Acceptance Analysis of an INFOBIDAN Application to Improve a Midwife's Competency in a Remote Area

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Abstract: East Java has among the top 10 maternal and infant deaths in Indonesia. East Java's MMR 2015 is 89.6 per 100,000 of live births. Although East Java has experienced a downward trend, the number of maternal deaths is still high. These problems occurred in remote areas with limited health care facilities. The quality of maternal and infant health services can be influenced by midwife competencies. There is new health information technology for midwives to improve their competence. This study aims to evaluate acceptance of the INFOBIDAN application in a remote area. It was a descriptive research with a cross sectional study design. Research was conducted in Madura Island. The population of the research was 92 midwives. A Technology Acceptance Model (TAM) was used to analyze this data research. The result was that 69.56% midwives rarely used the INFOBIDAN application. Health information technology being needed by midwives in remote areas is based on the benefits of technology (PR=17.00) and easy to access (PR= 4.1). It showed that midwives accepted INFOBIDAN, but rarely used it due to its content. This evaluation can be used to improve the content of an INFOBIDAN application to make it suitable for midwives needed in remote areas.

1 INTRODUCTION

The number of maternal deaths in East Java is still high. In 2015, the Maternal Mortality Rate (MMR) in East Java was 89.6 per 100,000 live births. This number successfully reached the SDG's target of less than or equal to 102 per 100,000 live births. However, it is a problem because the National Strategic Plan target is no more than 80 per 100,000 live births.

The Maternal Mortality Rate (MMR) in East Java is caused by multifactors, especially in a remote area. Remote areas are regions that have less ability to access technological innovations. This is because the area is difficult to reach due to various reasons such as geography, transportation, social and economic conditions. Therefore, health facilities related to technological innovation are also limited, so health development efforts should be implemented for equitable health services in these areas.

In remote areas, labor that is not accompanied by health personnel, especially in the Madura area such as Pamekasan and Sampang, is one of the causes. As of June 2015, there were more than 500 births not attended by a health worker in the area. Data in 2013 shows that midwives in remote areas have inadequate competencies.

On the other hand, the Infant Mortality Rate (IMR) in East Java is still a problem in itself. Data shows that, as of June 2015, there were 2,141 cases of infant mortality in East Java.

In the past year, midwives in remote areas, especially in Pamekasan and Sumenep districts (Madura Island) have utilized the BIDAN INFO application. Madura is an island separated from the Java Island. Separate island conditions cause the island to have limited access in terms the advancement of a health system. It was on this basis that Pamekasan and Sampang were included as remote areas.

INFOBIDAN is a health technology that was launched in 2012 by UNICEF and the Government of Indonesia to empower midwives. It aims to leverage Indonesia's growing rates of smartphone penetration to keep them informed of the best ways

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to protect infant health from birth through the all-important first 1,000 days. By using this application, it is expected that midwives can improve their ability to provide maternal and infant health services so that they can reduce maternal and infant mortality rates in the area.

INFOBIDAN may have some limitation for apps so needs to be improved. This study aims to evaluate acceptance of the INFOBIDAN application for midwives in remote areas using Technology Acceptance Model (TAM) analysis.

The healthcare related studies that have examined technology acceptance have examined concepts such as acceptance, usefulness, ease of use and behavioral intent to use a system (Schnall, et al. 2011). Technology Acceptance Model (TAM) is used to determine the level of acceptance of an information system. TAM is the analytical blade used to know the attitude of user acceptance of the present technology. TAM is an information systems theory that models how to come to accept and use a technology. TAM is a theory of information systems that models how the user came to receive and use technology. Therefore, it can be said that TAM is an analytical model to learn the behavior of users who are in acceptance of the technology.

TAM has the assumption of the time the user will use the new information system. There are two factors affecting it, namely:

- Perceived Ease of Use
  Davis (1989) stated that "ease" means "freedom from difficulty or great effort". Davis et al. (1989) stated "...people tend to use or not use an application to the extent they believe it will help them perform their job better. This first variable is referred to as the perceived usefulness of IT technology; even if potential users believe that a given application is useful, they may, at the same time, believe that the system is too hard to use and that the performance benefits of usage are outweighed by the effort of using the application. That is, in addition to usefulness, usage is theorized to be influenced by the perceived ease of use (p. 320).
- Perceived Usefulness (Perceived Usefulness).
  Davis et al. (1989) went on to define usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance" (p320). The results of Davis's research (1989) shows if perceptions of ease can be explained, the user's reasons for using the system and can explain if the new system can be accepted by the user. If the user trusts the system and it is useful then he/she will certainly use it, but otherwise if they do not believe it will be useful then the answer is surely that they will not use it.

