

Efforts to Develop Cognitive Learning Interest with Interactive Learning Media Based on Crossword Labs in Students at Madrasah Aliyah

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This study aims to develop and analyze the effectiveness of interactive learning media based on Crossword Labs in increasing students' cognitive learning interest at MA. Bahrul Ulum. The background of this study is based on the low interest in cognitive learning of students caused by the use of conventional methods that do not involve active participation and higher-order thinking skills. A qualitative approach was used with a qualitative descriptive research type. The research subjects consisted of subject teachers and students. Data were collected through in-depth interviews, direct observation, and documentation of learning activities through the application of Crossword Labs media. The results showed that the use of Crossword Labs media was able to significantly increase cognitive engagement and student learning interest. Students showed high enthusiasm in solving puzzles related to the subject matter, resulting in an increase in aspects of conceptual understanding and critical thinking skills. In addition, teachers found it easier to manage a more interactive and collaborative learning process. These findings indicate that Crossword Labs media can be an innovative alternative in the development of digital learning media in Islamic high schools, especially in developing the quality of learning that focuses on cognitive learning interest.

Keywords: Cognitive Learning Interest, Interactive Learning Media, Crossword Labs

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1. Introduction

Interest in learning is a crucial factor influencing the success of the learning process in schools. According to Slameto (2015), interest in learning is a person's liking and attraction to a learning activity without any coercion from others. If a student's interest in learning is low, their engagement in understanding the material and completing learning assignments will be less effective and optimal, thus hindering learning outcomes. Djaali (2012) stated that interest has a significant influence on learning activities because students with high interest demonstrate better attention, concentration, and engagement in the learning process.

According to Mendrofa et al., in schools implementing active learning strategies, 41.7% of students still demonstrate low interest in learning English (Mendrofa, 2026). Furthermore, research by Yue Zhang et al. reports that interest in learning plays a crucial role in student engagement in online learning. Low interest can significantly reduce academic engagement, negatively impacting overall learning effectiveness (Zhang, 2024). Based on the data from the phenomenon that has been discovered, low interest in learning leads to minimal participation, poor understanding of the material, and a lack of focus during the learning process in elementary schools (Ritonga, 2025). Based on observation and interview data that has been conducted by researchers, results were found that show that the use of interactive media needs to be implemented considering that students nowadays are easily bored so they often do not focus, which ends up causing some to daydream, be busy with themselves and even talk to their friends. Therefore, interest in learning is

an important indicator that reflects the extent to which students are interested and motivated to understand learning concepts in depth, rather than simply memorizing material from texts.

Given that low interest in learning can impact students' learning outcomes and critical thinking skills in the long term, efforts are needed to create a more engaging and interactive learning process. This is due to educators not optimally utilizing digital media that can encourage students' activeness, concentration, and cognitive abilities in the learning process. According to Jean Piaget, cognitive abilities are related to the processes of thinking, understanding, remembering, and problem-solving that develop through learning experiences. During the learning stage, cognitive abilities are a crucial element for achieving success. Cognitive abilities encompass thinking activities or how a person processes data, where the information received is stored in memory to form knowledge. Research by Pramudiyana and M. Fadhilah indicates a strong positive relationship between learning interest and students' cognitive load in the context of learning to classify living things. High learning interest correlates with students' ability to cope with the cognitive processing load of learning tasks (Pramudiyana, 2024).

To develop students' learning interest, particularly in the cognitive aspect, interactive media are needed to support the delivery of learning materials more effectively (Aisyah, 2023). Learning media are tools used to convey learning messages, thereby stimulating students' attention, interest, thoughts, and feelings during learning activities. Interactive learning media aims to increase enthusiasm, motivation, understanding, and stimulation during the learning process so that learning messages can leave a lasting impression on students (Hasan, 2021). Therefore, interactive learning media is an appropriate means of establishing two-way communication between students and learning materials, creating a more active and meaningful learning experience.

One interactive media with significant potential is the Crossword Labs-based digital platform for creating crossword puzzles. According to Vygotsky's cognitive theory, learning will be more effective when students are actively involved in the process of discovering and constructing their own knowledge through interactions and learning experiences. The use of Crossword Labs as a learning medium begins with the design stage of crossword puzzles tailored to learning objectives. Teachers create core competency-based questions and enter them into the Crossword Labs application to create interactive crossword puzzles relevant to the learning material. Once the questions are configured, teachers can adjust the grid size, word orientation, and list of clues on the Crossword Labs interface to suit the students' ability level and the learning context. This crossword puzzle-solving activity not only trains students' memory but also helps improve critical thinking skills, conceptual understanding, and student engagement during the learning process.

