, and evaluate effectively. Harini (2017) suggests three indicators of reading literacy: 1) understanding information that involves the process of seeking and locating them; 2) using information to make decisions, solve problems, and organize ideas; 3) analyzing, interpreting, and

evaluating ideas. The OECD (2019:16) also identifies three indicators within the reading literacy domain: accessing and retrieving information, integrating and interpreting texts, and reflecting on and evaluating texts. Furthermore, Winarni et al. (2020) propose five assessment indicators for reading literacy: 1) the ability to receive information; 2) the ability to understand information; 3) the ability to develop interpretations; 4) the ability to reflect and evaluate textual topics; 5) the ability to reflect and evaluate text contents.

According to the OECD (2019), reading literacy is classified into three dimensions: reading format, reading assignment, and reading situation or context. The first dimension is a text format consisting of continuous and non-continuous texts. The continuous text comprises sentences densely organized into paragraphs and can also take the form of larger structures such as text sections, chapters, or books. The non-continuous text refers to informational content presented in diagrams, graphs, tables, maps, advertisements, and other formats that require a distinct approach or reading strategy. The second dimension involves reading assignments divided into three aspects: seeking and finding information explicitly or implicitly stated in a text, interpreting the text to construct meaning and draw conclusions, and reflecting and evaluating texts by connecting written information with ideas, knowledge, and previous experiences. The third dimension pertains to reading context and involves categorizing text based on its association with other people, the intended purpose of the text, and the broader context in which it is situated. In this regard, texts used in PISA assessments vary across educational, personal, and public contexts.

Research method

This study employed a qualitative approach incorporating the content analysis method. Moleong (2019) states that qualitative research is grounded in a natural context and focuses on humans as research subjects. Research data were collected using a documentation technique in the form of reading literacy questions developed by teachers from three Vocational High Schools in Pekanbaru City. These schools were chosen due to their creation of reading literacy instruments and recognition as centers of excellence in education. Arikunto (2013) suggests that documentation techniques aim to gather data from sources such as transcripts, agendas, notes, magazines, etc. In the present study, the researchers collected documents in the form of reading literacy test instruments from Indonesian teachers in three schools. The data analysis technique employed was qualitative data analysis, involving organizing, sorting, synthesizing, identifying patterns, highlighting crucial elements, and making informed decisions regarding the data (Moleong, 2019). To enhance the data validity, theoretical triangulation was involved, including several literature studies to analyze the test constructs containing higher-order thinking skills. Additionally, according to Miles, Huberman, & Saldana (2014), there are three stages in qualitative data analysis: data reduction, data presentation, and conclusion drawing.
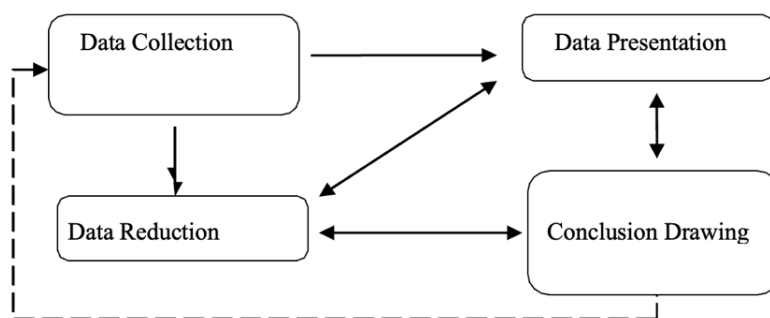

Figure 1. Qualitative data analysis model

Results

HOTS in reading literacy questions at vocational high schools

Reading literacy assessment is a policy of the Indonesian government in education. It is based on the Ministry of Education and Culture circular letter Number 1 of 2020 on independent learning. One of the decisions is to replace the national exam with a specific type of assessment. This policy aims to evaluate the quality of education in an area or educational unit, whose results are subsequently used to enhance learning outcomes. The analysis of questions assessing HOTS was conducted employing two reading literacy instruments, which were categorized based on their characteristics into three groups: (1) indicators of critical thinking, (2) indicators of problem-solving, and (3) indicators of creative thinking in reading literacy questions.

