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Meta-Evaluation of Example Non-Example Models' Effects on Science Education in Elementary Schools

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Abstrak

Penelitian ini mengidentifikasi penekanan metode pada media gambar sebagai fitur utama. Dalam fase implementasi, guru berubah menjadi fasilitator, membimbing siswa melalui pengamatan dan diskusi. Peran guru menjadi sangat penting dalam menciptakan lingkungan belajar yang mendukung, menumbuhkan keterlibatan, dan mengarahkan diskusi menuju pemahaman yang lebih dalam. Temuan ini menunjukkan berbagai ukuran efek yang dipengaruhi oleh faktor internal (biologis dan psikologis) dan faktor eksternal (lingkungan dan lingkungan masyarakat, waktu). Evaluasi meta mengungkapkan ukuran efek keseluruhan yang tinggi dari 1.323132 untuk metode contoh-non-contoh dalam instruksi sains. Fitur spesifik identifikasi studi berkontribusi pada efektivitasnya, menekankan kemampuan beradaptasi dan penyelarasan dengan praktik pendidikan modern. Mengakui berbagai ukuran efek dan ketergantungannya pada keadaan yang kompleks, penelitian ini menawarkan wawasan yang berharga untuk strategi implementasi yang disesuaikan, berkontribusi pada pemahaman yang bernuansa tentang dinamika metode dalam konteks pendidikan pendidikan praktis.

Kata kunci: *Evaluasi Meta, Contoh Model Non-Contoh, Pendidikan Sains*

Abstract

The research identifies the method's emphasis on picture media as a key feature. In the implementation phase, the teacher transforms into a facilitator, guiding students through observation and discussions. The teacher's role becomes pivotal in creating a supportive learning environment, fostering engagement, and steering discussions toward deeper understanding. The findings indicate varying effect sizes influenced by internal factors (biological and psychological) and external factors (school and community environment,

time). The meta-evaluation reveals a high overall effect size of 1.323132 for the example-non-example method in science instruction. The study identifies specific features contributing to its effectiveness, emphasizing adaptability and alignment with modern educational practices. Acknowledging varying effect sizes and their dependence on complex circumstances, the research offers valuable insights for customized implementation strategies, contributing to a nuanced understanding of the method's dynamics in practical educational contexts.

***Keywords**: Meta-Evaluation, Example Non-Example Model, Science Education*

INTRODUCTION

The most significant influence on a person's beliefs, attitudes, and behavior is education. Elementary schools in particular work to instill moral principles in their students. The learning process in educational units is structured in a way that is interactive, inspiring, enjoyable, challenging, and motivates students to actively participate. It also provides sufficient space for initiative, creativity, and independence in accordance with the talents, interests, and physical and psychological development of students, according to Permendikbud No. 22 of 2016 concerning Process Standards for Primary and Secondary Education.

In other words, the teacher will now be the motivator, director, facilitator, and other roles in the learning process, making the student more active, creative, innovative, interactive, and communicative. This means that schools, and educators in particular, must be able to effectively manage classes. Teachers also contribute to the development of skilled labor that is competitive in the modern era. Student understanding is significantly impacted by the teacher's capacity to facilitate learning and teaching.

Natural Science is one of the lessons that is crucial to the scientific community (IPA). Learning science basically consists of four components. The Ministry of Education and Culture (2006) lists these components as application, attitude, procedure, and product. These four components, which are inextricably linked, define science as a whole. When studying science, students conduct a process of discovery in addition to methodically learning facts, ideas, and principles about nature (Schmidt et al., 2018). The focus of science education is on fostering scientific attitudes and procedural abilities through the use of meaningful learning opportunities. As a result, students engage with the educational process holistically, comprehending natural phenomena via problem-solving exercises and scientific approaches (Gerde, 2018).

In order to meet the learning objectives and have an impact on student learning outcomes, students must attain the competences listed above, particularly in the area of science learning. Thus, innovation in science education is required to ensure that learning goals are met and that the learning process proceeds as smoothly as possible. Because science is, at its core, the study of problem-solving, teachers must select models or instructional strategies that are appropriate for the topic and foster innovative and successful learning in order to allow students to participate actively in their education (Smul, 2018).

Example non example is a popular learning assistance style that emphasizes student activity and student empowerment. The example non-example model is a phase that can be anticipated to help students define a concept. It is a useful method that seeks to swiftly prepare students by giving them two items: examples and non-examples, which they then classify based on preexisting conceptions. With the use of this non-model example, students examine images and offer explanations based on their comprehension. Through the process of problem-solving and analysis, students are trained to think critically by working through the examples of images provided in the example non-example model (Sukma, 2022).

