

Exploring Nurse' Use of Digital Nursing Technology

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Abstract. This is a quantitative cross-sectional study using the characteristics of innovation diffusion theory to evaluate nurse' acceptance and adoption of digital nursing technology (DNT). Data were collected through questionnaires based on innovation diffusion theory in the wards of a regional hospital in Taiwan from March 21 to May 31, 2022. Results indicated that the higher the innovative characteristics of DNT, the higher the DNT acceptance. Difficulties with network connections contributed to negative experiences and led to recommendations for future system improvement.

Keywords. Digital nursing technology (DNT), innovation diffusion theory, system acceptance

1. Introduction

Taiwan has become an increasingly aging society and is estimated to enter a super-aging society in 2025. In order to solve the problems of a nursing professional shortage and high healthcare expenditure, turning to technology is a backup alternative. DNT includes the NIS (nursing information system) for workflow management support, electronic nursing records, BCMA (barcode medication administration), barcode technology for blood biochemistry and blood transfusion, automatic uploading of physiological data, and electronic signature of consent forms. Nurses are vital to the success of the development and implementation of information technology. Patient-centered healthcare requires nurses' acceptance of the system and a certain consensus on the use of new technological devices, so that DNT can truly be applied in clinical practice.

2. Methods

A cross-sectional study based on the innovation diffusion theory by Everett Rogers [1] was applied to explore nurse' acceptance of DNT. A questionnaire survey was used for data collection in the wards of a regional hospital in Taiwan from March 21 to May 31, 2022. The first part of the questionnaire contained 35 questions to assess five innovation

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characteristics including observability, simplicity, comparative advantage, trialability, and compatibility. The second part included 6 questions specific to the acceptance of DNT. Both parts were based on a 5-point Likert scale. The third part included one single-choice question to identify the user' innovative role which included early adopters, early majority, and late majority. The combined three parts of the questionnaire included 42 structured questions in total. A fourth part of data collection included an open-ended question to obtain suggestions or to cite difficulties encountered in the use of DNT. The fifth part of data collection included four questions on basic demographic attributes including age, working years, advanced level and time spent on DNT when working.

3. Results

One hundred fifty-nine valid questionnaires were collected, and 99 participants answered the open-ended question to state their experience regarding the use of DNT. Results of this study are as follows: observability ($r=.783$), simplicity ($r=.716$), comparative advantage ($r=.678$), trialability ($r=.616$), and compatibility ($r=.598$), which are positively related to the acceptance of DNT ($p<.001$). In the identification of innovative roles among nurses, early adopters had a greater significant impact on both DNT innovation characteristics ($F=5.424$, $p<.005$) and the acceptance of DNT ($F=15.581$, $p<.001$) than early majority and late majority innovative roles. There was no significant difference or correlation between the basic attributes of nursing staff and the acceptance of DNT.

4. Discussion

The innovative characteristics of DNT have a highly positive correlation with acceptance of DNT. The higher the relative advantage, compatibility, simplicity, trialability, and observability, the more acceptance of DNT by nurses. The average score of nurse' acceptance of DNT is above the median score, indicating that nurses generally have a good acceptance of DNT. The innovative characteristics of DNT and the roles of nurses identified as innovative users have a significant interaction effect. The early adopters have the most obvious innovative characteristics and acceptance of DNT as compared to the early majority and the late majority. From feedback of the open-ended question, nurses recognized the benefits and convenience brought by DNT, and revealed that the problem of network connection is the main reason for negative experiences using DNT.

5. Conclusions

DNT should be developed innovatively to include characteristics of relative advantages, compatibility, simplicity, trialability, and observability. Optimizing innovative characteristics could help increase nurse DNT acceptance and support care delivery.

References

- [1] Rogers EM. *Diffusion of Innovations*. New York: Free Press; 2003. 551 p.