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# Technology Use Among Indonesian Nursing Students Does Not Correlate With Their Perception of Telenursing Competence

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**ABSTRACT**
**Background**: Current nursing students are mostly from a generation native to information technology use. They are expected to be familiar with the use of technology in telenursing, which is more needed in these times. However, whether their technology use affects their perception of telenursing is unknown. **Aim**: This study investigates factors that correspond to the telenursing competence perception among nursing students in Indonesia. **Method**: We use a cross-sectional design. We gather the data with an instrument we have developed and tested for its validity and reliability. The survey is distributed online to nursing students in 12 provinces in Indonesia. The demographic data, school subject, information technology use, and telenursing competence perception are extracted and analyzed using Spearman correlation. **Results**: We received 185 responses. The data analysis shows that respondents' age, province of the school, or nursing information system course has no significant correlation with the telenursing competence perception. The use of technology does not significantly correlate with students' perception of their competence in telenursing. Despite showing a higher correlation, the increased technology use during the coronavirus pandemic shows no significance either. **Conclusion**: The practice of using information technology among nursing students in their daily activities does not significantly impact their perception of telenursing. We recommend that the nursing schools in Indonesia promote technological advancement and provide more telenursing views in their curriculum.

***Keywords**: telehealth, information technology, self-reported competence, digital native*

## 1. INTRODUCTION

Health service has been evolving through different eras along with society's demands. In times of pandemic, the use of technology becomes compulsory in the healthcare area. Telenursing is a part of telehealth, which is a long-distance health service conducted using information technology [1]. Many countries have implemented telenursing as part of their healthcare services. Indonesian nurses have initiated and studied technology to provide remote nursing care [2], [3]. However, the application is yet integrated into the existing healthcare system. With Indonesia's demographic characteristics and the absence of inadequate health facilities in certain areas, there is a need to prepare future nurses to utilize technology to deliver nursing care.

The majority of nursing students come from generation Z, known as a digital native, born and growing up in the middle of rapid technology development. A study shows that generation z's use of technology in leisure activities is high [4]. Their customization with information technology could help apply telenursing and other technology-related activities when they graduate. However, their use of technology is not always followed by competencies required for telenursing. A study argues that high frequency in smartphone use does not determine technology competence in the learning process [4]. It Is pivotal to ensure that the technology used in nursing students could support their future career as a nurse as the current curriculum integrates a high use of smartphones, computers, and the internet. However, the evidence of its correlation is scarce. Thus, this study investigates factors that correspond to the telenursing competence perception among nursing students in Indonesia.

## 2. METHOD

We employ observational design with a cross-sectional approach using a survey. The data is gathered through a google form, distributed to 12 provinces in Indonesia (South Sumatera, Lampung, Jakarta, Yogyakarta, Bali, East Java, East and West Nusa Tenggara, Maluku, West Kalimantan, South and North Sulawesi). These provinces were chosen to represent the internet use heterogeneity in Indonesia [5]. The data collection was conducted from July to August 2020. Active nursing students of diploma, bachelor, and professional programs from the 12 provinces aged 18-25 are qualified to be the respondents. On the other hand, students from pure remote learning programs, and nurses who enroll in the continuing education program are excluded.

We developed an instrument to measure nursing students' perception of their telenursing competence based on a study by Houwelingen et al [6]. We added other technology competence related to nursing activities. We have tested the instrument for its validity and reliability. We distributed the survey through a faculty member of nursing schools to spread to the students. The data gathered is analyzed using SPSS 25 (IBM Corp, Armonk, N.Y., USA). Spearman correlation is used to determine the relationship between students' perception of telenursing competence and the use of technology and other demographic factors. This study has been approved by the ethics committee of Universitas Pembangunan Nasional Veteran Jakarta.

## 3. RESULTS

After the survey period, we gathered 185 responses after three responses being excluded for incomplete data. More than a third of respondents were born in the year 2000, followed by the year 1999. On the other hand, the oldest respondent was born in 1993. The vast majority of respondents are from bachelor programs, and more than 80% of respondents had taken a health information system course. Table 1 and 2 describe the demographic characteristics of respondents.

Year-of-birth has negative weak correlation with students' perception (r= -0.4, *p*= 0.593). On the other hand, study programs show a stronger correlation (r= 0.294, p = .00) with diploma nursing students having higher perception scores. There is no significant difference in perception scores between those who have done an information technology course and those who have not (5.85/5.56, p= 0.996) as depicted in Table 3.

Technology use does not show a significant correlation with the perception score. The smartphone use especially has the weakest correlation (r= .004, *p*= .957) as seen in Table 5. However. We also measure the difference in technology use before and during the 2019 Corona Virus Disease (COVID19). While the correlation is stronger than the previous one, it shows no significance and a negative correlation. The use of computers and the internet does not show correlation either, as shown in Table 4 and 6.