The TAM model conceptualizes how users receive and use new technology. It comes from a psychological approach theory to describe users who refer to their beliefs, attitudes, interests, and user behavior relationships. The characteristic of the TAM Model is simple, but can predict acceptance as well as the use of technology. The external variables can be replaced and adapted to the object and research topics. From various research results that have been done by using the TAM model, an example is: complexity, trust, self-efficacy, social factors, service assurance, quality internet connection, and so forth.

Venkatesh, et al. (2002) integrates the TAM model which includes intrinsic and extrinsic factors as external variables which affect system usage. 'Intrinsic factor' means emerging from within individual users, while 'extrinsic factors' mean because of the environmental factors that users are encouraged to use information Systems.

Other researchers such as Gahtani (2001) also modify the model TAM by combining the intensity variables of usage behavior (Behavioral intention to use) and the use of real-time system (Actual system use) into a variable acceptance (acceptance). The changes are as shown in the Figure below:

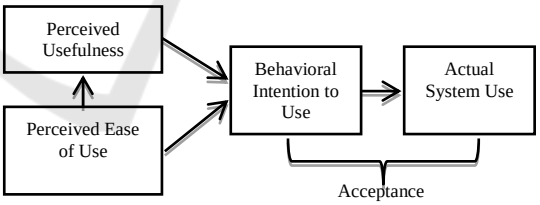

Figure 1: Modification of TAM Chuttur Model by Davis in 1996 and Gahtani in 2001.

From Figure 1 we can see that a variable of behavioral intention to use can be influenced by Perceived usefulness and Perceived ease of use variables. The end result, the actual information system will be accepted by the user, if the factors ease of use and usefulness have been met.

2 METHODS

This research was conducted in Pamekasan and Sampang district in Madura Island. Our research team introduced the INFOBIDAN application to midwife members of the Indonesian Midwives Association (also called IBI) in Pamekasan and Sampang at the end of 2016. We conducted an evaluation survey in April 2017.

This research was a descriptive study using cross sectional study design. There was no treatment in the study subjects because this was an observational research. The population of the research was midwives who were members of the Indonesian Midwives Association (IBI in Pamekasan and Sampang). We found 92 midwives who qualified as research subjects as they had used the application several times. The sample selection in this study was conducted using a purposive sampling technique. Purposive sampling is the selection of sample members based on the purpose and certain considerations of the researcher (Neuman, et al., 2006).

The research data was collected from a questionnaire by a sample and interview in Focus Group Discussions (FGD) with several midwives in each of the two districts. The topic of FGD is a limitation in the INFOBIDAN application. We maintain the confidentiality of the research data. The data collected has received approval from the research sample by completing the informed consent research form.

Variables that were to be evaluated were the usefulness of the application (perceived usefulness) and ease of the application (perceived ease of use). Both of these variables are part of the Technology Acceptance Model (TAM) approach. The data obtained was analyzed using descriptive analysis.

3 RESULT

Based on the data obtained, the result was that most of the respondents are midwives who have a diploma education (70.7%). There are several questions on the questionnaire asking how often they use the INFOBIDAN application. 69.6% of the midwives rarely use the INFOBIDAN application. The perception related to the ease of application is that 94.6% of the midwives feel the application is easy to use. In addition, 97.8% of the midwives feel that INFOBIDAN applications are beneficial to their job performance. This description can be seen in this Table:

Table 1: Distribution frequency result of variables.

Variable	N	%
Education level		
Diploma	65	70.7
Bachelors	14	15.2
Masters	13	14.1
Frequency of use		
Rarely	64	69.6
Often	28	30.4
Ease of use apps		
Easy	87	94.6
Difficult	5	5.4
Usefulness of apps		
Useful	90	97.8
Useless	2	2.2
Have good behavioral intention		
Yes	86	93.5
No	6	6.5

Based on the obtained results, there was a relationship between perceived ease of use with behavioral intention, with the value of PR= 4.1. This means that midwives who feel that the application is easy to use have the behavioral intention to use the application regularly, 4.1 times compared with midwives who feel that the application is difficult to use. There was a relationship between perceived usefulness with behavioral intention, with the value of PR= 17. This means that the number of midwives who feel the application is useful for their job have the behavioral intention to use the application regularly, is 17 times the number of midwives who feel that the application is useless for their job.

The result of the Focus Group Discussion (FGD) interview is that midwives claimed that the reason they rarely used the INFOBIDAN application was because:

- They were not interested in the application's content.
- The application's content was not up to date.
- The information they got through the application was very limited.
- The information they got was the same as the information in the mother and child health book.

This means that they are less motivated to use the application. They need the latest information relating to maternal and child health issues such as immunization of MR, procedure of registration of health personnel as midwife, etc.