Critical thinking is categorized as a process of rational thinking and reasoning that involves the ability to analyze, interpret, draw conclusions, and evaluate information appropriately, making it the first component to be analyzed. In this regard, questions in the critical thinking category were analyzed based on question instructions and operational verbs. Nonetheless, the government's version of reading literacy questions exhibited different characteristics than the national exams, including multiple-choice, complex multiple-choice, short entries, and descriptions. The analysis results revealed the following indicators of critical thinking in reading literacy questions.

Table 1. Critical thinking indicators on reading literacy questions

No	Indicator
1	Implicitly interpreting the meanings of characters in the short story
2	Determining the implicit value of correctly presented story excerpts
3	Identifying aspects contained in the text of the observation report
4	Searching for statements related to the text
5	Identifying factual sentences from the text
6	Evaluating implicit information in the complex text
7	Identifying statements related to the content of the complex text
8	Analyzing statements that correspond to the location of the event
9	Identifying statements related to the contents of the matrix
10	Correcting incorrect sentences by referencing clear sources

The research findings discussed two reading literacy instruments administered by teachers in schools. Those instruments had several criteria for HOTS-based questions. Pusmenjar (2020: 12) also states that reading literacy questions must be able to measure students' high-level thinking skills. One of the criteria is including a component that assesses learners' critical thinking. It is expected to serve as a benchmark in improving learning outcomes. Thus, the result of implementing this instrument is that students can tackle various social and academic challenges.

In this context, individuals who possess the ability to think critically can readily solve life's problems, especially when dealing with complex texts. Students' critical approach to interpreting a text involves deconstructing and reconstructing it, and the fusion of these two aspects can aid them in solving problems within their academic and non-academic pursuits. Critical thinking in reading extends beyond mere comprehension of textual content and examines external textual elements. It can be achieved through meticulous analysis, evaluation, and synthesis of information from the text. Furthermore, critical thinking regarding reading involves linking the text's contents to the reader's personal experiences and connecting them to social, political, and cultural dimensions (Suarcaya & Prasasti, 2017).

Within the two reading literacy test instruments, indicators were identified as necessitating students to engage in critical thinking. The indicator predominantly employed in the tests was the identification of intricacies related to complex text content. The questions posed to students demanded their engagement with the text provided as a stimulus. This trait characterizes a HOTS item, which typically incorporates a stimulus as either a literary or an informational text. The OECD (2019) similarly asserts that texts used to measure reading literacy encompass continuous and non-continuous forms. The continuous text involves densely packed sentences structured as paragraphs or even larger units such as sections, chapters, or books. Meanwhile, the non-continuous text pertains to informational content presented as diagrams, graphs, tables, maps, advertisements, and other materials, demanding a distinct approach to reading.

Furthermore, the issue of reading literacy also incorporated HOTS indicators, taking the form of interpreting character statements in short stories, identifying determinants and value aspects, and evaluating, analyzing, and improving the implied information in the text. The inclusion of these indicators categorized the issue within the realm of critical thinking. Moreover, relevant research results identified critical thinking indicators in the National Examination (*UN*) questions, encompassing statement analysis, sentence effectiveness, and word usage accuracy. Accordingly, critical thinking indicators appeared in National Examination questions in the form of implicitly discerning intent, text settings, and reasons for incorrect usage of punctuation marks. They necessitated students to engage in reasoning and critical thinking, thereby enabling the assessment of HOTS.

Critical thinking skills can be enhanced through various means, including consistently posing questions to clarify problems, compare differing opinions, and identify relevant elements (Srinawati et al., 2020; Ismawati et al., 2023). Consequently, the reading literacy instruments developed by educators should actively stimulate learners to engage in critical thinking. Questions that exhibit relevant characteristics can be incorporated into daily tests, midterms, final-semester exams, class advancement assessments, major selection evaluations, and school admission processes. Another noteworthy observation from the analysis of reading literacy questions was the variability in the portion of HOTS-based questions devised by teachers. This disparity is more clearly illustrated in the following table.