## 4. DISCUSSION

This study shows that nursing students' familiarity with the communication gadget is not related to their perception of technology in nursing competence. This study's result is similar to the previous study, which suggests that digital native nursing students do not particularly positively view telenursing [7]. Technology use in delivering healthcare could include video conferencing, self-measurement devices, online monitoring, and educating patients about technology use [6], [8]. Technology customization might assist students in adapting technology in telenursing activities. However, not only being able to use the device, a nurse needs to be competent in therapeutic communication, assessment, health promotion, and education to conduct remote assistance to the patients. Despite the weak correlation, younger respondents tend to show a lower perception score. This result could show that they might not be prepared for telehealth not because of the technology but because of their lack of confidence and knowledge about nursing.

The nursing curriculum in Indonesia has been adjusted to meet the need for change due to healthcare demands. The use of technology in learning activities began to increase as the online learning component, and the Nursing Information System in Nursing have been integrated in the Nurse Education Core Competencies 2016. In practice, there is no specialist in nursing information technology in Indonesia, and not every hospital applies electronic medical records. This condition could hinder the initiation of telehealth in Indonesia. In this study, for instance, the Nursing Information System course does not affect students' perceptions. In other words, nursing students might not receive enough view about telehealth and the use of technology in nursing care in that certain subject.

This study has some limitations. Firstly, the COVID19 pandemic might cause the heterogeneity of technology use among nursing students. However, we anticipated it by considering the use of technology before the pandemic, despite similar correlations. The number of participants and the school origins might also increase the risk of bias in this study.

## 5. CONCLUSION

The high intensity in technology use does not result in a fruitful result for the perception of telenursing competence among nursing students in Indonesia. We recommend nursing schools to evaluate the nursing education curriculum and the technology-based activities so that nursing students could gain more views about how the technology might be used in a nursing perspective, especially for telenursing.

**Table 1 Mean score based on the year of birth**

| Year of Birth | Mean | N | Std. Deviation |
|---|---|---|---|
| 1993 | 7.0000 | 1 | . |
| 1996 | 5.9444 | 3 | 1.82828 |
| 1997 | 5.9630 | 9 | 1.03675 |
| 1998 | 5.8133 | 25 | 1.09853 |
| 1999 | 5.8050 | 53 | .97168 |
| 2000 | 5.7465 | 71 | 1.01998 |
| 2001 | 5.8968 | 21 | 1.02127 |
| 2002 | 5.7500 | 2 | .35355 |
| Total | 5.8099 | 185 | 1.01427 |

**Table 2 Mean score based on the education program**

| Education program | Mean | N | Std. Deviation |
|---|---|---|---|
| Undergraduate | 5.6202 | 122 | 1.01215 |
| Nursing profession | 5.0833 | 2 | 1.76777 |
| Diploma | 6.2131 | 61 | .88356 |
| Total | 5.8099 | 185 | 1.01427 |

**Table 3 Mean score based on the course received**

| | Took the course | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Score of Telenursing Competence Perception | Yes | 155 | 5.8581 | 1.00608 | .08081 |
| | No | 30 | 5.5611 | 1.03713 | .18935 |

**Table 4. Spearman's correlation of telenursing competence perception's score and computer use**

| | | | Score of Telenursing Competence Perception | Computer using time (in hour) |
|---|---|---|---|---|
| Spearman's rho | Score of Telenursing Competence Perception | Correlation Coefficient | 1.000 | .026 |
| | | Sig. (2-tailed) | . | .725 |
| | | N | 185 | 184 |
| | Computer using time (in hour) | Correlation Coefficient | .026 | 1.000 |
| | | Sig. (2-tailed) | .725 | . |
| | | N | 184 | 184 |

**Table 4. Spearman's correlation of telenursing competence perception's score and smartphone use**

| | | | Score of Telenursing Competence Perception | Smartphone using time (in hour) |
|---|---|---|---|---|
| Spearman's rho | Score of Telenursing Competence Perception | Correlation Coefficient | 1.000 | .004 |
| | | Sig. (2-tailed) | . | .957 |
| | | N | 185 | 185 |
| | Smartphone using time (in hour) | Correlation Coefficient | .004 | 1.000 |
| | | Sig. (2-tailed) | .957 | . |
| | | N | 185 | 185 |

**Table 4. Spearman's correlation of telenursing competence perception's score and internet use**

| | | | Score of Telenursing Competence Perception | Internet using time (in hour) |
|---|---|---|---|---|
| Spearman's rho | Score of Telenursing Competence Perception | Correlation Coefficient | 1.000 | -.019 |
| | | Sig. (2-tailed) | . | .802 |
| | | N | 185 | 185 |
| | Internet using time (in hour) | Correlation Coefficient | -.019 | 1.000 |
| | | Sig. (2-tailed) | .802 | . |
| | | N | 185 | 185 |

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