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The Role of Artificial Intelligence in Modern Education

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Abstract

This study aims to explore the perception and adoption of artificial intelligence (AI) technologies in educational settings, focusing on their benefits and the factors influencing their integration. Guided by Rogers' diffusion of Innovations Theory, the research examines the relative advantage, compatibility, complexity, trialability, and observability of AI tools in education. Utilizing a qualitative approach, data were collected through surveys and interviews with students from The PendidiKan agama Islam program at university Islam Jakarta, the findings reveal a generally positive perception of AI technologies, with strong support for their relative advantage, compatibility triability and observability. Most respondents recognise the benefits of AI in personalizing learning experiences and providing flexible, accessible support, However, opinions are divided on the complexity of AI tools, indicating a need for more user- friendly designs and comprehensive training. The study also highlights various motivational factors, such as curiosity, autonomous learning, engagement, emotional involvement, authenticity, and the desire for self-improvement, which significantly influence the learning process. these insights suggest that addressing perceived challenges and fostering, a supportive, engaging learning environment can enhance the acceptance and effectiveness of AI in education. future research should focus on developing intuitive AI interfaces, conducting longitudinal impact studies, and exploring strategies, To enhance personalization & engagement.

Key words: *artificial intelligence, education, diffusion of innovations theory, learning technologies, student motivation etc.*

Introduction

Artificial intelligence has rapidly become a transformative force in numerous sectors & education is no exception. As we progress further into the twenty first century, the integration of AI into educational settings is reshaping the way teaching & learning occur. this this technology's Capability to process vast amounts of data, recognize patterns, & adapt to individual needs makes it a tools for enhancing educational outcomes .To understand the diffusion of AI in education, it is useful to apply Everett M. Rogers' Diffusion of innovations theory. this theory provides a framework for understanding how, why, & at what rate new ideas and technologies spread through cultures. According to Rogers, the adoption of an innovation is influenced by 5 key factors: relative advantage, compatibility, complexity, trialability, and observability. First, relative advantage: AI offers numerous advantages over traditional education methods. For instance, it can provide real-time feedback, identify areas where students need more help, and adopt to the learning pace of each student. these benefits can lead to improved learning outcomes and more efficient use of teachers' time. Second, compatibility: the integration of AI in education is compatible with current education goals and values, which emphasize personalized learning competency-based education, and the use of technology to enhance learning. AI tools can seamlessly integrate with existing educational technology, such as learning management is systems (LMS), making the transition smoother for institutions.

Third, complexity: while AI technologies can be complex, many are designed to be used user- friendly for both teachers and students. educational institutions may need to invest in training and support to ensure effective use of AI tools, but the long- term benefits can outweigh these initial challenges. Fourth, trialability: AI applications in education can often be trialed on a small scale before full implementation. schools and universities can pilot AI tools in specific courses of

department to evaluate their effectiveness and gather feedback from users. 5th, observability: this impact of AI on education can be readily observed through improved student performance, higher engagement levels, and positive feedback from educators. success stories and case studies from early adopters can further drive the diffusion of AI technologies and education.

some study suggest that for AI to be widely adopted in education stakeholder must perceive it relatives advantage, see it as compatible with existing practices, find it not overly complex, have opportunities to trial it, and observe its benefits. understanding this factors can help educators and also policymakers design strategies to promote the effective integration of AI education.

This research aims to explore the role of artificial intelligence in one modern education, focusing on how advanced learning technologies can empower both teachers and students. in conclusion, this research seeks to contribute to the growing body of knowledge on the integration of AI in education. By examining the current state of AI technologies, evaluating their impact, & understanding the factor influencing their adoptions, the study aims to provide valuable insights for educators, policymaker, and technology developers. the goal is to hardness the potential of AI to create more effective, Inclusive, and personalized educational experiences experience for all learners .

Method

The study employees are qualitative research design to understand the adoption of AI in education. data was collected from a sample of 80 college students selected randomly to ensure divers representation. the participants were asked to respond to a structured questionnaire distributed via Google from (G-form). the questionnaire utilized a likert scale format to gauge respondents' perceptions, attitude, & experiences related to the challenges and opportunities of AI education.

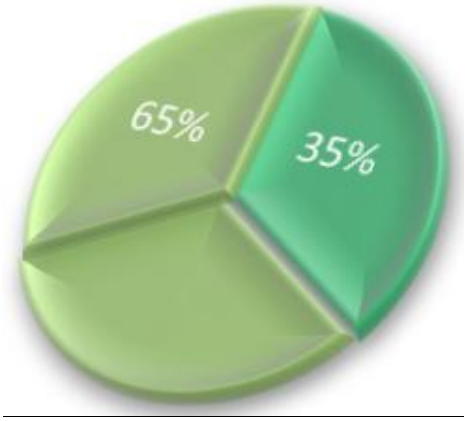

Figure 1. Respondents of research

Based on finger 1, this indicates that most participant in the study were female, which could influence the analysis & interpretation of findings. depending on whether gender impacts perspectives on AI in education. the data collected through the Google forms questionnaire using likert scale was analyzed using a qualitative thematic analysis approach. as shown in the figure 2.

