



## Beyond Surface Learning: Examining Instructional Module Alignment with Deep Learning Principles in Elementary Schools

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### ABSTRACT

This study aims to analyze the alignment of elementary school teaching modules with deep learning principles that emphasize meaningful learning, cognitive involvement, and knowledge transfer capabilities. The research background is based on the tendency of learning in elementary schools that is still oriented towards memorization so that it has not fully encouraged high-level thinking. The research uses a qualitative approach with content analysis design for class V teaching modules in the subjects of Science Studies, Mathematics, and Indonesian Language. The analysis was carried out using the rubric of deep learning indicators which included cognitive depth, conceptual understanding, knowledge transfer, cognitive involvement, and coherence of learning components. The results showed that most of the modules were in the medium alignment category, with indicators of conceptual understanding and cognitive engagement relatively better than indicators of cognitive depth and knowledge transfer. These findings show that module design is still in the transition stage from surface learning to deep learning. Therefore, the development of modules that are more contextual, collaborative, and aligned between objectives, activities, and assessments is needed to improve the quality of meaningful learning in primary schools.

## 1. Introduction

The paradigm shift in 21st-century education demands that students not only master the material, but also understand concepts, think critically, and use their knowledge in a variety of situations. In this context, deep learning emphasizes meaningful, reflective, and problem-solving-oriented learning. This method allows students to develop active cognitive engagement, analysis, and reflection, which helps them understand concepts through active cognitive engagement (Fullan et al., 2021; Panggabean et al., 2025). Thus, this approach helps students understand the complexities of the modern world (Fullan et al., 2021; Panggabean et al., 2025). However, learning in elementary school often focuses on the above learning, which emphasizes memorization and procedure. As a result, students do not develop high-



level thinking skills (Biggs & Tang, 2022; Hailikari et al., 2022). This condition suggests that learning designs that allow for greater cognitive engagement and strong conceptual understanding are needed.

Various studies show that the deep learning approach is able to increase students' cognitive engagement and help them build more meaningful conceptual understanding through contextual and reflective learning activities. This approach emphasizes a learning process that focuses not only on mastery of the material, but also on the ability of students to relate concepts to real-life experiences as well as apply them in a variety of learning situations. Research on basic education shows that the application of mindful, meaningful, and joyful learning can increase students' understanding of concepts and active participation in the learning process (Feri et al., 2024; Nafi'ah & Faruq, 2025). In addition, several studies also confirm that the deep learning approach has the potential to strengthen critical thinking skills, literacy, and 21st century competencies in elementary school students (Handayani et al., 2025; Rohmah et al., 2025).

Instructional design, especially teaching modules, is essential to produce effective learning. Good teaching modules systematically integrate objectives, activities, and assessments to support a consistent and significant learning process (Darling-Hammond et al., 2022). Constructive alignment principles emphasize alignment between objectives, activities, and assessments to ensure the best possible achievement of learning outcomes (Biggs & Tang, 2022). Students can improve cognitive engagement, motivation to learn, and the ability to learn analytically and reflectively if modules are well-designed (Hailikari et al., 2022; López-Pastor & Sicilia-Camacho, 2023).

Students can improve their conceptual comprehension, critical thinking skills, and knowledge transfer abilities with teaching modules that support deep learning, according to recent research (Fullan et al., 2021; Panggabean et al., 2025; Budhiarti & Mytra, 2024). However, there is still very little research examining the quality of teaching module design specifically especially related to primary schools. In addition, it is still rare to see how learning objectives, activities, and assessments are aligned as indicators of module quality. Based on this background, the purpose of this research is to evaluate how teaching modules in elementary schools are in harmony with the principles of deep learning. To achieve this goal, this study uses a content analysis approach. Therefore, it is important to assess the extent to which the teaching modules used in elementary schools are aligned with the principles of deep learning through the compatibility between learning objectives, actions, and learning objectives. The research is also expected to make theoretical and practical contributions, as well as become a reference for teachers, curriculum developers, and policymakers to improve the quality of teaching modules and learning processes.

## 2. Methods

This research was carried out in one of the private elementary schools in Sukabumi Regency with the subject of research in the form of teaching modules used in the learning process. The focus of this research analysis is the teaching module for grade V of elementary schools which includes the subjects of science, mathematics, and Indonesian Language. This study uses a qualitative approach with a content

analysis design to evaluate the alignment of the teaching module with the principles of deep learning. Content analysis is the right choice because it allows researchers to conduct thorough research of learning documents to find the patterns, meanings, and quality of instructional design of teaching modules (Elo et al., 2021). The concept of deep learning, which emphasizes meaningful learning, high cognitive engagement, and students' ability to apply knowledge in new contexts, is the basis of research analysis (Panggabean et al., 2025; Budhiarti & Mytra, 2024). The principle of constructive regulation, or the suitability between learning objectives, learning activities, and assessments, is also discussed in this study (Hailikari et al., 2022).

