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Integration of Operational Verbs, Objective Tests, Essay Tests, Scales, And Rubrics in Cognitive Assessment: A Literature Review

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ABSTRACT

Assessing cognitive learning outcomes requires instruments aligned with learning objectives and students' expected cognitive abilities. This study aims to analyze the integration of operational verbs (KKO), objective tests, essay tests, rating scales, and rubrics in cognitive assessment. A qualitative approach using a literature review method was employed. Data were collected from scientific journal articles, academic books, conference proceedings, and other scholarly sources related to cognitive assessment, Bloom's taxonomy, and assessment instruments. Data analysis involved content analysis and thematic synthesis to identify and connect findings across sources. The findings indicate that operational verbs link learning objectives with measurable indicators of cognitive abilities. Objective tests are effective for assessing structured responses, while essay tests provide opportunities to evaluate students' abilities to explain, analyze, evaluate, and develop ideas. Rating scales and rubrics support assessment by clarifying performance criteria and improving scoring consistency. The study demonstrates that integrating these five components can strengthen the alignment between learning objectives, assessment instruments, and expected learning outcomes. Its significance lies in providing a conceptual foundation for teachers to design more systematic, fair, and comprehensive cognitive assessments. This integration can also help teachers obtain a clearer understanding of students' cognitive achievement and

support informed decisions to improve teaching and learning processes.

INTRODUCTION

Assessment is an essential part of learning; through assessment, teachers can determine the extent to which students have achieved the established competencies. (Ridha et al. 2025). Assessment should not be understood merely as the act of assigning a grade at the end of instruction, but rather as a means to gather information about learners' abilities while simultaneously determining appropriate follow-up actions for learning. (Noven Kusainun 2020). Therefore, the quality of assessment is heavily influenced by the instruments employed. A high-quality instrument must be capable of capturing the specific abilities being assessed, rather than merely generating numerical scores. This requirement is particularly crucial in cognitive assessment, as a learner's capabilities extend beyond simply recalling and comprehending material to include applying, analyzing, evaluating, and creating. In this context, Operational Verbs (KKO) play a vital role in translating learning objectives into observable and measurable competencies. Research (Nurmaya et al. 2022) demonstrates that instruments based on the revised Bloom's Taxonomy can be used to measure various levels of cognitive ability, but each level requires appropriate thinking demands.

In instructional practice, the alignment between learning objectives, operational verbs (KKO), indicators, and question formats is not always consistent. A teacher might employ operational verbs indicating analytical or evaluative skills, yet the actual questions posed require students merely to recall or state information. Consequently, the assessment results fail to accurately reflect the competencies originally targeted in the instruction. Rassul highlights that the relationship between learning outcomes and assessment questions remains problematic, particularly when assessments predominantly measure lower-order thinking skills. (Rassul 2022). The principle of constructive alignment asserts that learning objectives, learning activities, and assessments must be designed in a mutually aligned manner so that the evidence of learning outcomes truly reflects the learners' competence. (Slavča Hristov. et.al 2023). Therefore, the development of the instrument needs to begin with the ability to be measured, which is then translated into appropriate indicators and task formats.

Selecting the type of test is also a crucial part of the process. Objective tests offer advantages in terms of scoring efficiency, consistency, and content coverage, whereas essay tests allow students to articulate ideas, formulate arguments, analyze issues, and demonstrate their thought processes. Both serve distinct functions and can be used complementarily, depending on the nature of the competency being assessed. Zahir highlights that objective and non-objective tests differ in their characteristics and the considerations involved in using them to measure learning outcomes. Conversely, when

student responses take the form of essays, the scoring process requires clear criteria. (Zahir, Harahap, and Sumarta 2025). Scales and rubrics can help teachers determine the quality level of answers more consistently. Research by Hayes et al. (2021) indicates that the cognitive complexity of a task must be accurately reflected in the rubric so that assessment results provide information aligned with the abilities being measured.