4 DISCUSSION

Respondents consisted of three different levels of education. The limitations of this study are not analyzed based on each level of education. Analysis needs to be done for each level of education because the level of education is a factor that affects a person's ability to use technological developments (Ponce and Penal, 2015).

Gahtani (2001) said that to analyze the acceptance of system information on the midwives with the TAM model, some variables were used. These are:

- perceived ease of use;
- perceived usefulness;
- behavioral intention to use.

Perceived ease of use is a statement about whether the user's perception will be ease or difficulty in using the INFOBIDAN application. This can be identified from various indicators, among others:

- easy to learn;
- easy to achieve goals;
- clear operational;
- easy to understand;
- flexible information system;
- free from difficulty;
- easy access;
- clarity on the information system.

There are 94% of midwives who feel that the application is easy to use. This convenience gives them the desire to use the application intensively. Research of Money et al. (2015) states that the ease of application, associated with the interface design, can influence the acceptance of applications. Simple views and usability will make users interested in apps (Middlemass et al., 2017).

There are 3 things that affect the acceptance of mobile-based health technology that are content of messages, cellular characteristic, and technological literacy (Campbell et al., 2017). In addition, user attitudes, organizational support, usefulness, and social influence are important factors when using health technologies (Hsiao and Chen, 2016)

The big challenge of receiving mobile phone based technology is limited internet access in the remote areas. Not everyone has the ability to use health technology. Mobile phones with android systems are difficult for adults to understand (Currie et al., 2015).

Perceived usefulness is a statement about the user's perception of use of the INFOBIDAN application. Health workers need health technology because they want to solve health problems in their workplace (Loo, 2010). Indicators include:

- speed up work;
- increase work productivity;
- improve performance;
- improve task effectiveness;
- learn information required by the user;
- the existence of usefulness overall;
- the information system used is useful for the midwife to provide maternal and infant health care so that health status in the work environment affects health technology acceptance decisions (Loo, 2010).

Gururajan says in his research that some healthcare organizations are aware of the potential benefits they can gain by using mobile technologies, and, although they encounter problems in adopting them, they are realizing the anticipated benefits.

Behavioral intention to use it is the intent of a person to use the INFOBIDAN application, so it becomes a tendency of behavior to remain using the INFOBIDAN application. Here's what is called the acceptance phase, because the user shows an attitude of acceptance of the use of the INFOBIDAN application. The existence of the user's positive intent to use the information system is believed to be able to motivate users to use the INFOBIDAN application. Used information systems level on the user can be predicted from the attitude of his or her attention to the information system. Therefore, there is such a motivation to use and a desire to motivate other users. This includes the aspects of cognitive or perspective interest in information systems, affective with statements by users to use information systems, which components related to the behavior that is the desire to remain using existing information systems. It is because, according to the theory of planned behavior, that the action of the individual on a particular behavior is determined by the individual's interest to conduct the behavior (Budiman, et al., 2013).

The results of the study showed that they rarely use INFOBIDAN applications when working. This does not mean that they refuse to use the application. TAM explains that users accepted the technology because of the ease and usefulness variables. They actually feel that this app is easy to use and is useful for their work.

The ease and benefits of this application will make midwives willing to use the application intensively, but there are several reasons why they rarely use this app:

- They want new and up-to-date information;
- They are bored with monotonous content;
- Content of information on INFOBIDAN applications is similar to maternal and child health books, so they want innovation from the application.

This evaluation can help users to provide feedback on system design, improvement design, implementation strategies, and policies to promote acceptance and use in the work environment (Holden et al, 2016). In addition, computer self-efficacy has an effect on the perception of benefit and perception of ease of the use of technology in health service management information systems, so hardware which supports the system should get attention (Supriyanti, 2016).

From these reasons, it is necessary to update the application so the needs of the users can be provided in these apps. Most of the midwives are diploma graduates. They need complex information which is related to maternal and child health. Information that is still superficial and fundamental may have been obtained from their education or work experience. New information is needed to develop their competence.

Health facilities in remote areas are very limited. Midwives need to use innovation to provide optimal service with limited resources. Information related to such matters is what they need.

Improvements made to INFOBIDAN applications are expected to make midwives use this application more intensively, so the purpose of increasing competence through the utilization of this technology can be achieved.

5 CONCLUSION

This research aimed to evaluate applications using a Technology Acceptance Model (TAM) approach based on the perceived usefulness and ease of use dimensions from the user. In fact, the results showed that the application is received by the midwife in a remote area. One thing that causes them to use the application rarely is because the content in the application is less diverse. Behavioral intentions of midwives to use the application always is influenced by the ease factor in using the application and the usefulness of the application. It takes updating and improving the application content to give the information that midwives need in remote areas, so they can increase their competence through the INFOBIDAN application.

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