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## Adoption of innovations online tutoring apps on high school students

M Badri

Department of Communication Science, Faculty of Da'wah and Communication,  
Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia

Email: muhammad.badri@uin-suska.ac.id

**Abstract.** This study aimed to discover the adoption of innovations online tutoring apps on high school students. This study used the diffusion theory of innovation with an innovation-decision process model approach with indicators of knowledge, persuasion, decision, implementation, and confirmation. The research was conducted in Pekanbaru City, Riau Province, Indonesia. Data collection used a survey method on 120 respondents from state and private senior high school students representing public schools, vocational schools, and religious schools. This study found that most of the respondents were users of online tutoring apps (71%). The decision of adoption has gone through the stages of knowledge, persuasion, decision, implementation, till confirmation, with a moderate to high score average. The score of using online tutoring apps to support learning activities and support achievement was relatively high. At the confirmation stage, the score of the desire to continue adopting the online tutoring apps was high (71%), it indicated that most of them will continue to adopt online tutoring apps. These findings illustrated that high school students are adopters of online tutoring apps innovation. As a post-millennial generation, they are an important generation for realizing Society 5.0 in Indonesia.

**Keywords:** Adoption of Innovation, Online Tutoring Apps, High School Students

### 1. Introduction

Society 5.0 changes the relationship between human and technology, from technology as a tool into technology as the power to create a super-smart society. Society 5.0 combines cyberspace and physical space to balance economic progress in solving social problems [1]. Society 5.0 is a new human-centered vision of society [2] it is aimed at the welfare of society [3]. The education system should be directed towards Society 5.0 in both research and teaching [4]. The use of the Internet of Things (IoT), big data, and artificial intelligence (AI) in education is needed to realize Society 5.0 [5].

One of the digital-based educational technology implementations is the online tutoring apps. Changing the demographic of student, larger classes, and the growth of part-time studies, it leads to many developers of tutoring alter to online media for teaching and learning [6]. Online learning is expected to be one of the important tools to improve access to education [7]. If it is designed properly, an online learning system can be used to determine the needs of students, adjust the appropriate material, and achieve the desired learning outcomes [8]. Effective online tutorials are influenced by tutor learning strategies and the rationality of using the internet [9].

Interest in online tutoring apps is also relatively growing in Indonesia. One of the digital education startups recorded a 10-fold increase in users in the 2016 to 2018 period, with an accumulation of users reaching 13 million people [10]. However, the data is general and it does not represent users in a certain



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city. Seeing the limited data of online tutoring apps users, the research on the use of online tutoring apps is interesting, especially among high school students.

Previous research on digital technology-based education in Indonesia found that high school students often access the internet to collect alternative learning sources besides teacher teaching [11]. Senior high school students understand how to access data from the internet and understand that the internet can be used as a learning resource [12]. The presence of digital learning media apps has received a positive response from high school students and it has functioned effectively as a source of independent learning [13]. The virtual class can also be used for practical lessons [14].

Online tutoring through computer-mediated communication (CMC) is very efficient for learning activities. Successful online tutoring requires well-designed resources to support learning activities [15]. The use of online tutoring apps is influenced by human, technology, usability, and ergonomics aspects. Students like apps that provide easy, fun, and interesting learning, with content that is not only text but also videos and animation [16]. Factors that affect the effectiveness of online tutoring cover the tutor's ability to operate technology, find out useful information, create teaching materials with technology, and the willingness and ability of tutors to use different learning strategies [17].

The main determinant of the success of online tutoring technology is the user [18], the role of tutors, and online tutoring scaffolding [19]. The online learning model utilizes smartphones and it has great potential to be developed [20]. At the student level, the outcome of online learning is better to occur when students log in frequently and stay logged in longer [21]. To find out the online tutoring ecosystem, it is necessary to conduct research with an innovation diffusion approach, to see the process of spreading innovation to the community [22]. The diffusion of innovation is generally referred to the spread of technology in a social context [23]. The innovation diffusion theory is widely used to identify information technology adoption [24]. The theory of innovation diffusion is commonly used to examine the innovation of communication, the process of innovation-decision, and the impact of innovation. This study aimed to discover the adoption of innovations online tutoring apps on high school students through the analysis of the process of innovation decisions.