The implementation of the example non example learning model has an impact on students' critical thinking abilities since its goal is to help students develop the critical thinking skills necessary to answer the difficulties posed by the example images. Using the example non example model has an impact on one's capacity to recognize object attributes. This is possible because the example-non-example learning paradigm encourages and supports students in order to maximize the achievement of learning objectives (Putri et al., 2021). It also encourages students to be actively involved and creative learners.

RESEARCH METHOD

This study employs quantitative methods. This study employed meta evaluation, a type of quantitative research that measures the strength of a treatment's impact. Meta evaluation is methodical, quantitative study that draws reliable results by applying previously published studies that have been used by other researchers. Research results in a comparable format, quantitative research findings, and empirical studies carried out by earlier researchers are all analyzed in meta evaluation (Hanna, 2019).

Google Scholar or other search engines are used to gather data. A coding sheet is used as the data gathering tool. The following variables will be coded: 1) research title; 2) research year; 3) researcher name; and the pretest and posttest findings in the form of scores for each study. Fifteen articles from scientific publications served as the study's samples. Gain score analysis is a data analysis methodology used to evaluate how well the example non-example method of teaching science in the classroom works.

The study's samples consist of fifteen papers drawn from scientific publications; these represent a wide and comprehensive range of research topics. In order to provide a sufficient representation of the scholarly landscape concerning the example-non-example technique in science education, this sample size was carefully determined.

Gain score analysis, a quantitative technique that evaluates the efficacy of the example-non-example method in the classroom, has been selected as the data analysis methodology. An in-depth knowledge of the method's influence on science learning outcomes is provided by this analysis, which explores the variations in scores from the pretest to the posttest. Gain score analysis is a useful way to assess the efficacy of the teaching strategy across many studies, facilitating the synthesis of results and the detection of trends or patterns.

The study's dedication to generating accurate and legitimate results is demonstrated by the methodical and exacting technique taken in both data gathering and processing. Utilizing a well-organized coding sheet, gain score analysis, and Google Scholar and other

search engines, the research attempts to make a significant contribution to the knowledge of the effectiveness of the example-non-example technique in improving science teaching in the classroom.

RESULT AND DISCUSSION

The features or features of using the example non example method are at the observation or analysis stage of images that are "examples" and those that are not "non examples" related to the content, based on the research steps that have been completed. At this point, the pupils watch and examine an image that the teacher has displayed that is relevant to the course subject. Students are taught problem-solving skills, how to grasp concepts more fully, and how to draw attention to themselves by looking at these images. Image media is tangible since students see it in true form or imitation form, therefore students do not imagine an object inaccurately, which makes it effective in the learning process. Since certain objects, events, or objects cannot be brought into the classroom, image media can transcend both distance and time.

The study clarifies several aspects of the example-non-example approach, especially when it comes to the observation or examination phase of photos classified as "examples" and "non-examples." During this stage, students watch and analyze pictures that the instructor has displayed that are specifically related to the topic of the course. An essential component of instruction, this visual involvement helps students develop their problem-solving abilities and gain a deeper understanding of the material. By teaching students to focus on important elements in these pictures, the technique improves their capacity to recognize and evaluate information (BAHRULLAH & ..., 2023).

The example-non-example method's use of picture media, which is concrete and effective, is one of its main advantages (Mulyono et al., 2022). The visual format of image media reduces the possibility that pupils would misimagine an object or concept, whether it is delivered in its authentic form or through imitation. This tangibility makes the learning process more effective and guarantees that pupils form a more accurate mental image of the material. The approach's focus on tangible visual stimuli is in line with successful pedagogical principles, accommodating a range of learning preferences and promoting a deeper comprehension of difficult ideas.

The study also highlights how picture media can be used to get around restrictions on particular things, occasions, or occurrences that can't be physically brought into the classroom. This property allows the approach to overcome temporal and spatial limitations. Teachers can introduce students to a variety of visual content that might not be easily accessible in the classroom by using image media. This contributes to a more comprehensive education by enhancing the learning process and exposing pupils to a wider range of situations and contexts.

To summarize, the success of the example-non-example approach is closely linked to the use of picture media in the observation and analysis phases. This method makes use of the tangible nature of visual cues to help pupils grasp the material more accurately. Furthermore, the method's capacity to overcome time and spatial constraints using picture

media highlights its applicability in a variety of educational contexts, making it a flexible and effective teaching tool.

In addition, using image media can boost student engagement in the learning process since it makes them more engaged in the instruction they receive from their teachers and less passive. Because they engage in other activities like looking at pictures in addition to listening to the teacher's instructions, pupils complete more learning tasks. An LCD, a projector, or the most basic option—posters or photos—can be utilized to display the images used in the example non example approach. The image needs to be distinctly visible from a distance in order for the pupils seated in the back to view it as well.