A number of studies have developed assessment instruments based on higher-order thinking skills (HOTS), in the form of either tests or rubrics. Arthadewi developed a HOTS-based learning outcome assessment instrument. (Made et al. 2024), meanwhile, Rukmana developed a cognitive assessment instrument to train students' critical thinking skills. (Rukmana and Putri 2024). Gradini also demonstrates that rubrics can be used to assess various aspects of higher-order thinking, such as critical thinking, problem-solving, reasoning, and communication. (Gradini 2022). These studies demonstrate that the development of assessment instruments has garnered significant attention. However, some research still focuses on specific types of instruments or on a single aspect of ability. The interrelationships among operational verbs, essay tests, objective tests, scales, and rubrics have not yet been extensively developed into a cohesive assessment framework.

Previous studies on cognitive assessment have widely discussed the use of operational verbs (KKO), objective tests, essay tests, rating scales, and rubrics. However, the relationships among these five components within an integrated assessment framework require further examination. Existing studies tend to examine assessment components according to their individual functions, leaving room for a more comprehensive explanation of the connections between learning objectives, instrument selection, and scoring criteria. Therefore, this study offers a conceptual contribution by synthesizing these five components into an integrated framework for cognitive assessment. Operational verbs serve as the basis for identifying measurable cognitive abilities, objective and essay tests function as complementary instruments for assessing different levels of thinking, while rating scales and rubrics provide clear criteria and support scoring consistency. Integrating these components is important because the quality of assessment depends not only on the appropriateness of individual instruments but also on the alignment between learning objectives, assessment tasks, and evaluation standards. This integration can help teachers design more systematic, fair, and comprehensive cognitive assessments while gaining a clearer understanding of students' learning achievements. Thus, this review contributes a conceptual foundation for improving educational assessment practices and promoting more meaningful evaluation of students' cognitive learning outcomes.

This presents an opportunity for further research: specifically, how these various components can be integrated so that assessment yields not only scores but also a clearer picture of the quality of learners' cognitive abilities. Based on this review, the study develops a cognitive assessment instrument by integrating operational verbs, essay tests, objective tests, scales, and rubrics as interconnected components. Operational verbs are used to define the required level of ability to be measured, while indicators serve as the basis for formulating tasks or questions; objective and essay tests are selected according to the specific characteristics of the competency. Scales and rubrics are employed to clarify

achievement levels and scoring criteria. This approach represents the study's novelty, as the instrument is viewed not merely as a collection of questions, but as a system linking learning objectives to evidence of learning outcomes. The study aims to develop a cognitive assessment instrument to measure learning outcomes through the integration of operational verbs, essay tests, objective tests, scales, and rubrics. The findings are expected to assist educators in designing assessments that are more focused, objective, and aligned with the abilities intended to be fostered in learners.

RESEARCH METHODS

This study employs a qualitative approach utilizing a literature review method. This approach was selected because the study aims to understand and integrate various concepts and research findings related to cognitive assessment, operational verbs, objective tests, essay tests, rating scales, and rubrics. Rather than collecting data directly from respondents or conducting instrument trials, the study examines relevant scholarly sources to gain a comprehensive understanding of the relationships among learning objectives, cognitive ability levels, instrument formats, and scoring techniques. The data sources consist of scientific journal articles, academic books, conference proceedings, and scholarly documents relevant to the study's focus, encompassing both theoretical sources and empirical research findings.

Data collection was conducted through literature searches on Google Scholar, ScienceDirect, ERIC, and relevant scientific journal portals. Keywords used included cognitive assessment, learning outcomes, Bloom's taxonomy, operational verbs, objective test, essay test, rating scale, and assessment rubric, along with their Indonesian equivalents. Literature was selected based on its relevance to the research focus, source credibility, clarity of bibliographic information, and contribution to the discussion. Works directly addressing cognitive assessment and instrument components served as primary sources, whereas sources discussing educational evaluation only in general terms without a link to the research focus were not used as primary material. Classic literature was retained where it held significance as a theoretical foundation, while more recent studies were utilized to illustrate the evolution of the field and its practical applications.

The data obtained were subsequently analyzed using content analysis and thematic synthesis. The analysis process involved critically reading the sources, identifying key ideas, comparing similarities and differences across sources, and then categorizing them into themes, cognitive assessment concepts, operational verbs (KKO) and cognitive levels, objective tests, essay tests, rating scales, and rubrics. (Thomas and Harden 2008). Subsequently, each theme is linked to examine the alignment among learning objectives, indicators, cognitive levels, test formats, and scoring techniques. In this way, the study not only produces a summary of prior research but also constructs a synthesis regarding the role of each instrument in measuring learning outcomes.