This study used an innovation-decision process model [22] with indicators of the stages of the process of innovation-decision including (1) knowledge, (2) persuasion, (3) decisions, (4) implementation, and (5) confirmation. The stage of knowledge describes how the individual learns about innovation and its uses. The persuasion stage describes the assessment of innovation. The decision stage illustrates how the individual makes the choice to accept or reject the innovation. The implementation stage reveals the use of innovation by those who accept the innovation. Finally, the confirmation stage explains whether the individual who has adopted will continue the innovation or not, and vice versa for those who refuse.

## 2. Method

The research was conducted in Pekanbaru City, Riau Province, Indonesia. The data collection obtained through a survey method toward 120 respondents from state and private senior high school students representing public schools, religious schools, and vocational schools. The research questionnaire used a Likert scale to measure respondents' attitudes or opinions on the innovation-decision process of online tutoring apps with indicators: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. The respondent's answer score was then calculated using the Weight Means Score (WMS) formula with the following indicators: 1% to 20% (very low), 21% to 40% (low), 41% to 60% (moderate), 61% to 80% (high), and 81% to 100% (very high).

## 3. Result

The respondents of this study were state senior high school students (66.7%) and private senior high school students (33.3%). They represented the public schools (33.3%), vocational schools (33.3%), and religious schools (33.3%). The gender of respondents consisted of male (42.5%) and female (57.5%) from class 11 (51%) and class 12 (49%). Respondents' achievement in school consisted of rank 1 to 5 (18.3%), rank 6 to 10 (28.3%), and rank 10 and above (53.3%). Next, the findings of the stages of the innovation-decision process are presented.

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### 3.1. Knowledge

The knowledge stage is the initial stage of the innovation-decision process, namely when someone gets information or knowledge about the innovation and its attributes [22]. At this stage, the individual begins to know information about the innovation, its benefits, and assesses its need for innovation.

**Table 1.** Indicators of online tutoring apps knowledge

No	Indicators	Score (%)
1	The activeness of using a smartphone	90
2	The Ability to buy internet packages	75
3	Knowledge of online tutoring apps	79
4	Knowledge of the benefits of online tutoring apps	78
5	Assessment of the need for online tutoring apps	70
	Average score	78.4

This study finds out that the average score for the knowledge indicator is high (78.4%). The highest score is the level of smartphone use by respondents, namely very active (90%), it indicates that the basic platform for innovation installation is already available. The lowest score is the level of need for online tutoring apps (70%).

### 3.2. Persuasion

Persuasion is the formation of attitudes and changes in individuals. At this stage, the individual is actively seeking information about the innovation, the individual decides based on the individual considers credible, and the individual decides how the person will interpret the information has received. In addition, persuasion is influenced by the attributes of innovation, namely relative advantage, compatibility, complexity, trialability, and observability [22].

**Table 2.** Indicators for online tutoring apps persuasion

No	Indicators	Score (%)
1	Perception on the advantages of online tutoring apps	62
2	The need for online tutoring apps	72
3	Easy level to installed	80
4	Easy level to learn	71
5	Easy level to use	75
6	The support of parents for using online tutoring apps	74
7	The support of teacher to use the online tutoring apps	74
8	Persuasion by advertisement	68
	Average score	72

This study discovers that the average score of knowledge indicator is high (72%). The highest score is the respondent's perception toward the ease of the apps which is installed (80%). The lowest score is the perception of the advantages of online tutoring apps compared to conventional tutoring (62%). In communication indicators, the support of parents and teachers is higher than persuasion from advertisements in mass media and social media.



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### 3.3. Decision

At the decision stage, the individual chooses to adopt or reject the innovation. At the decision stage, individuals take the concept of innovation and consider the advantages or disadvantages of using innovation. One way of dealing with the inherent uncertainty about the consequences of innovation is to attempt partially new ideas. Testing is an important part of the decision to adopt. Methods for facilitating the trial of innovation, for example, free samples [22].

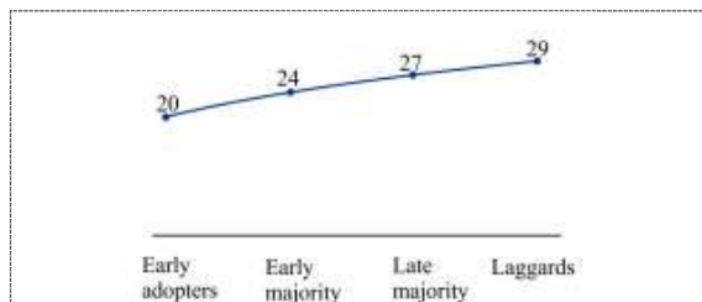
**Table 3.** Indicators of decision to adopt an online tutoring apps

No	Indicators	Score (%)
1	The experience of trying online tutoring apps	66
2	The level of liking for online tutoring apps	67
	Average score	66.5

This study reveals that a high level of respondents' trial of online tutoring apps innovation (66%). The level of preference of respondents to online tutoring apps is also relatively high (67%). After going through the trials, the individual then decides to accept or reject the innovation.

