

Research Article

Nursing Students' Perception and Its Determinants of Using Digital Educational Technologies in Teaching and Learning of a Selected Nursing School, Sri Lanka

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Abstract

Background: The COVID-19 pandemic has affected all forms of physical classroom education during the pandemic period, and several Digital Educational Technologies (DETs) were implemented to continue education at the School of Nursing, Matara. Students in other settings have expressed various positive and negative thoughts regarding DETs. However, there was no solid reported evidence on Nursing students' self-perception regarding DETs and its' determinants related to the context of the School of Nursing, Matara. Therefore, it is a timely need to assess the Nursing students' perception and its' determinant factors on the usage of DETs, aiming for future advancement of the blended learning activities. This study aimed to assess the Nursing students' self-perception regarding DETs, and to identify determinant factors for the self-perception.

Methods: The study design was a comparative cross-sectional. A total of 422 Nursing students were selected by using a convenient sampling method. The perception of the Nursing students was assessed by using the Sinhala version of the "Comprehensive Evaluation of Use of Technology in Education (CEUTIE)" instrument. Data were collected through a Google-based Likert scale from July to August 2023. Mean and standard deviation for all 28 items of the instrument and for the 08 constructs were calculated. Independent Sample T Test, One Way ANOVA, and Tukey Post Hoc Test were performed by using the statistical package SPSS-25 version, to identify overall mean differences between the groups of demographic and other factors, towards students' self-perception, regarding the usage of DETs in the teaching and learning process.

Results: The mean value range was 3.52 - 5.04 for all 28 items. The highest overall mean value was reported for the construct of "Technology" and the lowest for the construct of the 'Presence/Community'. There was a significant difference between the overall mean values, among the groups of, Gender ($p = 0.01$), Student Batch ($p = 0.03$), Perceived Digital Dependency Levels (PDD) ($p = 0.01$), Perceived Digital Competency Levels (PDC) ($p = 0.05$) and Family Support Levels Received for Continue Education (FSL) ($p = 0.03$).

Conclusions: The perception of the Nursing students regarding the DETs were 'generally positive'. Gender, Student Batch, PDD, PDC, and FSL were the factors that determine the perception regarding the use of DETs among Nursing students.

Keywords: Determinant Factors, Digital Educational Technologies, Nursing Students, Self-Perception.

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Introduction

All the universities and schools, including nursing academic institutions, were closed due to the COVID-19 pandemic in Sri Lanka, to implement social distancing guidelines, issued by the government of Sri Lanka (Rathnayake et al., 2022). Closure of the Nursing schools and universities negatively impacted the nursing education in Sri Lanka, with the acute shortage of nurses (Rathnayake et al., 2022). Nursing education in Sri Lanka was continued purely in face-to-face classroom teaching before the COVID-19 pandemic (Rathnayake et al., 2022). During the COVID-19 pandemic, face-to-face teaching and learning strategies were turned into an online mode to prevent the spread of the COVID-19 infection (Rathnayake et al., 2022).

Several DETs were used more commonly in educational settings to facilitate the teaching and learning process, due to technological evolution, in the rest of the world (Damascena et al., 2019). Those were discussion forums, blogs, avatars, virtual scenarios, immersive technologies, video calls, web conferences, audios, videos, slides, tutorials, image sharing, bibliography sharing, activities, tests, online schedules, mind maps or graphic organizers, file and management stores, instant messages, researches and social networks (Loureiro et al., 2021).

E-learning is 'the learning supported by digital electronic tools and media' (Hoppe et al., 2003). E-learning has several advantages. It facilitates students to be flexible and independent in learning. Students are able to develop cognitive, technical, and critical

thinking skills by engaging in e-learning activities. E-learning empowers teachers to improve their personal and professional growth and development of technical skills (Kuriplachová et al., 2019).

However, gaining clinical skills and competencies were challenged while using online teaching and learning strategies, because nursing is a highly practical discipline (Rathnayake et al., 2022). There were several other challenges related to the usage of E-learning activities, including limited practical learning, barriers related to online assessments, connectivity issues, loneliness, and limited computer skills to use e-learning activities (Nuuyoma et al., 2023).