The validity of the study was established through source triangulation—specifically, by comparing information from multiple academic sources addressing the same theme. The researcher served as the primary instrument in locating, selecting,

reading, interpreting, and synthesizing the literature used. (George 2008). There were no informants or respondents, as the research data were derived entirely from scholarly documents. The analysis aimed to explain how operational verbs, objective tests, essay tests, scales, and rubrics can be utilized in a coordinated manner for cognitive assessment. Through this approach, the study is expected to provide a more structured understanding of the principles governing the selection and use of assessment instruments, ensuring that the measurement of learning outcomes focuses not merely on question formats but also takes into account the cognitive abilities being measured and the appropriateness of the scoring techniques.

RESULTS AND DISCUSSION

Cognitive Assessment as a Crucial Part of Measuring Learning Outcomes

The results of the literature review indicate that cognitive assessment serves not only to determine students' final grades but also to provide insight into their abilities to understand, apply, analyze, evaluate, and generate ideas. (Thomas and Harden 2008). Therefore, assessments need to be structured based on the abilities that students truly want to learn. Bloom's Taxonomy, revised by Anderson and Krathwohl, is a widely used framework for distinguishing cognitive ability levels from remembering, understanding, applying, analyzing, evaluating, to creating. (Marta et al. 2025). Utilizing these levels assists educators in determining appropriate question formats and the requisite level of cognitive demand. Research on cognitive assessment also indicates that classroom assessment instruments must take into account the specific ability levels being measured, rather than merely focusing on the volume of material that can be covered.

The alignment between learning objectives and assessment instruments is a robust finding across various studies. A high-quality instrument is not merely one containing a large number of questions; rather, it is one capable of providing information that corresponds to the learning objectives. If the learning objective requires students only to recall facts, simple questions may suffice. (Widiana et al. 2021). However, when students are expected to analyze a problem or provide reasons for a decision, the form of assessment must also accommodate such abilities. Thus, cognitive assessment should be understood as an integral part of the learning process, rather than merely an activity conducted after instruction has concluded.

Operational Verbs as a Link between Learning Objectives and Assessment Instruments

A review of various sources shows that Operational Verbs (KKO) play a crucial role in developing cognitive assessments. KKO help translate general learning objectives into more concrete, observable skills. (Idham and Rambe 2025). Words such as *state*, *explain*, *apply*, *analyze*, *evaluate*, and *create* provide an indication of the level of proficiency to be measured. The use of Operational Verbs (KKO) also assists educators in determining appropriate question formats, thereby establishing a connection among learning objectives, indicators, assessment items, and expected outcomes. However, simply selecting a verb

deemed to represent levels C1 through C6 is insufficient; these verbs must be understood in the context of the accompanying subject matter and activities. A single verb can entail different cognitive demands depending on the material or situation in which it is applied. (Idham and Rambe 2025). Therefore, the formulation of indicators must take into account the relationship between the targeted competency, the subject matter, the conditions of the test items, and the expected form of the answer. These findings align with studies on the use of Bloom's Taxonomy in assessment, which indicate that the application of cognitive levels needs to be tangibly translated into assessment criteria rather than merely listed in the test specifications.

From the results of this synthesis, it can be seen that KKO functions as a link between learning objectives and assessment instruments. KKO helps educators determine what needs to be measured, while the form of the instrument determines how these abilities can be proven. Thus, KKO should not be treated as a stand-alone list of verbs, but as part of an assessment plan that links objectives, indicators, questions and scoring.

Objective Tests and Essay Tests Serve Complementary Functions

The study results indicate that objective tests and essay tests possess distinct characteristics and strengths. Objective tests—such as multiple-choice, true-false, matching, and fill-in-the-blank formats—enable educators to obtain more structured answers and facilitate the grading process. (Arini et al. 2024). Written tests can be either objective or non-objective in nature, with each type offering distinct benefits and limitations regarding the assessment of learning outcomes. Objective tests are effectively used when educators wish to measure knowledge mastery across a relatively broad range of material; however, their quality ultimately depends on the educator's ability to craft the stimulus, answer choices, and cognitive demands for each test item. (Dian afrilianti, Et.al 2025).