Table 2. Distribution of HOTS indicators in the reading literacy assessment created by teachers

No.	HOTS Indicators	Instrument 1		Instrument 2		Instrument 3	
		Number of Item	Percentage	Number of Item	Percentage	Number o Item	Percentage
1	Critical thinking	6	30	8	30	8	32
2	Problem Solving	2	10	1	4	0	0
3	Creative Thinking	2	10	3	11	0	0
4	Not HOTS	10	50	15	56	17	68
	Total	20	100	27	100	25	100

Another finding from the analysis of the reading literacy assessment was the varying distribution of HOTS-based questions. Based on the three teacher-created instruments, there was a varied allocation of the number of HOTS items. In the first instrument, the critical thinking aspect had 6 items or 30%, the problem-solving aspect had 2 items or 10%, the creative thinking aspect

had 2 items or 10%, and the remaining 10 items or 50% were not classified as HOTS. In the second instrument, the critical thinking aspect comprised 8 items or 30%, the problem-solving aspect included 1 item or 4%, the creative thinking aspect encompassed 3 items or 11%, and the remaining 15 items or 56% were not categorized as HOTS. The same pattern was also observed in the third instrument, in which the critical thinking aspect consisted of 8 items or 32%, the problem-solving aspect had 0 items or 0%, the creative thinking aspect had 0 items or 0%, and the remaining 17 items or 68% were not perceived as HOTS.

Difficulties in creating HOTS questions: teacher's perspectives.

     An initial interview was conducted to gather information regarding teachers' understanding and needs concerning the development of reading literacy instruments for students. This interview involved ten Indonesian language teachers from Vocational High Schools in Pekanbaru, Indonesia. The results revealed that all informants were familiar with reading literacy acquired through workshops, seminars, and training sessions. This understanding was based on the interview results from all Indonesian language teachers, whose outcomes are as follows.

> *Teachers have gained knowledge through socialization and training conducted by the government, institutions, and relevant professional organizations regarding reading literacy matters. Reading literacy assessment has been introduced as a replacement for the National Examination. The reading literacy instruments are divided into two categories: those administered by the government, aimed at eleventh-grade students, and those conducted by teachers, intended for other grades.*

     Indonesian language teachers fundamentally possessed information and knowledge regarding reading literacy. However, the information was limited to the awareness of upcoming assessments by the government and the requirement for all teachers to prepare for and introduce various types of reading literacy questions to students. It was further supported by the interview results with teachers concerning their understanding of the characteristics of reading literacy questions. The summarized outcomes of these interviews are as follows.

> *The characteristics of reading literacy questions are divided into several components, namely the content of the text, the discourse context used as a stimulus, and the tested cognitive level. In terms of content, the texts incorporate literary and informational forms. Literary texts can be folktales, legends, fables, poems, rhymes, etc., while informational texts include news, articles, reports, brochures, tables, graphs, etc. Furthermore, the characteristics of reading literacy questions consist of three aspects: personal context, socio-cultural context, and scientific context. The personal context involves individual events, actions, and settings. In this regard, the reading content revolves around hobbies, aspirations, and experiences. The socio-cultural context typically covers traditional games, regional cuisines, dances, etc. In the scientific context, the texts aim to enhance the understanding of scientific knowledge, covering topics like nutrition, medical science, medications, climate, etc. The characteristics of the third component encompass three levels: locating information, comprehending, and evaluating or reflecting. Reading literacy questions for the vocational high school level are expected to emphasize evaluating and reflecting levels more than others. These questions should demand students to engage in critical thinking, creativity, and problem-solving in daily life situations.*

     The questions regarding the characteristics of reading literacy items must meet the criteria established by the government, including multiple-choice, complex multiple-choice, matching,

fill-in-the-blanks, and open-ended questions (Pusmenjar, 2020). This statement was consistent with what the informants WY, HN, and RAS conveyed. The respondents' answers concerning the characteristics of reading literacy questions are outlined below.