Previously, similar research was conducted in journals entitled "Improving Student Learning Outcomes in Economic Activities through Crossword Labs Learning Media in Grade X.11 of SMA N 3 Pekanbaru" (Utami, 2025) and "Developing Interactive Learning Media to Enhance Elementary School Students' Learning Motivation" (Hartono, 2025). However, this study uses a different perspective. Although several studies have developed interactive crossword puzzles, few have specifically developed and tested interactive learning media based on Crossword Labs to develop students' cognitive learning interests in Madrasah Aliyah (Islamic Senior High School). Furthermore, most studies focus more on motivation or learning outcomes in general and have not specifically examined the aspect of "cognitive learning interest."

In this case, the researcher will examine the use of interactive media based on Crossword Labs to develop students' learning interests, particularly in the cognitive aspect, at MA Bahrul Ulum. Current learning patterns tend to be text- and memorization-oriented and utilize conventional methods, resulting in relatively minimal classroom interaction and a more one-way approach. These conditions limit the space for Efforts to Develop Cognitive Learning Interest with Interactive Learning Media Based on Crossword Labs in Students at Madrasah Aliyah. Adinda Nur Syafitri et.al

developing students' cognitive engagement. Therefore, developing interactive learning media based on Crossword Labs is crucial as a contribution to fostering students' cognitive learning interests and providing a strong argument for the media's effectiveness in creating innovative, active, and interactive learning.

2. Method

This study used a qualitative approach with a descriptive approach, aiming to gain a deeper understanding of efforts to develop students' cognitive learning interests through the interactive learning media Crossword Labs. According to Sugiyono (2022), qualitative research is a research method used to examine the conditions of natural objects, where the researcher acts as a key instrument. Meanwhile, Lexy J. Moleong (2018) explains that qualitative descriptive research aims to holistically understand the phenomena experienced by research subjects through descriptions in the form of words and language within a specific, natural context.

The research subjects were determined using purposive sampling, a technique for selecting informants based on specific considerations to ensure the data obtained is relevant to the research objectives. Said Maskur (2024), citing Suharsimi Arikunto, argues that purposive sampling involves selecting subjects deemed to have the most knowledge and understanding of the problem under study. In this study, subject teachers and students at MA Bahrul Ulum were selected as key informants because they were deemed to have direct experience using Crossword Labs in the learning process.

Data collection was conducted through in-depth interviews to explore students' and teachers' perceptions and learning experiences, direct observation of the classroom learning process, and documentation in the form of photographs of activities, student practice results, and learning tools used. According to Undari Sulung (2024), the use of various data collection techniques in qualitative research aims to obtain more comprehensive and in-depth data, thereby providing a comprehensive picture of the phenomenon.

The researcher acts as a key instrument, observing the phenomenon directly in the field. This aligns with Sugiyono's (2022) opinion, which states that in qualitative research, the researcher is the primary instrument in data collection and interpretation. Data analysis techniques used the Miles and Huberman model, which includes the stages of data reduction, data presentation, and conclusion drawing or verification. According to Matthew B. Miles and A. Michael Huberman (1984), qualitative data analysis is conducted interactively and continuously until the data reaches saturation point.

Data validity is strengthened through source and technique triangulation to ensure that the data obtained truly reflects the real conditions within MA Bahrul Ulum. According to Rahman Malik (2025), citing Norman K. Denzin, triangulation is used to increase data credibility by comparing various sources and data collection methods. Crossword Labs media was used as the object of development, while learning activities were observed naturally without manipulation to ensure the data obtained remained authentic. Thus, this qualitative method provides a comprehensive overview of how interactive learning media can increase students' cognitive learning interest through crossword puzzle solving activities relevant to the subject matter.

3. Results and Discussion

Result

Field analysis shows that at MA Bahrul Ulum, an Islamic boarding school (pesantren), conventional methods are still dominant in teaching. Consequently, classroom interaction is relatively minimal and tends to be one-way. This is one reason why student interest in learning is low, and cognitive engagement in learning is

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likely suboptimal. This suggests that monotonous lecture methods are less effective in fostering learning interest and understanding, especially when not combined with interaction or learning media (Agusta, 2024).

