

**Technology Acceptance Model to Measure Perception Use of Electronic Nursing Documentation****Ana Zakiyah**

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Abstract

Electronic Nursing Documentation (END) use in hospitals has increased along with the development of technology. Hence, nursing education needs to synergize to adopt the use of END. However, preceptors have varying perceptions regarding their application in nursing clinical practice. The study aims to determine the preceptor's perception of using END based on the Acceptance Model (TAM) Technology. In the descriptive research design, the population is clinical preceptors in hospitals, and purposive sampling was used to obtain a total of 90 samples. The research instruments used Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). The analysis uses frequency distribution. The study's results on the PU variable obtained the perception of the preceptor about the use of END in all indicators, generally in the high category of more than 90%. In the PEOU variable, most clinical preceptors had a moderate perception of the clarity indicator 71 (78.9%), and a high perception of the flexibility of use indicator as much as 69 (76.7%). A positive perception of technology can be formed if users find the technology practical and easy to use.

INTRODUCTION

The development of technology in the 5.0 era is marked by digitalization in almost all aspects, so nursing must synergize in providing nursing care by utilizing technological advances, one of which is for nursing documentation (Sukesi & Winarti, 2023). Nursing care documentation has an essential role in recording all patient care information. The completeness of documentation and the accuracy of data can improve the quality of nursing services because it is a source of information about patient needs and nursing interventions that have been provided to patients (Solehudin et al., 2024; De Groot, K., De Veer, A.J., Paans, W, 2020).

The electronic-based nursing documentation system has advantages for nurses, including more optimal nursing care for patients, allowing nursing care to be more integrated, effective and efficient because it reduces the use of paper (paperless) so that it can help reduce the impact of global warming and hospital expenditures (Kalimah, 2024).

Electronic documentation provides accurate and consistent information, and data accessibility is faster, stored over a long time, structured and systematic, making it easier to evaluate performance and minimizing the risk of errors in patient care. Optimizing electronic documentation supports the effectiveness and efficiency of nursing care and aims to improve the quality of services comprehensively (Solehudin et al., 2024; Hinonaung, J.S.H et al., 2023).

The increasing trend of digitalization in hospitals requires nursing education institutions to synergize and adopt electronic-based nursing care documentation (Minanton et al., 2023). Research by Chung & Reynolds (2021) shows that implementing the Academic Electronic Health Record (AEHR) will help achieve the competency of undergraduate nursing students in END and improve nursing services for patients. This is useful for preparing students and nursing educators to adapt to health information technology.

The current phenomenon is that nursing graduates are not all trained in electronic documentation, and nursing institutions have not fully incorporated electronic documentation into the curriculum. Efforts to optimize nursing graduates begin with a solid educational foundation. The nursing curriculum must prepare students to face the complexity of the demands of the world of work. Effective, efficient, and quality patient care must adopt EMR for communication and documentation. Therefore, nursing institutions must ensure that students are ready and proficient in using EMR (Williams, C., Moody, L.R. and Martinez, D, 2021).

Another phenomenon related to the use of END in students during nursing clinic practice is the perception of the preceptor, which is still different. The results of a preliminary study with ten respondents were obtained 6 (60%) argued that practical students need to adjust to technological developments, primarily related to computer-based nursing documentation, 4 (60%) stated that the use of computer-based documentation reduces students' critical thinking because students are presented directly with diagnostic options. An analysis of the program intervention is included.

A person's perception and acceptance of technology is based on several factors. Davis (1989) developed a theoretical framework called the Technology Acceptance Model (TAM) Theory, explaining how to accept users and use new technologies. This theory refers to the Theory of Reasoned Action (TRA), which states that factors that affect a person's behaviour include the intention to act, which is further influenced by subjective attitudes and norms. Davis simplifies TRA to TAM by focusing on two main variables that affect technology adoption. The first variable is Perceived Usefulness (PU); a positive user perception of technology provides significant benefits because users tend to adopt it to improve performance. The second variable is Perceived Ease of Use (PEOU), a user's perception of the ease of learning technology. Technology that is easy to learn and use provides an excellent opportunity for users to accept the existence of such technology (Davis, 1989; Venkatesh & Davis, 2000).