By considering the differences between the face-to-face learning atmosphere and the virtual learning environment, it was important to develop a new assessment model to assess the E-learning circumstances as a timely requirement (Lee & Lee, 2008). However, there was very few knowledge about the students' perception regarding the experience of using educational technologies (Clarke et al., 2001).

Several E-learning strategies were adopted to continue education in educational institutes in Sri Lanka, without having any evidence regarding students' acceptance of those strategies (Yatigammana & Wijayarathna, 2021). Therefore, the assessment regarding students' acceptance of e-learning pedagogies was required to design their e-learning methodologies in teaching, according to the students' expectations (Yatigammana & Wijayarathna, 2021).

Nurse educators in Sri Lanka also used

various e-learning platforms, including Zoom, Microsoft Teams, Learning management systems, emails, and the WhatsApp messaging app to continue education during the COVID-19 pandemic period (Rathnayake et al., 2022).

Social distancing rules and regulations issued by the government of Sri Lanka to control the COVID-19 pandemic affected to continuation of education at the School of Nursing, Matara. Virtual teaching and learning sessions were started by utilizing DETs from March 2020 to February 2022, with the combination of physical classroom education. Thereafter, with the transport crisis in Sri Lanka, the administration of the School of Nursing, Matara, decided to conduct virtual teaching and learning sessions during the period from July 2022 to September 2022, as a partial fulfillment of the curriculum.

The participation of the students in those online lectures was nearly 75 % from March 2022 to September 2022, relevant to both student batches (2018 A and 2019 A). The submission rate of the assignments via the online platform was nearly 70% over the period, relevant to both student batches. Students reported several problems, including technical issues, when logging into the online classes and submitting assignments during their feedback forums.

Staff meeting reports revealed that some nurse educators had complained about several difficulties while conducting virtual teaching and learning sessions, including logging issues, less interaction, low effectiveness, and low student attendance rates. However, several nursing students and

the nurse educators expressed opposing views, by supporting the use of DETs due to the benefits such as flexible time scheduling, maximum utilization of time, and less expenditure for the participation.

There was very little knowledge about the students' perception regarding the experience of using educational technologies globally (Clarke et al., 2001). The circumstances were also similar at the School of Nursing, Matara, with little or no evidence related to the student perception on the use of DETs and its' determinant factors. Therefore, it was a timely and important need to evaluate the self-perception and its' determinant factors of the nursing students, School of Nursing Matara, Sri Lanka, regarding the use of DETs in education, with the purpose of the advancement of nursing education in Sri Lanka. The purpose of this comparative cross-sectional study was to evaluate the perception of the nursing students regarding DETs in education at the School of Nursing, Matara, and to identify determinants of the students' perception on the usage of DETs.

Methodology

Study design

In line with the study objectives, the perception of the nursing students was evaluated in a numerical form at a given point in time, and therefore, this study used the quantitative research method. The present study was not aimed to check the efficacy of a new intervention modality and therefore it was a non-experimental study. The study compared the mean scores of perceptions regarding the usage of DETs across different categories of variables among nursing

students. Therefore, a quantitative, comparative cross-sectional design was used to perform the present study.

Study setting

The setting for this study was the School of Nursing, Matara, situated in the Matara district, Southern province in Sri Lanka. There were 450 nursing students studied at the School of Nursing, Matara in the year 2022-2023. School of Nursing Matara is governed by the authority under the Director, District General Hospital, Matara, Sri Lanka.

Study period

This study was conducted from the 20th of July 2023 to the 20th of August 2023.

Study population

The target population for the study was the nursing students of the 2018 A and 2019 A Batches, School of Nursing, Matara, Sri Lanka. There were 450 nursing students represented in the study population.

Inclusion criteria

Nursing students of the 2018 A and 2019 A Batches, School of Nursing Matara, with the volunteer participation.

Exclusion criteria

Students who have been transferred from other Nursing Schools to the School of Nursing Matara, after August 2022, because they have not been adequately exposed to DETs.

