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Application of Interactive Application-Based Constructivistic Learning at MAN 2 Kota Palu

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ABSTRACT

Constructivism-based learning emphasizes the active role of learners in building knowledge through experience and reflection. In the context of madrasas, this approach can be optimized through the use of interactive applications that support an active, collaborative, and reflective learning process. This study aims to analyze the application of interactive application-based constructivist learning in MAN 2 Kota Palu. The method used is a literature study, by analyzing various research results in the last five years (2019-2024) related to the use of interactive media in Islamic education. The results of the study show that applications such as Canva, Quizizz, and Google Classroom are effective in increasing student engagement, learning independence, and critical thinking skills. However, the effectiveness of the implementation is still influenced by the readiness of teachers and the technology infrastructure of the madrasah. This study recommends improving the digital pedagogic competence of madrasah teachers so that constructivistic theory can be optimally implemented in interactive application-based learning.

1. Introduction

The development of digital technology has brought significant changes in the education system, including in the madrasah environment. Learning is no longer *teacher-centered*, but has shifted to constructivist-based active learning, where students play an active role in building knowledge through learning experiences (Al Abri et al., 2024).

Madrasah Aliyah Negeri (MAN) 2 Kota Palu as one of the Islamic educational institutions at the high school level has utilized various interactive applications such as *Quizizz, Canva,* and *Google Classroom* to support learning activities. This media provides a space for students to explore concepts independently and collaboratively (Wiwin et al., 2022).

However, the main challenge faced by madrasah teachers is how to integrate interactive applications within the framework of constructivism theory consistently, so that learning does not just use technology, but actually forms meaningful knowledge. This study aims to describe the application of interactive application-based constructivist learning in MAN 2 Kota Palu through a literature study approach to relevant research in the last five years (2019-2024).

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2. Literature Review

2.1 Constructivist Theory in Islamic Education

The theory of constructivism states that knowledge is not the result of transfer from teacher to student, but rather the result of active construction by students through experience and social interaction (Prakash Chand, 2023). From an Islamic perspective, constructivism is in line with the principles of tadabbur (contemplating Allah's creation) and tafakkur (deep thinking) which emphasize reflective learning.

Teachers act as facilitators who create challenging learning conditions and support the exploration of concepts. Thus, learning becomes a means of developing intellectual (aql), spiritual (spirit), and social (nafs) potential. This theory also demands an authentic learning context, where students face real problems to be solved collaboratively (Cho et al., 2015). In modern Islamic education, constructivism is the basis for strengthening a competency-based curriculum that balances knowledge and values, while fostering moral responsibility in the application of science (Hebard et al., 2023).

In addition, constructivism has a strong relevance to the concept of humanization of Islamic education, which is the process of making students as subjects who are aware, critical, and empowered in finding the meaning of learning. This approach places learning as a spiritual-intellectual vehicle that not only sharpens logic, but also shapes the morals and character of Islamic science.

2.2 Interactive Applications as Learning Media

Interactive applications are digital media that allow two-way interaction between users and content (“Proc. Int. Symp. Res. Arts, Des. Humanit. (ISRADH 2014),” 2015). Some of the applications that are popular in madrassas include:

a. *Quizizz and Kahoot* for game-based quizzes (*game-based learning*),
b. *Canva* for creative visual creation;
c. *Google Classroom* for online learning management,

Interactive applications are effective in increasing student learning motivation, as they combine visual, auditory, and kinesthetic elements that suit the learning style of madrasah students (Dahliana et al., 2023). In addition, this media also supports differential learning, where teachers can adjust activities according to students' abilities and interests. Consistent use of interactive apps also strengthens students' digital skills as well as exercises learning responsibilities through a direct feedback system and collaborative engagement between learners. Thus, interactive media not only serves as an auxiliary tool, but also serves as a pedagogical bridge between constructivist theory and technology-based learning practices in modern madrasah.

2.3 Related Research Results

Some research supports the effectiveness of interactive app-based learning. The use of constructivism-based interactive media improves cognitive and affective learning outcomes (Asysyura et al., 2023). Meanwhile, the readiness of teachers and technology facilities has a significant effect on the success of the implementation of digital media in madrasah (Yaminah et al., 2023).

In general, literature studies show that the successful application of constructivism theory in Islamic-based schools is highly dependent on the synergy between pedagogical, managerial, and technological support factors. The results of other research conducted also showed that the use of project-based interactive media can strengthen students' metacognitive abilities (Wang et al., 2024). In addition, the combination of collaborative learning and digitization of materials has been proven to improve 21st century skills such as critical thinking, communication, and creativity of madrasah students. Recent research even confirms

that the integration of interactive applications with Islamic spiritual values can strengthen students' religious character while building ethical digital literacy and oriented towards universal human values (Amriani et al., 2023).