Based on the description in the background, the researcher wanted to find out the perception of the preceptor about the use of END in clinical practice students using the TAM approach. The purpose of the research is to predict the perception of the preceptor, which will later be one of the bases for consideration when developing the application of nursing documentation for nursing clinic practice students.

RESEARCH METHODS

The study uses a descriptive approach, and it determines the perception of the preceptor about the use of END in nursing clinic practice students based on TAM theory. The population is clinical preceptors in X hospitals, which are practice places for students. A purposive sampling was used, and a sample of 90 people was obtained.

This research instrument adopts the Technology Acceptance Model (TAM) by Davis (1989), which consists of Perceived Usefulness and Perceived Ease of Use. Perceived Usefulness instruments consist of productivity, effectiveness, performance improvement, speed, relevance, and ease of work. Meanwhile, the Perceived Ease of Use variable consists

of ease of learning, ease of operation, clarity, flexibility of use, reduced workload, and comfort in use.

The results of the validity test of PU instruments using Pearson Correlation obtained a calculation greater than the r table (0.361) to declare the instrument valid. The reliability test results showed that Cronbach's Alpha value was more than 0.7, which is 0.923, which means that all dimensions are reliable. Likewise, the PEOU instrument validity test results obtained that the r calculation was more significant than the r table (0.361), and the Cronbach's Alpha value was 0.879.

The interpretation of the results consists of high (above 3.0), moderate (2.0–3.0), and low (below 2.0) categories. All respondents were given informed consent before filling out the questionnaire. Participation is voluntary, and confidentiality and anonymity are also guaranteed. The research analysis uses frequency distribution. This research has passed the ethics test no.211/KEP/ITKES-ICME/X/2024.

RESULT

Table 1

Characteristic of respondents based on age and gender (N=90)

Variable	Minimum	Maximum	Mean	Std. Deviation
Age	24	51	34	7.023
Variable	n	Percentage (%)		
Gender				
Male	26		28.9	
Female	64		71.1	
	100		100%	

The average age of preceptors is 34, the minimum age is 24, and the maximum age is 51. The acceptance of technology is influenced by age. The younger generation tends to accept and adapt to technology more quickly. The older generation can embrace technology with the proper training and encouragement.

The respondents in this study were gender-based; most were women as many as 64 (71.1%). In accepting technology, gender can affect the perception of new technology. Women tend to be more sensitive to the technology's ease of use and social aspects. Women tend to be more sensitive to the technology's ease of use and social aspects.

Table 2

Perceived Usefulness of clinical preceptors of END in nursing practice students (N=90)

No	Variable	Amount								
		Perceived Useful		Low		Moderate		High		Total
		n	%	n	%	n	%	n	%	
1	Productivity	0	0	4	4.4	86	95.6	90	100	
2	Effectiveness	0	0	2	2.2	88	97.8	90	100	
3	Performance improvements	0	0	6	6.7	84	93.3	90	100	
4	Speed of completing tasks	0	0	17	18.9	73	81.1	90	100	
5	Relevance to the task	0	0	5	5.6	85	94.4	90	100	
6	Ease of work	0	0	3	3.3	87	96.7	90	100	

Clinical perceptions of using END across all indicators averaged in the high category, i.e. more than 90%. Positive perceptions of Perceived Usefulness are keys to successful technology adoption. The more positive the user perceives usability, the more likely the technology will be adopted and used effectively.

Table 3

Perceived Ease of Use of clinical preceptors about END in nursing practice students (N=90)

No	Variable Perceived Ease of Use	Jumlah						Total n	Total %
		Low		Moderate		High			
		n	%	n	%	n	%		
1	Learning facilities	1	1.1	42	46.7	47	52.2	90	100
2	Ease of operation	8	8.9	39	43.3	43	47.8	90	100
3	Clarity	0	0	71	78.9	19	21.1	90	100
4	Flexibility of use	0	0	21	23.3	69	76.7	90	100
5	Workload reduction	0	0	60	66.7	30	33.3	90	100
6	Comfort in use	0	0	60	66.7	30	33.3	90	100

Most clinical preceptors had a moderate perception of the clarity indicator of 71 (78.9%) and a high perception of the flexibility of use indicator of as much as 69 (76.7%). Clinical preceptors still have a low perception of learning and operational ease indicators.