> *Reading literacy questions consist of five formats: multiple-choice, complex multiple-choice, matching, short answer, and essay. The proportion of questions for the vocational high school level is predominantly in the complex multiple-choice and conventional multiple-choice formats. The distribution of question formats for reading literacy is not specified. The most important aspect is that the developed questions should be contextual and require students to think critically.*

The initial understanding of teachers regarding reading literacy was acquired through various training and socialization efforts. However, the number of teachers developing reading literacy questions remained limited. Based on interviews with 10 informants, it was found that three of them, who were from different schools, had created reading literacy questions. The following is a description of the interview results conducted with all informants.

> *Some teachers have created reading literacy questions, developed based on their efforts by referencing book examples. Additionally, some others established questions based on existing reading literacy materials. Hence, they were developed from government-issued questions (WY; RAS; HN). On the other hand, other teachers had not created any reading literacy question (LS; EYY; UW; JS; NKS; CA; YS).*

In general, not all teachers developed reading literacy questions. Approximately 70% of teachers made those questions, while the remaining 30% did not. Furthermore, informants were asked about their obstacles in developing reading literacy questions. Their responses varied; excerpts from interviews with them regarding these challenges are outlined below.

> *Teachers struggle with appropriate operational verbs to measure students' abilities in alignment with the discussed material. There is a lack of understanding in constructing good and accurate literacy questions. Thus, teachers find creating HOTS-based reading literacy questions difficult. Another challenge is the lack of references for HOTS-based questions. Meanwhile, crafting them requires high-level thinking skills to adjust each indicator and align suitable options with the reading literacy questions being created.*

The interview results can be summarized as follows: teachers encountered several challenges in developing reading literacy questions, including (1) difficulty in determining operational verbs, (2) difficulty in developing reading literacy questions, (3) difficulty in creating HOTS-based questions, and (4) difficulty in creating answer choices following the reading literacy criteria.

Furthermore, the interview with informants regarding teachers' testing and validation of the reading literacy instrument, average student performance in answering questions, and obstacles students faced in answering questions also provided insights for this research. In this regard, teachers did not validate the developed reading literacy questions. The created instrument was directly tested on students, and their performance ranged from 56 to 75, categorized as adequate. However, this categorization was considered low, as they encountered several obstacles described below.

> *Students find it challenging to comprehend lengthy text-based questions. Analyzing those questions is perceived as difficult for students, as they demand higher-order thinking. Moreover, the time given to answer the questions is too short.*

Expert's judgement of reading literacy assessment at vocational high schools

The researchers sought expert judgement using Aiken's validation technique regarding the relevance of the question items to the HOTS indicators. In this regard, the researchers employed Aiken's test—the expert validation involved 4 individuals. The instruments subjected to validation were 3 reading literacy instruments. The indicators in question encompassed critical thinking, creative thinking, and problem-solving.

Table 3. Expert judgement using Aiken's test

Instrument 1			Instrument 2			Instrument 3		
Item	Loading Factor	Validity Criteria	Item	Loading Factor	Validity Criteria	Item	Loading Factor	Validity Criteria
1	0.250	low	1	0.167	low	1	0.167	Low
2	0.250	low	2	0.250	low	2	0.167	Low
3	0.167	low	3	0.083	low	3	0.583	Moderate
4	0.583	moderate	4	0.167	low	4	0.750	Moderate
5	0.833	high	5	0.250	low	5	0.250	Low
6	0.750	moderate	6	0.750	moderate	6	0.833	High
7	0.750	moderate	7	0.833	high	7	0.250	Low
8	0.167	low	8	0.583	moderate	8	0.250	Low
9	0.250	low	9	0.750	moderate	9	0.750	Moderate
10	0.750	moderate	10	0.750	moderate	10	0.250	Low
11	0.750	moderate	11	0.250	low	11	0.167	Low
12	0.167	low	12	0.250	low	12	0.250	Low
13	0.167	low	13	0.250	low	13	0.750	Moderate
14	0.583	moderate	14	0.750	moderate	14	0.167	Low
15	0.833	high	15	0.250	low	15	0.167	Low
16	0.167	low	16	0.250	low	16	0.750	Moderate
17	0.750	moderate	17	0.167	low	17	0.250	Low
18	0.167	low	18	0.250	low	18	0.250	Low
19	0.167	low	19	0.250	low	19	0.250	Low
20	0.833	high	20	0.750	moderate	20	0.750	Moderate
			21	0.833	high	21	0.167	Low
			22	0.833	high	22	0.833	High
			23	0.250	low	23	0.250	Low
			24	0.833	high	24	0.750	Moderate
			25	0.750	moderate	25	0.750	Moderate
			26	0.750	moderate			
			27	0.750	moderate			