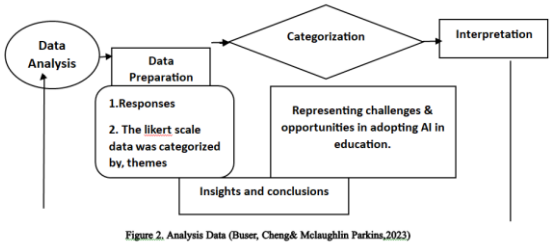

Figure 2. Analysis Data (Buser, Cheng& Mclaughlin Parkins,2023)

Results & Discussions

Results

The results of the study reveal that artificial intellegence is widely perceived in the process of identifying current AI technologie in education as a beneficial, & adaptable educational innovation, with strong support for its relative advantage, compatibility, trialability, & observability.

The process of identifying current AI technologies in education.

The process of identifying current AI technologies in education involves three key steps: mapping existing tools, examining their functionalities, & understanding their usage:

- The first step, mapping existing AI tools, focuses on identifying the various AI tools & platforms currently being utilized in educational settings. These tools range from adaptive learning systems that adjust to individual student needs to virtual tutors that provide additional support such as the learning process used G-Form, E-Learning, G-Meet, Zoom & Chat-GPT.
- The second step, examining functionalities, involves analyzing the features and capabilities of these AI tools. For instance, the tutor gives the feedback through Chat-GPT automated grading systems streamline the assessment process, and real-time analytics tools offer insights into student performance and engagement. Understanding these functionalities helps evaluate the tools' effectiveness in achieving educational goals.
- The final step, understanding usage, explores how educators and students interact with these AI technologies and the benefits they derive from them. Educators often use AI to monitor student progress, identify learning gaps, and adjust their teaching strategies accordingly. Students benefit from AI tools by engaging in self-paced study with virtual tutors or accessing customized learning materials that match their individual needs. Together, these steps provide a comprehensive understanding of how AI technologies are shaping modern education.

Apply Rogers' Diffusion of Innovations Theory

Applying Rogers' diffusion of innovations theory in this study involved examining how the key factors-relative advantage, compatibility, complexity, trialability, and observability- affect the adoption of AI technologies in educational settings (Yu,2022). By evaluating these factors, the study aims to identify what drives or hinders the integration of AI tools among teachers and students. For instance, understanding how AI's relative advantage in personalizing learning experiences can be highlighted, ensuring its compatibility with current educational

practices, addressing the complexity through adequate training, offering trial opportunities to mitigate risks, and showcasing observable benefits through case studies and pilot programs will provide actionable insights, these insights will guide educators and policymakers in strategically promoting and implementing AI innovations to enhance the learning process. As shown in figure 3 below.

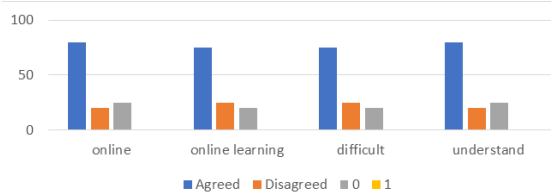

Figure 3. Innovation by Rogers

The chart presents respondents' perceptions of AI-Innovation in relation to five dimensions of innovation: **relative advantage, compatibility, complexity, trialability, & observability.** These dimensions help evaluate how responds view the benefits and challenges of online learning as an educational innovation. In relative advantages, a significant majority (80%) of respondents agree that they like online learning, acknowledging its relative advantage over traditional learning methods. This suggests that online learning is perceived as beneficial, likely due to features such as flexibility, accessibility, & the ability to learn at one's own pace. However, 20% of respondents disagree, indicating that some students may not see online learning as superior to in-person education, perhaps due to the lack of face to face interaction or other personal preferences. In terms of compatibility, 80% pf respondents find online learning aligned with their needs and lifestyles, reflecting its adaptability to various learning styles and schedules. However, 20% do not find it compatible, which might point to challenges is such as technological limitations or a preference for traditional classroom setting. Compatibility with individual circumstances is crucial for the effective adoption of online learning.