Sample size

Calculation of the sample size of the students was done according to the following standard formula (Lwanga & Lemeshow, 1991).

$$n = \frac{Z^2 \times p(1 - p)}{d^2}$$

For this calculation, the desired confidence level was taken as 95%. The Z value was 1.96. The anticipated population proportion from the total population (P) was considered as 50%. Acceptable margin of error (d) was considered as 5%. By adding 10% of the dropout rate, the final sample size was considered as 423.

Sampling technique

A sample was taken from both the 2018 A and 2019 A batches by using a convenient sampling technique. A total of 160 females and 14 males were represented in the sample of the 2018 A Batch. A total of 239 females and 10 males were represented in the sample of the 2019 A Batch.

Study instrument

The Sinhala version of the CEUTIE instrument, originally developed by Lai et al. (2022), was used as the study instrument for the present study. The original English version of the CEUTIE instrument was cross-culturally validated to use for Sinhala-speaking nursing students in Sri Lanka by Sampath & Warnakulasuriya 2023, by following the validation guidelines suggested by Beaton et al. (2000).

The Sinhala version instrument had 8 key factors with 28 individual items. Those key factors include learning outcomes, affective elements, behavior, design, technology, teaching pedagogy, presence/community, and institutional environment. Each item of the instrument was measured with a seven-point Likert scale, varying from 0 to 6. “0”

represented the perception of the students as “Strongly Disagree” and the “6” represented the perception as “Strongly Agree”, to the given statements (Sampath & Warnakulasuriya, 2024).

During the cross-cultural validation process, the Sinhala version of the CEUTIE instrument received a maximum content validity ratio of 1.0 for all the items and a maximum content validity index for all individual items of 1.0. Sampath & Warnakulasuriya (2024) had evaluated the psychometric properties of the Sinhala version of the CEUTIE instrument by using 152 nursing students from, School of Nursing, Galle. The Cronbach's alpha value for all 28 items in the instrument was 0.98 in the validation study in Sinhala. Correlations for each questionnaire item score with the total score (rxy Value) were higher than the r table product moment of 0.16 ($p < 0.001$). It was a reliable and valid tool to assess the Sinhala-speaking nursing students' self-perception regarding DETs in education (Sampath & Warnakulasuriya, 2024).

Personal and demographic characteristics as suggested by Gasaymeh, et al. (2017) and the factors created by the present study researchers, according to their experiences and perception, were added to the data collection tool additionally as per the requirement. Participants were provided multiple options to mark their responses related to the said personal and demographic characteristics accordingly.

Data collection

The validated Sinhala version of the CEUTIE instrument by Sampath & Warnakulasuriya

(2024) was created on the Google platform. The Link of the instrument was shared with the selected nursing students, via email or WhatsApp, with a soft copy of the letter of information. Informed consent was taken electronically. All the participants were requested to complete the instrument according to their perception as a self-administered tool. They were provided the option to leave the study without any penalty at any time. The time duration to complete the online instrument was approximately 30 minutes. Any of the financial compensations were not provided to the participants for their participation

Data analysis

All the Google spreadsheets were downloaded and converted into Microsoft Excel. Data analysis was done by using the statistical software IBM SPSS V.25.

The mean value and the standard deviation of the likert scale values for all 28 components of the instrument were calculated by using descriptive statistical techniques. Additionally, the overall mean value and the standard deviation for the eight key constructs in the instrument were calculated separately.

Independent sample t-tests and analysis of variance (ANOVA) tests were used to compare overall mean score differences of self-perception regarding the use of DETs between the subgroups of demographic and personal characteristic data factors. An independent sample t-test was used to compare overall mean score differences of self-perception regarding the use of DETs between the subgroups of student batch, sex,

and the completion level of prior IT courses. Analysis of variance (ANOVA) tests were used to compare overall mean score differences of self-perception regarding the use of DETs between the subgroups of age category, perceived digital dependency levels, perceived digital competency levels, distance levels from the nursing school, advanced level subject stream categories, family support levels received for continue education and the devices categories used for continuing education accordingly. Gasaymeh et al. (2017) used similar data analysis techniques to analyze the data in a similar study. The Tukey Post Hoc Test was performed to identify statistically significant differences in the overall mean perception values of the students, regarding the DETs, according to the subgroups of demographic and personal characteristic data factors.