Therefore, the researchers demonstrated in their data analysis that interactive learning media such as Crossword Labs are highly relevant for developing students' learning interests and cognitive activities. The use of this media not only increases students' interest in learning but also encourages deeper cognitive activity, particularly in the form of critical thinking, understanding, evaluation, and independent and collaborative search for answers.

Based on observational data, when students encounter difficult problems in Crossword Labs, they do not show a tendency to give up but instead try to find answers using various methods, such as asking friends for opinions and rereading the material. This can be seen from the documentation of the results of students' work obtained by researchers.

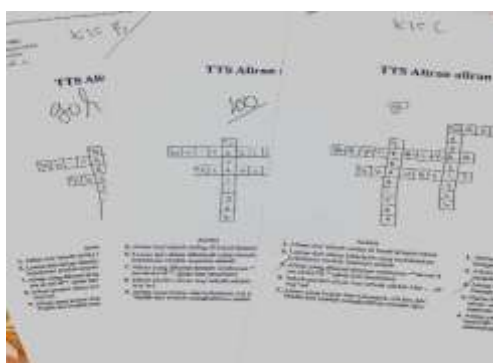


Figure 1. Student results working on crossword labs media

According to an interview with one student, she stated:

"If I have difficulty, I can reread the material or collaborate with my group mates."

This finding indicates deep cognitive engagement, where students engage in the processes of remembering, understanding, and processing existing information to find solutions. Theoretically, according to Rahmawati et al., interactive game-based learning can create challenging learning situations that encourage students to think more deeply (Rahmawati, 2024).

Furthermore, interviews with teachers also supported these findings, stating:

"This crossword labs media is very effective in providing motivation, collaborating with peers, and practicing previously acquired skills."



Figure 2. Student collaboration working on crossword labs media

Throughout the learning process, students engage in group discussions to determine the correct answers, providing a space for exchanging ideas and arguments, which is an important part of cognitive activity. In line with this, research by Gulo and Muhid states that puzzle-based activities or crossword puzzles can

stimulate critical thinking skills because they require students to actively analyze and connect information (Gulo, 2024). Thus, it can be understood that the use of Crossword Labs media not only functions as a learning aid but also as a cognitive stimulus that encourages students to actively think, seek information, and solve problems. This process indicates that students' cognitive learning interests develop in understanding the learning material.

Discussion

This study presents findings related to students' cognitive learning interests, the implementation of interactive learning media based on Crossword Labs, and the development of students' cognitive learning interests at MA Bahrul Ulum. These findings indicate that students' cognitive learning interests in conventional learning tend to be low, characterized by a lack of focus, engagement, interest, and passion in the learning process. According to Djaali, in his book "Psychology of Education," learning interest is a person's tendency to pay attention and actively participate in learning activities (Djaali, 2012).

Conceptually, learning interest can be classified into several dimensions, including personal interest, situational interest, and psychological interest. Personal interest relates to an individual's inclination toward a particular field that arises from within (intrinsic). This interest is characterized by a sense of enjoyment, fascination, and a strong drive to understand the material. Situational interest arises due to environmental influences or specific conditions, such as a teacher's teaching method or the use of engaging learning media. Psychological interest, on the other hand, relates to students' emotional and cognitive engagement in learning activities (Mulyadi, 2019).

Learning interest is closely related to cognitive processes. The cognitive aspect is related to the development of knowledge and intellectual skills (Herwati, 2024). Cognitive learning interest specifically refers to students' interest in activities such as understanding, remembering, analyzing, and solving problems. Therefore, students with a high cognitive learning interest typically exhibit greater curiosity, are active in asking questions, and have better critical thinking skills than those with low interest. Factors influencing cognitive learning interest include internal factors such as motivation and readiness to learn, as well as external factors such as the learning environment, teaching methods, and learning media used (Mesra, 2024).

Therefore, to develop students' learning interest, particularly in the cognitive aspect, researchers use interactive learning media. This study shows that the use of interactive media can overcome boredom in conventional learning, which tends to be monotonous. The media's engaging, challenging, and interactive characteristics provide a diverse learning experience, thereby increasing students' intrinsic motivation (Asyamsi, 2025). To support this, researchers implemented interactive learning media based on crossword labs. This media is a digital platform that provides features for easily creating crossword puzzles online, without requiring registration or fees, making it a practical and efficient tool for educators at various levels of education.