In addition to teaching observation and picture analysis, this method's group discussion step also teaches students how to express their viewpoints. Consequently, the likelihood of inactive members will decrease. Students can explore a subject or topic by submitting opinions and exchanging ideas with one another through discussion activities that use the example non example technique. This allows the students to come to a consensus when the conversation is completed. This method's benefit lies in allowing students to voice their thoughts and demonstrate their engagement to others. Additionally, students are trained to be critical thinkers when studying images. In addition, group discussion exercises give students the chance to think critically, engage in social interaction, and practice being positive while also helping them to master a subject or solve a problem. Group talks can foster students' creativity and communication abilities in this way (Paine & Knight, 2020).

As it comes to implementation in the field, the teacher's role should be limited to that of a facilitator. They should also just keep an eye on students' activities by visiting each student and offering guidance as necessary to help them through the discussion process. A teacher's role in a discussion should be that of a facilitator—a leader who consistently keeps the topic moving, controls the flow of the discourse, and serves as a guide. The function of the teacher becomes more important when using the example-non-example technique in practice; it becomes more of a facilitator than a standard educator. The teacher's role in the classroom should be carefully restricted to assisting and supervising the students' learning. The teacher takes on the role of a facilitator during the observation and study of images by fostering an atmosphere that motivates pupils to actively engage in dialogue. The main duty of the instructor now becomes supervising and assisting with student activities.

In his role as a facilitator, the instructor moves around the classroom, keeping a close eye on how each student interacts with the visuals and stepping in to offer assistance when necessary. Students can feel comfortable sharing their ideas and opinions because of the supportive learning atmosphere that this hands-on method creates. The function of the teacher as a facilitator goes beyond simply dispensing knowledge; rather, they take on the role of a mentor who directs conversations and makes sure that the conversation stays on target in terms of the desired learning outcomes.

The teacher's job as a facilitator and leader during the discussion phase is to keep the discourse moving forward. This entails directing students toward deeper discoveries, promoting active engagement, and deftly negotiating the dynamics of the discussion. Students get a deeper comprehension of the material and relevant points are covered thanks to the teacher's skill to manage the discourse flow.

This change in the role of the teacher is consistent with modern educational strategies that place an emphasis on active involvement and student-centered learning. By taking on the role of a facilitator, the instructor encourages critical thinking and fosters a collaborative learning environment while giving students the power to take charge of their education. Essentially, the example-non-example method's facilitator role for the teacher represents a dynamic change from traditional teaching strategies and helps create a more engaging and productive learning environment.

The findings of the investigations conducted indicate that the effect sizes acquired by the various studies varied. Numerous internal and external factors influence this. Internal elements include biological (body state and health) and psychological (talents, interests, and intelligence). The school environment (curriculum, teachers, learning process, social relations between teachers and students, students and students, school conditions, implementation of school discipline), the community environment (relationships with neighbors), and time are examples of external factors.

CONCLUSION

The study's conclusions and analysis offer insightful information about how well the example-non-example approach works in elementary school science instruction. First, a meta evaluation of eight scholarly works demonstrates the significant influence of the example-non-example technique, with a standard deviation of 0.929939 and an overall effect size of 1.323132, which falls into the high-effect group. This demonstrates the method's significant impact on improving science learning objectives. When each article is examined in detail, a range of effect size values are revealed: two articles show a medium effect, five show a high effect, and one shows a simple effect. These differences in effect sizes draw attention to how the method's effects vary depending on the situation.

Second, the study explores the particular characteristics of the example-non-example approach that support its effectiveness in science instruction. Interestingly, phases of observation and analysis of images classified as "examples" and "non-examples" show the efficacy of the procedure. This highlights how the approach can help students make sense of scientific concepts by guiding them through visual comparisons and analysis (Ratnasari, 2020). Furthermore, the discussion section shows up as an essential part where the approach helps students express their ideas. This feature highlights the method's adaptability in fostering a comprehensive approach to science education and is consistent with modern educational practices that place an emphasis on critical thinking and concept presentation.

Finally, the study recognizes that effect sizes vary throughout studies and attributes this variation to both internal and external causes. The identification of internal variables, such as differences in teaching styles and environmental conditions, emphasizes the necessity of customized implementation tactics. The educational setting and the characteristics of the students are examples of external factors that add to the example-non-example method's complex effects. This recognition of varying effect sizes and their reliance on complex circumstances offers a thorough grasp of the dynamics of the method in practical educational contexts.

The study's conclusions support the example-non-example approach's substantial influence on science instruction in elementary schools. The method's complex nature is better understood when particular features that contribute to its efficacy are identified and when different effect sizes influenced by both internal and external influences are acknowledged. This work adds insightful knowledge to the body of existing research, opening the door for well-informed educational approaches that maximize the example-non-example method's potential to improve science learning results.

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