Ethical consideration

Ethics approval for the study was received from the ethics review committee of the Kaatsu International University, Sri Lanka, according to the letter of KIU/ERC/23/041 dated 05.05.2023. Institutional approval was received from the Principal, School of Nursing, Matara, Sri Lanka. All the participants were informed about the purpose, benefits, and risks of the study by sending the e-version of the letter of information to the participants before deciding whether to join or decline. Informed consent was taken electronically. Participants were free to join or withdraw from the study at any time, without providing any reason. The researchers of the present study assured that all participants were protected from any potential harm, including physical, social,

psychological, or other forms. Additionally, participants' personal details were kept anonymous and private throughout the study and after the research process. The researchers maintained the data security and ensured that the study was conducted ethically and accurately by representing the results without any manipulation

Results

Socio-demographic data of the participants

The demographic data related to the participants are summarized in Table 1. The sample mainly consisted of females (94.3%, n=398, N=422). The majority (76.1%) represented the age category of 25-28 years. More than half (58.8%) of nursing students from the 2019 A Batch and above one third (41.2%) of nursing students from the 2018 A batch were represented in the sample. The majority (66.8 %) had reported their perceived digital dependency as 'medium level'. A high percentage (85.1%) had also reported their perceived digital competency as 'medium level'. Nearly half (56.6%) were living permanently, 21 kilometres away from the Nursing School. About three-fourths of students (77.5%) had completed their advanced level subject stream as 'Biology'. Nearly half (54%) had completed a formal prior information technology course before attending the nursing school. The majority (94.3%) had received 'good' family support to continue their education. The most popular device used by nursing students to continue their e-learning activities was the 'smartphone' (84.6%).

Table 1: Socio-demographic data of the participants

Category	Frequency (n)	Percentage
Sex		
Male	24	5.7%
Female	398	94.3%
Age category		
18-24 years	100	23.7%
25-28 years	321	76.1%
Over 29 years	1	0.2%
Nursing batch		
2018 A	174	41.2%
2019 A	248	58.8%
Perceived digital dependency		
Low	11	2.6%
Medium	282	66.8%
High	129	30.6%
Perceived digital competency		
Low	28	6.6%
Medium	359	85.1%
High	35	8.3%
Distance from the nursing school to the permanent residence		
Within 5km	27	6.4%
6 – 20 km	156	37%
Over 21 km	239	56.6%
GCE A/L stream		
Biology	327	77.5%
Combined Maths	56	13.3%
Agriculture	39	9.2%
Completion of a prior formal information technology course		
Completed	228	54%
Not completed	194	46%
Family support received for continued education		
Good	398	94.3%
Fair	21	5.0%
Poor	3	0.7%
Used device for engage e learning activities		
Smart phone	357	84.6%
Laptop	49	11.6%
Desktop	7	1.7%
Tab	8	1.9%
Other	1	0.2%

Reliability statistics of the tool in relation to the present study sample.

Cronbach's alpha for all 28 Likert scale items of the instrument was calculated as 0.96, indicating very high internal consistency. The value was closer to 01. Pearson correlation values, obtained through calculations for all the 28 items of the instrument with the total score (rxy Value), were higher than the r table product moment of 0.09 (Significance Level 5%, N=422, df=420). Significance values obtained by Sig. (2-tailed) for all 28 items were $0.000 < 0.05$.

Mean and standard deviation of the instrument items related to students' self-perception

The mean and the standard deviation for all 28 items of the instrument were summarized in Table 2. The highest mean value was reported for question number 19 (Mean = 5.04 ± 1.06) (The technology was useful to support learning in this course). The lowest mean value was reported for question number 25 (Mean = 3.52 ± 1.78) (The way the technology was used in this course enhanced my sense of connection with other students).

The overall mean score and the standard deviation for each of the 8 constructs of the instrument were listed in Table 3. The highest overall mean value was reported for the construct of 'technology' (Mean = 4.79 ± 1.03), and the lowest overall mean value was reported for the construct of 'presence/community' (Mean = 3.87 ± 1.18).