### 3.4. Implementation

The implementation occurs when an individual uses innovation. Implementation usually follows the decision-making stage directly [22]. This research found 71% of respondents adopted the online tutoring apps and 29% did not adopt it. The level of individual adopter innovativeness can be divided based on the time period they adopted to see if they were early adopters (>1 year), early majority (6 to 12 months), late majority (<6 months), or laggards (did not adopt). In this study, innovators were not included, because the diffusion of online tutoring apps was mass and open, thus, it was difficult to determine innovators.



**Figure 1.** The level of respondents' innovativeness

Figure 1 indicates that a graph of individual innovativeness shows the fewest early adopters with the direction of the graph that shows a greater value towards Laggards or not adopting. Although most of them have adopted it, the average implementation score is moderate (59%), it implies that they do not always open the apps every day. The use of these apps to support learning activities and support achievement is the same as a relatively high score (Table 4).

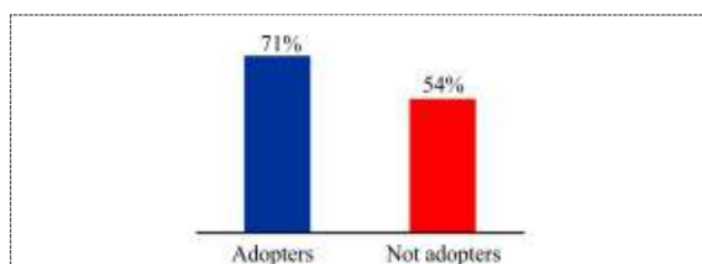
**Table 4.** Indicators of online tutoring apps implementation

No	Indicators	Score (%)
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1	Access the online tutoring apps everyday	51
2	Use to support learning activities	63
3	Use to increase achievement	63
	Average score	59

### 3.5. Confirmation

The empirical evidence from several researchers points out that the decision to adopt or reject an innovation is not the final stage of the process of innovation decision. However, there is a confirmation stage, in which the individuals seek reinforcement of the innovation decisions that they have made, and it can change decisions if the innovation is in contrast [22].



**Figure 2.** The comparison of confirmation of adopter and not adopter of online tutoring apps

This study points out that a high level of confirmation of respondents who have used the online tutoring apps is (71%), it signifies that most of the respondents will continue to adopt the online tutoring apps. The level of confirmation of respondents who have not adopted is moderate (54%), it indicates that some of them will become slow adopters.

## 4. Discussion

The findings of this study signifies that high school students are potential adopters of online tutoring apps. It is due to computer technology and the internet continues to influence people's lives, especially teenagers [25]. The large potential for the adoption of this online tutoring apps is due to respondents are very active smartphone users (90%). A number of studies have also revealed that teenagers spend a lot of time on smartphones [26][27]. The positive impact of using the internet is explained by several previous studies, it points out that high school students often access the internet [11], use it for learning [12] so that it is relatively effective for independent learning [13].

High school students use the online tutoring apps to support learning activities and improve achievement. The high score of motives for increasing achievement signifies that the tutoring apps can cover the lack of knowledge in learning activities at school. Other research has also found the use of ICT can improve academic achievement [28]. Moreover, if the learning system is based on multimedia, it is more effective than conventional one [29]. This strengthening of ICT and IoT is a realization of the era model of education in Society 5.0 [5]. Thus, in the era of Society 5.0, schools have the task of adjusting their education programs for digital natives in preparation for the future job market [4].

## 5. Conclusion

The adoption of online tutoring apps innovations in high school students was relatively high. The adoption decision had been through the stages of the innovation-decision process starting from knowledge, persuasion, decision, implementation, and confirmation, with a moderate to high score

average. The motive for using the online tutoring apps was to support learning activities and to support achievement with a high preference for using the apps, with the support from parents and teachers as well. These findings indicated that the online tutoring apps innovation was accepted by a group of high school students. The acceptance of apps-based education is a significant asset to realize Society 5.0 as the vision of a new society, namely a super-smart society.

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