After conducting Aiken's test on the three instruments, a number of question items were classified as either valid or invalid. A question item was considered valid if it met the criteria of high or moderate, whereas it was considered invalid if it met the low criteria. These findings are visualized through a graph that displays the percentage validity of the question items.
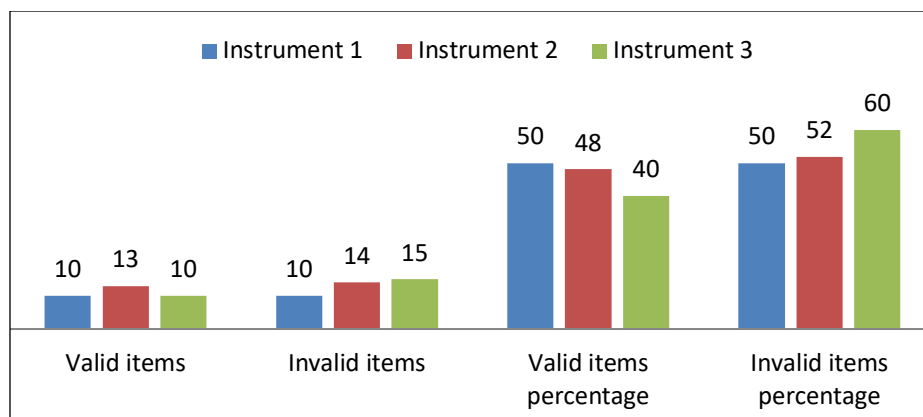
Figure 2. Percentage of question items validity based on Aiken's test

Discussion

Reading literacy needs to be possessed by every student. It is supported by the government and schools, which conduct literacy assessments at all levels of education. This policy is based on the results of research conducted by PISA, which found that students' reading literacy skills were classified as low. This ability serves as the fundamental foundation for individuals to participate in society, develop knowledge, and realize their potential (Harsiati, 2018; OECD, 2019; Koyuncu & Fırat, 2020; Saptono et al., 2020; Pinza-Tapia et al., 2021).

Another crucial component in reading literacy questions is the Higher Order Thinking Skills (HOTS) element, specifically problem-solving. It involves cognitive processes aimed at understanding and resolving problems. In this regard, problem-solving concerns identifying problems, formulating problem statements, exploring various solutions, selecting the correct choice, and evaluating the chosen solutions. The findings from the data analysis regarding the problem-solving aspect of reading literacy questions are detailed in the following table.

Table 4. Problem-solving indicators of reading literacy questions

No	Indicator
1	Revealing the causes of problems experienced by characters in the story
2	Revealing implied information in the complex text

Both in the learning process and completing assessments, the problem-solving ability becomes the foundation for students to gain experience in solving real-life societal problems. It is also affirmed by Graesser et al. (2017), who state that problem-solving involves exploring and understanding problems, representing and formulating problems, planning and implementing strategies, and monitoring and reflecting on problem-solving activities. Similarly, PISA employs the same approach to measure the ability to solve problems, encompassing understanding problems (exploring and comprehending), determining problems (representing and formulating), devising solutions (planning and executing), and evaluating (monitoring and reflecting) (Ismawati et al., 2023; OECD, 2013).

Hence, problem-solving skills need to be acquired and mastered by students before entering high school (Stevenson et al., 1986). To achieve this, students should be able to identify relevant pieces of data when confronted with extensive information, synthesize information that may not seem interconnected, establish connections between different sets of information, and relate new problems to previously encountered ones. Activities promoting problem-solving should ideally

involve issues relevant to the real world. In addition, during the assessment process, students should experience questions that require finding information presented in various formats, including texts, numbers, and graphics (Butterworth & Thwaites, 2013).