Factors determine the student's self-perception

Independent sample t-test, One way ANOVA and the Tukey Post Hoc Test were performed to compare overall mean differences between the sub categories of the demographic and personal characteristics variables including, sex, age category, nursing batch, perceived digital dependency level, perceived digital competency level, distance from the nursing school to the permanent residence, GCE A/L stream, completion of prior formal information technology course, family support level received for continue education and the device used for engaging e-Learning activities, related to their self-perception regarding DETs in education. Results are presented in the following tables 4, 5, and 6, respectively.

Discussion

In the present study, the mean values for the 28 items of the instrument ranged from 3.52 - 5.04. Lai et al. (2022) had reported slightly higher mean values, ranging from 3.80 to 5.40, in their study, conducted by using the same English version tool in 2022. Both studies had reported overall mean value ranges above the midpoint of the Likert scale value of '3'. It indicated that the majority of the students at the School of Nursing Matara, had reported generally positive scores for each questionnaire item of the Likert scale.

When considering the individual constructs of the instrument, the students at the School of Nursing, Matara, reported the highest overall mean score for the construct of 'technology'. However, Lai et al. (2022) had reported the highest overall mean value for the construct of the 'Learning Outcomes'. There may be several factors influencing the

Table 2: Mean and standard deviation for all the instrument items

Question	Mean	Standard deviation
Learning outcomes		
Q1- The way the technology was used in this course helped me to learn more about the subject.	4.86	1.10
Q2- The way the technology was used in this course helped me to perform better in this subject	4.37	1.29
Q3- The way the technology was used in this course increased my skills in the subject area.	4.53	1.29
Q4- The way the technology was used in this course has improved my level of knowledge in the subject area.	4.76	1.15
Affective elements		
Q5- The way the technology was used in this course enhanced my attitudes towards the subject.	4.31	1.35
Q6- The way the technology was used in this course helped to improve my confidence in this subject.	4.44	1.37
Q7- The way the technology was used in this course enhanced my motivation to learn.	4.32	1.45
Q8- The way the technology was used in this course made learning more enjoyable.	4.44	1.49
Behaviour		
Q9- The way the technology was used in this course increased my participation.	4.25	1.52
Q10- The way the technology was used in this course increased my ability to reflect upon my learning.	4.77	1.35
Q11- The way the technology was used in this course enhanced my overall engagement.	4.40	1.35
Design		
Q12- The way the technology was used in this course enhanced the overall design of the subject.	4.50	1.33
Q13- The way the technology was used in this course enhanced the subject content.	4.76	1.20
Q14- The way the technology was used enhanced the course structure.	4.54	1.32
Technology		
Q15- The technology used in this course was of high quality.	4.53	1.35
Q16- The functionality of the technology used in this course helped me to learn the subject.	4.72	1.27
Q17- The technology used for learning in this course was easy to use.	4.88	1.15
Q18- The technology used for learning in this course was reliable.	4.80	1.22

Q19- The technology was useful to support learning in this course.	5.04	1.06
Teaching/Pedagogy		
Q20- The way the technology was used in this course increased my overall perceptions of the teaching quality.	4.52	1.33
Q21- The way the technology was used in this course enhanced teaching.	4.73	1.19
Q22- The way the technology was used in this course enhanced feedback processes.	4.55	1.42
Presence/Community		
Q23- The way the technology was used in this course enhanced my sense of connection with the teacher.	3.90	1.71
Q24- The way the technology was used in this course enhanced my sense of being present in the class.	4.20	1.61
Q25- The way the technology was used in this course enhanced my sense of connection with other students.	3.52	1.78
Institutional environment		
Q26- There was good technical support for the use of the technology in this course.	4.21	1.46
Q27- The institutional support provided for the use of the technology positively contributed to my learning experience.	4.43	1.28
Q28- The institution embraces the use of technology in education.	4.44	1.35

*Note: Statements in this chart were mentioned in the English Language as per the CEUTIE instrument.