Analytical rubrics are created based on deep learning indicators, such as cognitive depth, conceptual comprehension, knowledge transfer, cognitive engagement, and coherence between learning components. Using purposive sampling techniques, the subject of the research is an elementary school education module. The modules are selected based on standards that include learning objectives, learning activities, and a complete evaluation. Data were collected from the teaching module documentation and analyzed descriptively to find out how close the teaching module was to the principles of deep learning. The validity of the instrument is tested through expert judgment, while the reliability of the judgment is tested through inter-rater reliability to ensure that the results of the analysis are consistent. Figure 1 shows the methodological structure of this research.

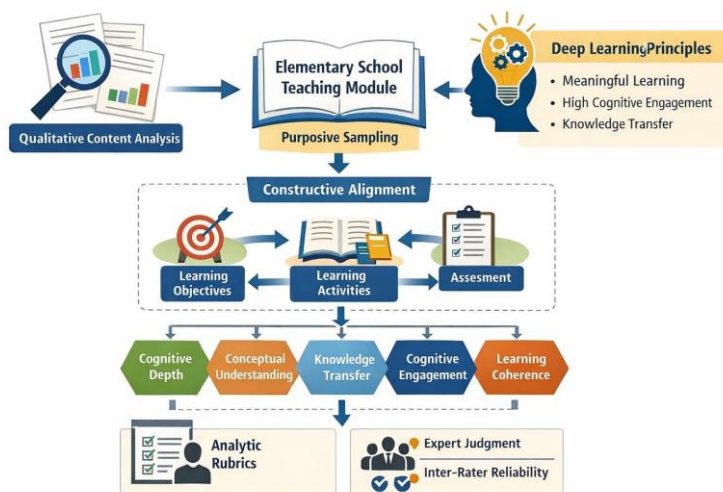


Figure 1 Research Methodological Framework

### 3. Results & Discussion

#### 3.1 Results

The content analysis of the teaching module for grade V of elementary schools which includes science subjects, mathematics, and Indonesian shows that there is a variation in the level of alignment of the modules with the principles of deep learning. These findings suggest that the learning design of teaching modules helps students participate cognitively at different levels. Figure 2 shows a radar chart that visually shows the level of alignment of each indicator. It provides a comparative overview of how each subject is doing with five key indicators of deep learning.

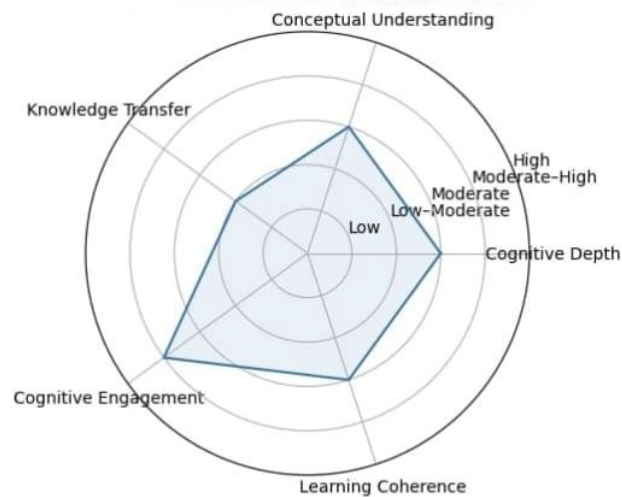


Figure 2 Radar Chart of the Level of Alignment of Class V Teaching Module

To clarify the results of the analysis, further assessment was carried out on each deep learning indicator which included cognitive depth, conceptual understanding, knowledge transfer, cognitive engagement, and coherence of learning components. This analysis aims to identify the extent to which the teaching modules in each subject have integrated the principles of deep learning in the planning of learning activities, the presentation of materials, and the form of assessment used. The results of the analysis showed that each subject had different characteristics and levels of alignment with deep learning indicators. In general, some components of the module have shown efforts to encourage students' cognitive engagement, but there are still sections that focus on factual and descriptive understanding so that they do not fully support the higher-level thinking process. A summary of the results of the analysis of the alignment of the teaching module with the deep learning indicators is presented in Table 1.