Essay tests offer the advantage of allowing students to develop their answers using their own words. Through these tests, educators can observe how students explain concepts, connect ideas, provide reasoning, solve problems, or defend an opinion. (Dian afrilianti, Et.al 2025). Therefore, essay tests offer a greater opportunity to probe more complex thinking skills. Studies on cognitive assessment indicate that objective instruments and essay tests should not be viewed as mutually exclusive forms of assessment; rather, they can be used in tandem, depending on the specific skills being measured.

Based on these findings, the choice between objective tests and essay tests should not be based on which is inherently better. A more appropriate question is what specific abilities are to be assessed and what form of evidence best demonstrates them. Objective tests are suitable when the expected answers can be clearly defined, whereas essay tests are more appropriate when it is necessary to observe students' thought processes and the quality of their arguments. A combination of both can provide more comprehensive information regarding learning outcomes.

Scales and Rubrics Enhance Scoring Objectivity

The study results also indicate that assessment does not end with the drafting of questions; the scoring method plays a decisive role in the quality of the information produced. Rating scales help illustrate learners' levels of achievement based on specific categories or ranges. (Wicaksono 2026). Meanwhile, a rubric provides more detailed criteria regarding the expected quality of answers or performance. The use of a rubric becomes increasingly important when assessment involves open-ended answers that allow for a variety of responses from learners. (Nia, Et.al 2023).

Gradini's Research (2022) It demonstrates that a Higher Order Thinking Skills (HOTS)-based assessment rubric can be developed to measure various aspects of high-level thinking abilities, such as critical thinking, problem-solving, comprehension, reasoning, representation, and communication. The developed rubric exhibits good validity, reliability, and practicality. These findings indicate that the use of the rubric can help provide clearer assessment criteria for identifying the quality of students' thinking abilities, particularly regarding high-level thinking skills. (Gradini 2022).

The use of scales and rubrics can also reduce assessments that rely too heavily on the evaluator's subjective impressions. When criteria are clearly defined, educators have a more consistent reference point for assigning scores. This is particularly important for essay tests or assignments that yield diverse responses. Thus, rubrics help align students' answers with the competency criteria established at the outset. Assessment becomes more transparent, as students can also understand the reasons why a particular answer received a specific score.

Integration of Operational Verbs, Test Formats, Scales, and Rubrics in Cognitive Assessment

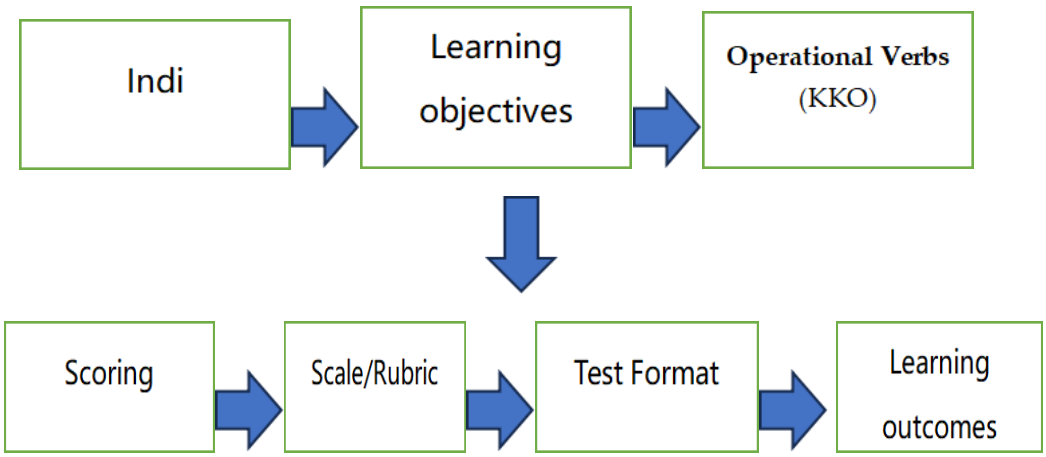
A synthesis of the literature indicates that operational verbs, objective tests, essay tests, scales, and rubrics should not be viewed as standalone components. Together, these five elements form an assessment sequence. Operational verbs define the ability to be measured; indicators translate that ability into observable behaviors; test formats determine how learners demonstrate their abilities; and scales and rubrics provide the basis for determining levels of achievement. This relationship can be illustrated as follows.