Table 3: Overall mean and the standard deviation for each of the constructs

Constructs of the Instrument	Overall mean	Standard deviation
Learning outcome	4.63	1.07
Affective elements	4.38	1.19
Behavior	4.47	1.21
Design	4.60	1.17
Technology	4.79	1.03
Teaching pedagogy	4.60	1.17
Presence/Community	3.87	1.51
Institutional environment	4.36	1.18

Table 4: Independent sample t-test to compare overall mean differences of the self-perception between the personal and demographic data factors

Independent Sample T Test							
Personal and demographic data factors	Sub categories	Overall mean values	Overall mean difference	Std. error difference	Degree of freedom	t-value	Sig. (2-tailed)
When equal variances assumed							
Sex	Male (24)	4.02	-0.50	0.20	420	-2.48	0.01*
	Female (398)	4.52					
Batch	2018 A (174)	4.37	-0.21	0.10	420	-2.18	0.03*
	2019 A (248)	4.58					
Completion of a prior IT course	Yes (228)	4.56	0.15	0.09	420	1.62	0.11
	No (194)	4.41					

*Overall Mean Value Differences Were Significant (Significance Level = 0.05)

Table 5: ANOVA test to compare overall mean differences of self-perception between the personal and demographic data factors

One-Way ANOVA test							
Personal and demographic data factors	Sub categories	Overall mean values	Sum of squares	Mean square	Degree of freedom	F value	Sig. value
Between groups							
Age category	18-24 (100)	4.64	3.87	1.94	2	2.08	0.13
	25-28 (321)	4.45					
	>29 (1)	3.43					
Perceived digital dependency	Low (11)	3.92	9.48	4.74	2	5.15	0.01*
	Medium	4.43					

	High (129)	4.68						
Perceived digital competency	Low (28)	4.04	9.74	4.87	2	5.30	0.05*	
	Medium	4.49						
	High (35)	4.83						
Distance from the nursing school	Within 5km	4.60	1.27	0.63	2	0.68	0.51	
	6-20 km	4.54						
	>21 km	4.44						
Advanced Level subject stream	Biology	4.47	0.51	0.26	2	0.27	0.76	
	Com.maths	4.53						
	Agri. (39)	4.58						
Family support for continue education	Good (398)	4.52	6.89	3.45	2	3.72	0.03*	
	Fair (21)	3.98						
	Poor (3)	3.92						
Devices used for continue e learning activities	S. Phone	4.49	1.20	0.30	2	32	0.87	
	Laptop (49)	4.43						
	Desktop (7)	4.83						
	Tab (8)	4.66						
	Other (1)	4.46						

Table 6: Post Hoc Test to compare overall mean differences of self-perception and selected personal and demographic data factors

Tukey Post Hoc Test					
Personal and demographic data factors	Sub categories	Comparing categories	Mean difference	std. error	sig.
Perceived digital dependency	Low	Medium	-0.50	0.30	0.20
		High	-0.76	0.30	0.03*
	Medium	Low	0.50	0.30	0.20
		High	-0.26	0.10	0.03*
	High	Low	0.76	0.30	0.03*
		Medium	0.26	0.10	0.03*
Perceived digital competency	Low	Medium	-0.45	0.19	0.04*
		High	-0.79	0.24	0.04*

	Medium	Low	0.45	0.19	0.04*
		High	-0.34	0.17	0.12
	High	Low	0.79	0.24	0.04*
		Medium	0.34	0.17	0.12
Family support received for continue education	Good	Fair	0.55	0.22	0.03*
		Poor	0.59	0.56	0.54
	Fair	Good	-0.55	0.22	0.03*
		Poor	0.05	0.59	0.10
	Poor	Good	-0.59	0.56	0.54
		Fair	-0.05	0.59	0.10

*Overall Mean Value Differences Were Significant (Significance Level = 0.05)

perception differences in the two different study settings.

Lai et al. (2022) had reported the lowest overall mean value for the construct of the 'Presence/Community'. The present study, similarly, identified the lowest overall mean value for the construct of the 'Presence/Community'. Students and the educators commonly believed that the usage of DETs may have interfered with the interaction of the teacher and the student (Loureiro et.al., 2021). This perception may negatively influence nursing students to report lower grades for the construct of the 'Presence/Community'. Therefore, it is important to organize educational activities to enhance the active participation of the students while delivering the curriculum by using DETs.