Reading literacy questions must effectively measure students' problem-solving abilities. It can be achieved by incorporating relevant steps into the reading literacy assessment. Data analysis revealed that only 4% of the reading literacy questions focused on problem-solving, indicating a minimal emphasis on problem-solving questions in the document. This notion is supported by the viewpoints presented by Talman et al. (2021), Widana (2017), and Ismail & Zubairi (2022), asserting that reasoning and problem-solving skills are vital for future professional endeavors. Cultivating these skills can enhance student motivation and learning outcomes.

The creation of the test instrument serves a specific purpose. Consequently, question designers must meticulously consider the indicators and their achievements. One purpose of the test instrument is to specify the measurements (Suwandi et al., 2021). The construct embedded in the analyzed instrument aligned to evaluate reading literacy, which entailed assessing an individual's capacity to locate, comprehend, and evaluate textual content and information. These proficiencies prepare students to contribute positively to society. Notably, problem-solving ability is one of the key skills demanded in the 21st century. Harsiati (2018: 91) and OECD (2019) emphasize the significance of 21st-century skills, including critical thinking, problem-solving, communication, collaboration, creativity, and innovation. To cultivate these skills within an educational setting, schools can implement problem-solving-based learning strategies and conduct assessments designed to gauge students' problem-solving abilities.

The capacity to engage in critical thinking and problem-solving is conducive to the development of creative thinking skills. This notion is corroborated by Sari et al. (2021), who suggest that problem-based learning significantly enhances students' problem-solving and scientific writing skills. The latter is regarded as an outcome of creative thinking, which involves the ability to produce and categorize a range of ideas, including unconventional ones. Developing critical thinking and problem-solving skills is crucial in response to the demands of the knowledge-based economy. Continuous learning and updating are essential to meet the needs of the 21st century. Therefore, everyone must embrace the significance of becoming lifelong learners to keep pace with technological advancements. UNESCO proposes that education should be built on four pillars: learning to know, learning to do, learning to live together, and learning to be. Additionally, UNESCO recommends adapting education to meet the emerging needs due to rapid technological advancements in the knowledge-based economy (Kai et al., 2017).

Table 5 below describes various indicators of creative thinking that can be incorporated into reading literacy questions. Developing high-level thinking skills such as critical thinking, problem-solving, and creative thinking is crucial for students as they face life's challenges, which are often highly competitive. In addition to helping learners achieve high academic scores, the ability to think creatively about problems is an essential component of HOTS. Thus, testing students with HOTS-based questions that encourage critical thinking and problem-solving is necessary to cultivate these skills. Moreover, creating a set of reading literacy questions that assess students' high-level thinking abilities is crucial (Fitriyatmi, 2020).

Table 5. Indicators of creative thinking on reading literacy questions

No	Indicator
1	Describing the characters in complex short story excerpts correctly.
2	Implicitly interpreting the story excerpts' meaning or message, requiring the emergence of ideas.

3	Determining the main idea in a text that presents multiple points of view.
4	Depicting character traits in story excerpts by choosing the correct answer.
5	Illustrating the characters in the story excerpts by choosing the correct answer.
6	Conveying the message contained in a poem.
7	Articulating the purpose of a poetic text.

Based on the table, numerous indicators of creative thinking were incorporated into reading literacy questions. The dominant indicators of creative thinking utilized included focusing on the main idea of the text, comparing two texts, evaluating implied meanings, describing characters and their traits, and more. All these instructions guided students to discover and generate ideas across different categories and develop unconventional notions. The questions within the creative thinking category prompted students to identify problems and devise solutions by engaging in creative and innovative thinking within real-life situations (Priyatni & Martutik, 2020; Hamdan et al., 2019). Research results conducted by Suwandi et al. (2021) indicated that thinking skills evaluated in the National Examination questions involved elaborating on points of view, determining main ideas and causes of conflict in literary texts, describing character traits, and identifying relevant paragraphs.