DISCUSSION

Perceived Usefulness (PU)

The results show clinical preceptors' perception of using END on all indicators of perceived Usefulness. In general, it is in the high category. Nurses' perception of electronic-based nursing documentation can determine the success of technology implementation or barriers to using health services (Shabnum et al., 2017). Perceived Usefulness, proposed by Davis (1989), is a measure or way of predicting the extent to which technology is believed to benefit its users (Yudawisastra dkk, 2024).

TAM research on electronic-based nursing documentation tends to be more specific regarding the need for nursing personnel, focusing on the efficiency of clinical tasks of nursing care and its direct impact on the quality of patient care. Meanwhile, similar research in other digital health systems has a broader scope, involves many types of users, and highlights security, scalability, and data management aspects.

In productivity indicators, clinical preceptors perceive that using END can increase productivity in completing tasks because the data is more complete and accurate. Meirte et al. (2020) explained that electronic-based patient report documents provide benefits for more incredible patient admission, higher data quality and response rates, and more accessible patient-clinician communication.

Electronic-based nursing documentation can also increase effectiveness in completing tasks. Electronic nursing documentation is an effective way to improve the quality of nursing documentation. In addition, a support system can affect the effectiveness of END implementation (Hariyati et al., 2020). The quality of nursing documentation after using electronics has improved (Firouzeh et al., 2017). Zaheya et al. (2017) explained that electronic-based health records are better than paper-based records regarding process and structure. However, in terms of quantity and quality of content, paper-based records are better than electronic health records. The study's results confirmed that the poor quality of nursing documentation and nurses' lack of knowledge and skills in the nursing process affect its application in both paper-based and electronic-based systems. This phenomenon is essential

information for policymakers and administrators as a basis for identifying effective strategies to improve the quality of nursing documentation.

An electronic-based nursing documentation system, Rahayu & Mufliah (2024) positively correlates with nurse performance. In addition to providing accurate data, it produces quality planning and improves nurses' performance in nursing care. In addition, nursing care documentation can be completed on time and efficiently so that nurses can make quick and informed decisions. The fundamental role of technology is to facilitate data input, storage and retrieval of vital information to help provide better service quality and improve work processes (Magdalena & Hariyati, 2023).

In the relevance indicator, it was found that electronic-based nursing documentation meets the needs of students in completing nursing care. The use of END also supports essential aspects of task completion. The need includes the perception of the application of electronic nursing care in nurse education, considering the importance of information technology in health services. Readiness consists of the perception of the ability to adopt and use END. END use is more practical and efficient (Minanton et al., 2023).

The completion speed indicator can be seen in the time savings in completing electronic-based nursing documentation. Work is completed faster and in a relatively faster time compared to paper-based documentation. This is in line with the research of Meirte et al. (2020), which explains that electronic-based patient documents provide the benefits of faster turnaround times, better data quality and higher response rates. A planned approach from management over time, allowing nurses to adapt to the new electronic documentation system, is a good investment in worktime efficiency, resulting in more time for patient care (McCarthy et al., 2018).

Electronic-based nursing documentation can make it easier for students to compile nursing care documentation. Using END can reduce the number of nursing care reports collected and documented manually by students while providing nursing care to patients, improving the accessibility of nursing care by reducing the documentation burden (Minanton et al., 2023). The performance of nursing students is more effective, efficient, and optimal. Nursing care reports improve the quality of services (Sukesi & Winarti, 2023).

Perceived Ease for Use (PEOU)

Clinical preceptors' perception of END use was almost the same across all perceived ease of use indicators. Most clarity indicators are in the medium category, and most flexibility indicators are in the high category. In the indicators of ease of learning and operational ease, clinical preceptors still have a low perception. PEOU is a measure that explains that ease of use plays an essential role because it is more complex, involving a person's perception of ease of use and ease of learning technology (Yudawisastra dkk, 2024).