The steps for implementing Crossword Labs begin with establishing clear, curriculum-aligned learning objectives to ensure measurable learning direction. The next step is selecting appropriate material that can be used as questions, compiling important keywords, and creating clues relevant to the material. The final step is creating a crossword puzzle through the Crossword Labs website by entering a title, clues, and answers, then saving it as a PDF for sharing or use in learning. Below is an example of how to create Crossword Labs.



Figure 2. Example of a crossword puzzle created by researchers at <https://crosswordlabs.com/>

Theoretically, the development of cognitive learning interest in this study is highly relevant to Vygotsky's cognitive learning theory. Vygotsky emphasized that knowledge is actively constructed by individuals through interaction with the learning environment and collaboration. The central concept of this theory is the Zone of Proximal Development (ZPD). The ZPD is the zone where children can work independently, but if they are unable to complete a task, they can receive assistance from more skilled peers. In this study, students were presented with challenging problems that could still be solved with the help of peers or teachers. When students discuss and help each other in groups, they are actually in the zone of potential development, where their cognitive abilities develop through social interaction.

In this case, Crossword Labs serves as a (scaffolding) tool that facilitates students' thinking processes through structured clue-based questions. This is evident in students' active discussions, exchange ideas, and collaborate on assignments. This interaction not only enhances understanding of the material but also strengthens cognitive learning interests because students feel directly involved in the learning process (Amseke, 2021). Therefore, according to Vygotsky, good learning is an interactive, collaborative process that fosters students' cognitive development through appropriate support.

This research uncovers aspects that have been relatively limited in learning studies, particularly those related to developing cognitive learning interests through interactive learning media based on Crossword Labs. Most previous research tends to focus on increasing learning motivation and learning outcomes as the main indicators of successful learning media use. For example, research by Dodi Setiawan Riatmaja et al. in the journal Pendidikan emphasizes that gamification in learning has a significant impact on increasing student learning motivation (Riatmaja, 2025), while Firda Zania, in her article, shows that the use of crossword puzzles is more widely studied in relation to improving learning outcomes (Zania, 2025).

Therefore, this study makes a novel contribution by making cognitive learning interest the primary focus, where this interest is reflected not only in interest or attention but also in active engagement in the thinking process. The results of this study indicate that the application of Crossword Labs not only develops students' interest in learning but also encourages cognitive activities such as remembering, understanding, connecting concepts, and problem-solving. Thus, this study expands on previous insights by demonstrating that interactive learning media serves as a bridge between the affective and cognitive dimensions of the learning process, which are typically studied separately. Therefore, the novelty of this research lies in its

attempt to conceptualize and empirically demonstrate the integration of learning interest with cognitive processes in the use of interactive learning media in madrasah environments.

4. Conclusion

Based on the research results and discussions described, it can be concluded that the use of interactive learning media based on Crossword Labs provides a significant contribution to the development of innovative learning media while increasing students' cognitive learning interests in Islamic senior high schools. This media not only functions as a learning aid, but also as a strategic means in creating a more interesting, interactive, and meaningful learning experience. Through its application, students show increased enthusiasm, active involvement, and cognitive abilities that include understanding, remembering, connecting concepts, and solving problems more optimally. Thus, this study confirms that the integration of technology-based interactive learning media such as Crossword Labs can be an effective solution in overcoming learning boredom and stimulating students' cognitive activities in a sustainable manner.

Practically, the results of this study have significant implications for various parties. For teachers, the application of this media can be an alternative, innovative learning strategy to improve the quality of student interaction and participation in the classroom. For educational institutions, these findings can serve as a foundation for supporting the development of technology based education policies and the provision of appropriate facilities and training. Furthermore, for educational media developers, this study demonstrates that interactive, simple, and relevant media design has significant potential for enhancing learning effectiveness, particularly in relation to cognitive aspects.

However, this study still has several limitations. First, it was conducted within the limited context of a single Islamic high school (madrasah aliyah), so the results require further study for generalizability. Second, the investigation's focus, which only highlighted the cognitive aspect of learning interest, did not fully encompass other dimensions, such as affective and psychomotor. Therefore, future research is recommended to expand the study to different levels and educational settings, and examine the impact of interactive learning media on other aspects of learning in a more comprehensive manner. Furthermore, future research should develop more innovative variations of interactive media and integrate the latest technology to support continuous progress in learning media development and improve educational quality.

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