Competence in reading can also significantly impact the acquisition of other literacies, such as mathematics achievement (Caponera, Sestito, & Russo, 2016). International surveys like the Program for International Student Assessment (PISA), Trends in International Mathematics and Science Study (TIMSS), and Progress in International Reading Literacy Study (PIRLS) have gained popularity in recent years. The Organization for Economic Cooperation and Development (OECD) conducts the PISA every three years and evaluates reading, science, and mathematics literacy. Each enactment prefers a specific field as the main subject, allowing participants and analysists to focus on it (Ertem, 2020).

Substantial reading skills are essential for a student to become a successful and productive adult in society. To address the demands for literacy in today's society, the term "reading literacy" was introduced, defined as "the ability to understand and use the written language forms required by society and valued by individuals" (Mullis, Kennedy, Martin, & Sainsbury, 2006).

The reading text in the literacy assessment should use language the students understand. The materials should also contain clear and understandable instructions so that students have no difficulty reading (Muhammadi, 2017). Reading motivation is perceived as an individual's goals, values, and beliefs concerning reading topics, processes, and outcomes (Guthrie & Wigfield, 2000). School stakeholders should create space for parental involvement with respect to the continuity of literacy experiences. By bridging the gap between literary socialization at home and literacy education at school, learners' motivation, engagement, and participation in the classroom can be enhanced (Netten et al., 2011). As long as students continue learning at home, cooperation between teachers and the family is necessary to monitor their learning progress (Junaidi eat al., 2022).

However, as reading literacy has gained popularity over recent decades, its challenges have also been reported as significant. Due to poverty, gender inequality, and historical and socioeconomic disadvantages, there is a general imbalance in the development of reading literacy ability across countries, regions, and individuals. Students with disadvantaged backgrounds tend to lack access to resources to develop basic reading skills (Combrinck & Mtsatse, 2019). The Simple View of Reading argues that reading comprehension is a product of decoding and linguistic comprehension (Gough & Tunmer, 1986; Hoover & Gough, 1990). In this context, decoding is the ability to transform printed letter strings into a phonetic code (Perfetti, 1985). Meanwhile,

according to Gough and Tunmer (1986), linguistic comprehension is the process by which given lexical information, sentences, and discourses are interpreted.

The data analysis revealed that reading literacy questions predominantly consisted of questions that tested creative thinking abilities. The first instrument comprised 25 questions; 6 items, or approximately 24%, were designed to evaluate creative thinking. In the second instrument, 11 items (around 41%) were categorized as creative thinking questions. The two instruments had 17 items on average, accounting for approximately 32% of the questions requiring higher-order thinking skills. These findings demonstrated that the reading literacy questions already incorporated items to assess HOTS.

Students are expected to possess the ability to think in their way and method. It can be achieved by consistently providing examples of questions or problems that can be solved in new and innovative ways. Thus, learners can produce new creations that others can use. It is reinforced by Anderson & Krathwohl (2001) that the highest level of thinking ability is analyzing, evaluating, and creating. HOTS involves self-control in the thinking process. Hence, an individual cannot be considered to have higher-order thinking skills if someone else assists in every phase (Sagala & Andriani, 2019).

However, the mechanism of the influence of school belonging on student academic achievement should be further explored, especially in reading performance (Tan et al., 2022). Learning theories have witnessed the development of students' higher-order thinking skills as a quintessential educational goal, as the absence of such skills in learning leads to learners' difficulty in answering analytical, critical, creative, and problem-solving questions (Damaianti et al., 2020). Research by Nurhayati uncovered that the students' and teachers' needs analysis results indicated they did not comprehensively understand the reading literacy questions. In addition, the teachers could not design and organize reading literacy questions (Nurhayati et al., 2023).

Conclusion

The development of HOTS-based reading literacy questions was expected to reflect students' reading literacy abilities. The findings revealed that the reading literacy questions developed by teachers were predominantly not HOTS-based. However, several questions exhibited HOTS characteristics, such as critical thinking, creativity, and problem-solving. Based on Aiken's test conducted by experts on the three teacher-created instruments, over 50% of the questions were not valid. This conclusion was further supported by interviews with teachers who encountered challenges in designing reading literacy questions, including difficulties determining operational verbs and a lack of knowledge in developing reading literacy questions, creating HOTS-based questions, and composing answer choices relevant to the provided rules.

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