In this study, there was a significant difference between the overall mean scores of males and females, the two student batches, perceived digital dependency levels, perceived digital competency levels, and the

family support levels received to continue the education. A similar study was conducted by Gasaymeh, et al. (2017) at the University of Jordan by using 218 university students. Gasaymeh et al. (2017) revealed that the student perception regarding DETs did not differ significantly according to gender, age, and the perceived digital dependency Levels. However, they reported that the students' perception regarding DETs were influenced by the academic year and the perceived digital competency levels. Those two factors (academic year and the perceived digital competency levels) were similarly influenced on the perception of the nursing students, regarding the DETs in Teaching, at the School of Nursing Matata.

2018-A Batch, School of Nursing, Matara had faced numerous problems while implementing DETs to continue their education, as the first experience of the Nursing School to implement such kind of activity. The exposure duration of the 2018-A Batch was higher than the 2019-A Batch for DETs. It might be the reason for reporting

significantly lower overall mean value from the students of the 2018-A batch than the 2019 A batch students.

According to the findings of the present study, there was a significant difference between the overall mean scores of perceived digital competency levels. Competent students of use digital devices could easily handle DETs, without any technical problems. There was a significant positive correlation between the technological competencies and digital competencies (Koyuncuoğlu, 2022). Therefore, the overall mean score related to the perception of DETs among the digitally competent students could be significantly higher than that of the other students.

The present study found significantly different overall mean scores for the self-perception regarding DETs across the groups related to the perceived digital dependency levels. In contrast, Gasaymeh et al. (2017) had not found perceived digital dependency to be a significant factor influencing students' perceptions regarding the use of DETs. It is possible that students who are more dependent on digital devices may acquire greater competencies in using them. Therefore, this could explain the significantly higher overall mean scores reported by the Nursing students with higher levels of digital dependency.

Gasaymeh et al. (2017) had not reported sex as a significant factor in changing the students' self-perception regarding the usage of DETs. However, the present study found a significant difference between the sex categories towards the overall mean self-

perception score on DETs. Male nursing students are generally underrepresented in the nursing schools in Sri Lanka, comprising only 5% of the total nursing students' population. Male students are also more assertive when expressing their perception. Therefore, they may have reported significantly negative mean perception scores compared to their female counterpart.

Family support is an important factor to continue successful education in any setting of the world (Roksa & Kinsley, 2019). Therefore, the Nursing students who received good family support reported significantly higher overall mean perception scores than those who received poor support at the School of Nursing, Matara.

Age, distance from the nursing school to the permanent residence, advanced level subject stream, completion of a formal prior information technology course, and the type of device used for e-learning activities did not significantly influence the overall mean differences between their subcategories.

Similarly, Gasaymeh et al. (2017) also did not find age as a significant factor influencing students' perceptions towards the use of DETs. In the present study, the age differences among the Nursing students were minimal, as they all belonged to the same age range. This might have contributed to the lack of significant variation in the results at the School of Nursing Matara, which is consistent with the findings at the University of Jordan.

Almost all the students at the School of Nursing Matara reside in Matara District and

stay at the hostel of the nursing school or nearby boarding places during weekdays. Additionally, the students had a reliable telecommunication network coverage for almost all the time. As a result, the distance from the nursing school to students' permanent residences might not have had a significant impact on the overall mean differences between the groups.

Students who passed the GCE A/L examination in the science stream were recruited to the general nursing diploma program. Most of these students had similar ranges of Z-score values. Therefore, the influence of the GCE A/L study stream on the perception of overall mean score differences was not statistically significant, as reported.

All students who were recruited to the nursing diploma program had completed a formal Information Technology module after their recruitment. Also, while implementing DETs, the students were provided adequate technological support by the institution. Consequently, the completion of the formal prior information technology course did not significantly influence the overall mean score differences between the groups.