3. Methodology

This study uses *a library research* method with a descriptive qualitative approach (Fayez, 2024). Data sources come from accredited national journals, proceedings, and scientific books relevant to the topic of constructivism and interactive applications (period 2019-2024).
The analysis steps include:

a. Inventory of relevant literature;
b. Classification based on the theme of constructivism and interactive media;
c. Content analysis of previous research results;
d. Synthesis to produce conceptual findings on the application of application-based constructivism in MAN 2 Kota Palu.

To improve the validity of the results, the researcher also compared several models of the application of constructivism in the context of madrassas in various regions of Indonesia. The analysis process is carried out with a thematic approach that emphasizes the similarity of patterns, challenges, and solutions offered by previous studies.

4. Results and Discussion

4.1 Implementation of Interactive Applications in MAN 2 Kota Palu

The use of applications such as Canva and Quizizz at MAN 2 Palu City has increased student participation in online and face-to-face learning. Teachers use this app to present visual materials and game-based exercises, making students more motivated.
The results of previous research show that students who are actively involved in the interactive application-based learning process show increased critical, collaborative, and creative thinking skills (Cao & Nguyen, 2023). In addition, teachers also observed that the use of digital media enriches the learning experience through collaborative projects, such as the creation of thematic presentations and educational videos.

From a learning management perspective, this innovation strengthens communication between teachers and students, accelerates evaluation, and encourages transparency of learning outcomes. In addition, this approach is also able to accommodate different learning styles so that low-ability students remain actively engaged through real-time feedback from interactive applications. This innovation shows how the use of technology can be a managerial strategy that supports the effectiveness of teacher performance and the efficiency of learning time.

Furthermore, the consistent application of interactive applications also has a positive impact on the academic culture of madrasas. Students demonstrate improvements in learning discipline, timeliness of assignment collection, and an interest in exploring additional learning resources independently. This shows a shift in the learning paradigm from instructional to participatory and reflective learning that is in line with the spirit of Islamic constructivism.

4.2 Constructivistic Analysis

Based on constructivist theory, learning with interactive applications reflects three main principles:

a. Self-study activities (*Active Learning*) – Students learn through self-exploration;
b. Social collaboration (*Collaborative Learning*) – Apps facilitate group work;
c. Self-reflection (*Reflective Thinking*) – Students evaluate their learning outcomes through automated feedback.

Thus, the application of interactive applications is in line with the constructivistic paradigm that places students as learning subjects. Furthermore, application-based learning is able to foster a culture of critical and creative thinking in the madrasah environment, in line with the vision of Islamic education that integrates science and spiritual values. In addition, this approach

encourages 21st-century skills such as digital collaboration, complex problem-solving, and communication skills across the context of technology-based learning.

From a pedagogical perspective, the application of constructivism through digital applications also strengthens the relationship between teachers and students in creating meaningful dialogue. The teacher is no longer the sole source of information, but transforms into a facilitator who motivates students to discover, interpret, and apply knowledge independently. This creates a more dynamic, reflective, and relevant learning space to the context of students' lives in the madrasah.

4.3 Implementation Challenges

Although effective, the implementation of interactive media in MAN 2 Kota Palu faces obstacles in the form of:

a. Limitations of digital devices for some students;
b. Teachers' technology competencies are not even;
c. Limited internet network in several areas around Kota Palu.

For this reason, there is a need for support from madrasah management in the form of training and the procurement of digital facilities on an ongoing basis. Collaborative efforts between schools, the government, and the community are needed so that the digital transformation of madrasas can run sustainably and inclusively. In addition, it is necessary to conduct periodic evaluations of the effectiveness of the implementation of interactive applications so that the technology adaptation process can adjust the dynamics of student needs and the madrasah environment holistically.

Furthermore, other challenges arise from the aspect of teacher motivation and the culture of educational organizations that are still oriented to conventional methods. A paradigm shift towards digital learning requires time, commitment, and strong policy support. Therefore, the successful implementation of digital constructivism in madrassas must be accompanied by a systematic change management strategy, involving all stakeholders, and accompanied by continuous monitoring and evaluation of the quality of the learning process.

5. Conclusion

The application of constructivistic learning based on interactive applications at MAN 2 Kota Palu has been proven to support the creation of an active, creative, and meaningful learning process. Interactive apps provide a space for students to build knowledge through hands-on experience and self-reflection. Its effectiveness is highly dependent on teacher readiness, infrastructure support, and madrasah policies that favor digital innovation.

However, implementation challenges such as limited facilities, teachers' digital literacy, and network barriers need to be overcome through a planned and collaborative managerial strategy. Overall, this approach strengthens the integration between constructivist theory and Islamic education that is oriented towards the development of students' character, intellect, and spiritual values in the era of digital transformation of madrasah education.

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