However, when it comes to complexity, the opinions are evenly divided, with 50% agreeing and 50% disagreeing. This split indicates that while half it of the respondents find in AI easy to use and navigate, the other half experience difficulties. These challenges could stem from unfamiliarity with digital platforms, lack of technical skills, or issues with the design of online learning systems. Simplifying these systems and providing support for studends could help address this barrier. Moreover, in trialability receivers strong support, with 85% of respondents agreeing that they appreciate the opportunity to try AI such as Chat-GPT. This dimension reflects the importance of being able to explore and experiment with online learning before fully adopting it. Only 15% of respondents disagree, indicating a minimal level of resistance to engaging with AI on a trial basis. Observability also garners a high level of agreement, with 85% of respondents acknowledging the visible benefits of using AI. This suggests that most students can see tangible positive outcomes, such as enhanced learning experiences or improved results, which reinforces the adoption of this educational innovation. Only 15% of respondents fail to observe these benefits, potentially due to personal challenges or unmet expectations. Overall, the chart indicates a generally positive perception of AI among respondents, particularly in terms of its relative advantage, compatibility, trialability, and observability. However, the split in opinions regarding complexity highlights a need for improvements in usability and technical support to make AI more accessible for all. These findings suggest that addressing perceived challenges could further enhance the acceptance and effectiveness of online learning.

Discussions

The study results reveal a generally positive perception of AI technologies in the educational domain, particularly emphasizing the tools relative advantage, compatibility, trialability, and observability. A substantial majority of respondents acknowledge the benefits of AI, recognizing its potential to personalize learning experiences and provide flexible, accessible educational support . This positive reception aligns with the principles of Rogers diffusion of innovations Theory, which suggest that innovation with clear advantages and observable benefits are more likely to be adopted. The enthusiasm for AI relative advantage underscores the perceived improvements over traditional methods ,such as the ability to tailor learning to individual needs and provide immediate feedback.

Regarding compatibility, a significant portion of respondents find AI tools aligned with their educational needs and lifestyle highlighting their adaptability to various learning styles and schedules .However ,the split opinion on complexity suggest that while many students find AI easy to use there remains a notable proportion that struggle with its technological aspects. This divide points to the need for user-friendly designs and comprehensive training to mitigate the perceived complexity .Ensuring that AI tools and recognizing their tangible benefits. The ability to trial AI technology allows students and educators to experience firsthand the enhancement these tools can bring to the learning process ,fostering confidence in their utility . Observability or the visible positive outcomes from using AI, reinforces the value of these innovations .The recognition of these benefits suggest that showcasing successful case studies and providing pilots programs can be effective strategies for encouraging the adoption of AI in education.

Motivation in the learning process is multifaceted, involving, curiosity, autonomous learning, engagement, emotional involvement, authenticity and the desire for self improvement . The desire for self- improvement. The study findings highlight that a majority of students are by curiosity and enjoy exploring new topics, although there remains a significant portion who do not share this intrinsic interest. This indicates a need for strategies to engage these learners, possibly by connecting new information to their existing knowledge and making learning more interactive and relevant. Emotional involvement is a significant motivator ,with many students feelings excited and energized by new understandings. This high level of positive emotional engagement indicates that fostering an emotionally supportive environment can sustain student interest and perseverance, Even in the face of challenges. Authenticity, or the ability to choose what and how to learn is also a strong motivator . The desire for self improvement and growth is evident among students ,who value feedback and strive to excel in areas they care about .. Educator can address this by designing

tasks that are sufficiently challenging to maintain interest but not so difficult as to be discouraging.

Overall, the study presents a complex yet insightful picture of how AI technologies and motivational factors influence the learning process. While many students exhibit high levels of curiosity, emotional involvement, and a desire for self- improvement.Emphasizing the relative advantages, compatibility, & observable benefits of AI tools, while simplifying their complexity & providing opportunities for trial, can enhance their adoption & effectiveness in modern education.

Conclusions

The study underscores the positive reception & potential of AI technologies in enhancing the educational process. By leveraging Roger's Diffusion of Innovations theory, it is evident that AI tools are widely perceived as beneficial due to their relative advantage, compatibility, trialability, & observability. The clear benefits of AI in personalizing learning experiences, providing flexible & accessible support, & offering immediate feedback are recognized by most respondents. However, the split opinion on the complexity of AI tools indicates a need for more user-friendly designs & comprehensive training to ensure broader adoption & effective integration into educational practices.

Motivation in the learning process is multifaceted, encompassing curiosity, learning, engagement, emotional involvement, authenticity, & the desire for self-improvement. While many students exhibit high levels of curiosity & emotional involvement, there are significant opportunities to enhance engagement strategies to foster a more widespread intrinsic interest in learning. Overall, the finding suggest that addressing perceived challenges in the complexity of AI tools & fostering a supportive, emotionally engaging learning environment can further enhance the acceptance & effectiveness of AI in education. Further research should focus on developing & testing more intuitive AI interfaces & comprehensive training programs for both educators & students. Understanding the specific challenges user face when interacting with AI tools can inform design improvements & training methods.

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