Table 1. Integration of Components in Cognitive Assessment

COMPONENT	PURPOSE	RELATIONSHIP TO ASSESSMENT
KKO	Determining the level of cognitive ability	Serves as the basis for formulating indicators.
Indicator	Explaining the competencies to be achieved	Serves as the basis for drafting items
Objective test	Measuring ability using structured responses	Suitable for skills that have relatively clear answers.

Essay test	Exploring the thought process and quality of answers	Suitable for explanation, analysis, evaluation, and argumentation.
Scale	Indicates the level of achievement	Helps categorize assessment results
Rubric	Explaining the quality criteria for answers	Helps with more consistent scoring.

Figure 1. Cognitive Assessment Integration Workflow



This process demonstrates that the quality of an assessment is determined by the coherence of its various components. A misalignment occurs when learning objectives require analytical skills, yet the assessment questions merely ask students to recall definitions. Similarly, if students are required to provide written responses but no clear rubric is available, the assessment may lack consistency. Therefore, integration is a crucial principle in designing cognitive assessments..

These findings reinforce the view that effective assessment is not necessarily the one employing the most complex instruments, but rather the one that is well-targeted. While objective tests retain a significant role in assessment, not all competencies can be adequately captured through multiple-choice formats. Similarly, essay tests offer the capacity to explore broader thinking processes but require clear scoring guidelines. Scales and rubrics serve to provide structure to the assessment process. Consequently, educators should select instruments based on the characteristics of the competencies to be measured, rather than relying merely on habit or ease of use.

DISCUSSION

More Meaningful Cognitive Assessment

The study's findings highlight a key insight: cognitive assessment needs to shift from a focus on the number of questions answered to the actual capabilities students can demonstrate. This shift aligns assessment more closely with learning objectives. Students are not evaluated solely on their ability to recall information but are also given the opportunity to demonstrate how they understand, apply, analyze, and evaluate concepts, as well as generate ideas.

The findings also indicate that relying on a single type of assessment instrument for all learning objectives has limitations. Research on cognitive assessment suggests that objective tests and essay tests can be combined, depending on the specific abilities and cognitive levels being measured. Objective tests allow for the efficient assessment of knowledge mastery, whereas essay tests provide learners with the opportunity to articulate their thought processes, reasoning, analysis, and arguments in greater depth. Therefore, the selection and combination of assessment instruments should be aligned with the learning objectives and the cognitive ability levels targeted for assessment. (Nitko, A. J., & Brookhart 2014). Similarly, the application of a rubric based on Bloom's Taxonomy can help clarify assessment criteria, although its practical implementation needs to be tailored to the specific abilities one aims to measure.

Thus, the primary contribution of this study lies in the understanding that cognitive assessment constitutes an interconnected system rather than a collection of techniques used in isolation. Cognitive assessment objectives (KKO) provide direction, tests offer evidence of ability, and scales and rubrics help assign meaning to that evidence. Integrating these four components makes assessment results easier to understand and more actionable for improving instruction. For educators, these findings can serve as a basis for designing assessments that are better aligned with learning objectives while providing more meaningful information regarding students' skill development.

CONCLUSION

A literature review on the integration of operational verbs (KKO), objective tests, essay tests, scales, and rubrics in cognitive assessment reveals that these five components serve distinct yet complementary functions in measuring student learning outcomes. Operational verbs provide the foundation for translating learning objectives into observable cognitive abilities, ranging from remembering and understanding to analyzing, evaluating, and creating. Based on indicators formulated using these verbs, educators can select appropriate testing formats. Objective tests measure abilities requiring structured responses, whereas essay tests allow students to demonstrate their thought processes and ability to develop ideas. Scales and rubrics further strengthen the assessment process by providing clearer metrics and criteria for determining students' levels of achievement. The study's findings confirm that integrating operational verbs, objective tests, essay tests, scales, and rubrics is crucial for developing cognitive assessments that align with learning objectives. Assessment should not merely yield numerical scores but also provide an accurate picture of the actual capabilities possessed by students. As this study is based on a literature review, the application of this integrative framework requires empirical testing

across various educational levels and subjects. Future research could examine how educators implement the integration of these five components and the extent to which their use enhances the accuracy, consistency, and meaningfulness of learning outcome measurements.

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