Table 1 Analysis of the Alignment of Teaching Modules with Deep Learning Indicators

Indicator	Key Findings	Alignment Level
Cognitive depth	Analytical tasks have emerged, but most of the questions are still descriptive.	Moderate
Conceptual understanding	The concept is explained systematically, but its relevance to the context of students' daily lives is still limited.	Moderate-High
Knowledge transfer	The activity still focuses on factual information so the application of the concept in other contexts is still limited.	Low-Moderate

Cognitive engagement	Group discussions have been used, but activities still rely heavily on responses to teacher questions or texts.	Moderate-High
Learning coherence	The objectives and assessments are relatively clear, but some activities do not fully support the learning objectives.	Moderate

The results of the analysis show that most of the teaching modules of class V are in the category of moderate alignment with the principles of deep learning. Indicators of conceptual understanding and cognitive engagement showed a relatively better level of alignment than other indicators. On the other hand, indicators of cognitive depth and knowledge transfer still need to be strengthened so that the learning process not only focuses on theoretical conceptual understanding, but is also able to encourage students to analyze, evaluate, and apply knowledge in various learning contexts and real-life situations.

### 3.2 Discussion

The results of the study show that the class V teaching module analyzed has integrated several elements related to the principles of deep learning, although the level of implementation still varies in each indicator. Some learning activities have encouraged students' conceptual understanding and cognitive engagement, but some activities are still dominated by descriptive questions and an emphasis on mastery of factual information. This condition shows that the learning design in the teaching module is still in the transition stage from the surface learning approach to deep learning. In educational studies, surface learning is characterized by learning activities that focus on memorizing and reproducing information, while deep learning emphasizes conceptual understanding, critical analysis, and the ability to connect knowledge with various contexts (Biggs & Tang, 2022). The findings of this study show that indicators of cognitive depth and knowledge transfer still need strengthening, because some learning activities have not fully encouraged students to analyze, evaluate, and apply concepts in different situations. Various studies show that the deep learning approach is able to increase students' cognitive engagement and help them build more meaningful conceptual understanding through contextual and reflective learning activities. This approach emphasizes a learning process that focuses not only on mastery of the material, but also on the ability of students to relate concepts to real-life experiences as well as apply them in a variety of learning situations. Research on basic education shows that the application of mindful, meaningful, and joyful learning can increase students' understanding of concepts and active participation in the learning process (Feri et al., 2024; Nafi'ah & Faruq, 2025). In addition, several studies also confirm that the deep learning approach has the potential to strengthen critical thinking skills, literacy, and 21st century competencies in elementary school students (Handayani et al., 2025; Rohmah et al., 2025). On the other hand, indicators of conceptual understanding and cognitive engagement showed comparatively better outcomes. Some modules have contained systematic discussion activities and material presentations so as to help students build understanding of concepts. Learning that involves interaction and reflection is known to increase students' cognitive engagement as well as strengthen meaningful learning

processes (López-Pastor & Sicilia-Camacho, 2023). In addition, the alignment between learning objectives, learning activities, and assessments is also an important factor in supporting the implementation of deep learning. The principle of constructive alignment emphasizes that all learning components need to be designed in an integrated manner so that learning objectives can be optimally achieved (Biggs & Tang, 2022). Therefore, the development of teaching modules that are more contextual, collaborative, and in line with the principles of constructive alignment is an important step to improve the quality of learning in elementary schools.

#### **4. Conclusion**

Based on the results of the content analysis of the teaching module of grade V of elementary schools in the subjects of science, mathematics, and Indonesian language, it can be concluded that the level of harmony of the teaching module with the principles of deep learning is in the moderate category. Several components of the teaching module have shown efforts to encourage more meaningful learning, especially in the indicators of conceptual understanding and cognitive involvement, which are shown through the systematic presentation of material and the existence of group discussion activities involving student participation.

The results of the study also show that indicators of cognitive depth and knowledge transfer still need strengthening. Some learning activities still focus on descriptive questions and mastery of factual information, so they do not fully encourage students to analyze, evaluate, and apply knowledge in a broader context. In addition, although the learning objectives and assessments have been formulated quite clearly, some learning activities have not fully supported the achievement of these objectives, so the application of the principle of constructive alignment still needs to be improved. Therefore, the development of teaching modules that are more contextual, collaborative, and aligned between objectives, activities, and assessments is needed to support the application of deep learning principles more optimally and improve the quality of meaningful learning in elementary schools.

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