The indicators of ease of learning in the medium and high categories have almost the same percentage. Ease of learning describes a person's belief in the extent to which a particular technology will be free from excessive effort, including mastery of the learning aspect of the theory. Perceptions in the context of PEOU include ease of understanding in terms of intuitive features, ease of use, which means reducing complexity during the learning process, and efficiency to master, which means minimizing the time and effort needed to

learn technology functions. A positive perception of the ease of learning technology can increase Perceived Usefulness (PU), further strengthening a person's intention to use it (Davis, 1989; Venkatesh & Davis, 2000).

The indicator of ease of operation or END use is that a small percentage of clinical preceptors have a low perception. Confusion when using END and making frequent mistakes still occurs. The ease of use is influenced by the nurse's experience with EHR, and computer skills are one of the determining factors for the success of the implementation of END (Tubaishat, 2018). Age factors and inadequate computer skills were identified as documentation barriers (Mather, 2019). In this study, the highest preceptor age was 51 years old, which is the age of transition for older people, tending to have difficulty understanding complex technology. Meanwhile, young preceptors are more adaptive to technological changes.

Tubaishat (2018) stated that nurses positively perceive the usability and ease of use of EHRs and then accept the technology. The variables that predicted usability were the nurse's gender, career path, EHR experience, and computer skills. The perceived ease of use is influenced by computer experience and skills.

The clarity indicator describes aspects related to the design of technology, functions, and system communication to users, such as readability and presentation of information, responsiveness to user actions, minimalist operational complexity, and ease of application in following instructions (Davis, 1989). Low support for information technology, hardware, and time-consuming data entry processes hinder EHR utilization in care services (Alsohime et al., 2019).

The indicator of flexibility in the use of most clinical preceptors is in the high category. Flexibility includes use in various conditions, the ability to adapt to user needs, and the ability of technology to perform multiple tasks simultaneously. Flexibility makes users feel comfortable, minimizes the likelihood of frustration if there are obstacles and increases satisfaction according to user preferences (Venkatesh & Davis, 2000). Nurses feel satisfied with using END. Factors that increase nurse satisfaction include ease of use of the system, ease of obtaining data to support decision-making, completeness of the nursing process and improvement of documentation quality (Riyani & Hariyati, 2022; Setyaningrum et al., 2016).

The perception of clinical preceptors towards workload reduction indicators was mainly in the medium category of 66.7% and 33.3% high. In general, nurses feel that the implementation of EHRs is beneficial, does not add to the workload, improves the quality of documentation, and will not eliminate the work of nurses. Recognition of the nursing profession and using EHRs is mandatory to enhance the success of EHR implementation and provide patient-centred care goals. Identifying nurses' perceptions and potential barriers to using EHRs will improve patient protection, improve communication, and reduce costs (Shabnum et al., 2017).

On the indicator of comfort in use, the perception of clinical preceptors was mainly in the medium category of 66.7% and 33.3% high. Some nurses find it frustrating when interacting with END. In the research of Ibrahim et al. (2019), the need to evaluate the comfort level of nurses in using END involves nurses in the design to ensure that the electronic documentation system is following the existing complexity in nursing practice.

This has the potential to increase the comfort of nurses. Nurses' comfort in using END is influenced by several factors, namely individual characteristics, such as nurses' technology-related experience, electronic documentation system design, and personal readiness through training. Heidarizadeh et al. (2017), TAM theory explains that the benefits of use must be the main focus of attention to encourage a person's acceptance of technology. The biggest obstacles to acceptance are familiarity and convenience in using the new technology compared to previous methods.

CONCLUSION

PU and PEOU are the main factors that affect a person's perception regarding the use of technology. Perceptions can vary depending on the user's needs, experience, and goals. A good experience tends to increase ease of use and Usefulness, which further affects overall perception. Users who find technology valuable and easy to use will form a positive perception. PU and PEOU form a positive attitude towards using technology, ultimately influencing the intention to use the technology.

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