Nursing students were familiar with the devices that they used for e-learning activities. Additionally, the institution provided adequate technological support to each student when implementing DETs. Therefore, the type of device used for E-learning activities did not cause a significant difference in the overall mean scores between groups.

This study was limited to a single setting, which could restrict the generalizability of the findings to other settings in Sri Lanka. The students at the School of Nursing, Matara, stayed in groups in their hostels or boarding places. Therefore, there was a possibility of data contamination while submitting their answers to the Google-based Likert scale.

The students at the School of Nursing Matara reported the lowest overall mean perception score for the construct of 'Presence/Community'. This indicated that the students believed the use of DETs had influenced their sense of connection with both the teacher and the class. Therefore, it is recommended to implement strategies that actively engage students in the lesson when delivering the nursing curriculum through DETs.

This study was limited to the School of Nursing Matara. Therefore, different perceptions and different determinant factors may exist in the different nursing schools in Sri Lanka. Therefore, it is recommended to conduct a wide-scale study to identify the overall perceptions of nursing students regarding DETs. This will help inform decisions before integrating blended e-learning activities into the nursing curriculum in Sri Lanka.

Conclusion

The overall perception of the nursing students at the School of Nursing, Matara, regarding the DETs used in teaching and learning was generally positive, as their ratings exceeded the midpoint of the Likert

scale value of '3'. The students had a highly positive perception regarding the construct of 'Technology', but they perceived less positively regarding the construct related to the active participation in the classes when applying DETs for teaching and learning.

Sex, student batch, perceived digital dependency levels, perceived digital competency levels and the family support levels received for continuing education were the determinants of the self-perception regarding the use of DETs of the nursing students at the School of Nursing, Matara, Sri Lanka.

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Conflict of Interest

The authors declare that they have no conflict of interest.

References

- Beaton, D. E., Bombardier, C., Guillemin, F., & Ferraz, M. B. (2000). Guidelines for the process of cross-cultural adaptation of self-report measures. *SPINE*, 3186–3191.
- Clarke, L., Flaherty, T., & Mottner, S. (2001). Student perceptions of educational technology tools. *Journal of Marketing Education*, 23(3), 169-177. doi:doi:https://doi.org/10.1177/0273475301233002
- Damascena, S., Santos, K., Lopes, G., Gontijo, P., Paiva, M., & Lima, M. (2019). Use of digital educational technologies as a teaching tool in the nursing teaching process. *Brazilian Journal of Development*, 5(12), 29925-29939. doi:10.34117/bjdv5n12-131
- Gasaymeh, A., Al-Taweel, A., & Al-Moghrabi, K. (2017). University students' perceptions of the use of digital technologies in their formal learning: A developing country perspective. *International Journal of Learning and Development*, 7(3), 149-164. doi:doi:doi:10.5296/ijld.v7i3.11666
- Hoppe, H., Joiner, R., Milrad, M., & Sharples, M. (2003). Guest editorial: Wireless and mobile technologies in education. *Journal of Computer Assisted Learning*, 19(3), 255-259. doi:https://doi.org/10.1046/j.0266-4909.2003.00027.x
- Koyuncuoğlu, D. (2022). Analysis of digital and technological competencies of university students. *International Journal of Education in Mathematics, Science and Technology*, 10(4), 971-988. doi:https://doi.org/10.46328/ijemst.2583
- Kuriplová, G., Kováčková, G., Magurová, D., Majerníková, L., & Kendrová, L. (2019). Advantages and disadvantages of e-learning in nursing teaching. *Journal of Health Systems and Policies*, 1(2), 45-55.
- Lai, J., Nobile, J., Bower, M., & Breyer, Y. (2022). Comprehensive evaluation of the use of technology in education – validation with a cohort of global open online learners. *Education and Information Technologies*, 27, 9877–9911. doi:doi:https://doi.org/10.1007/s10639-022-10986-w
- Lee, J.-K., & Lee, W.-K. (2008). The relationship of e-learner's self-

- regulatory efficacy and perception of e-learning environmental quality. *Computers in Human Behavior*, 24(1), 32-47. doi:<https://doi.org/10.1016/j.chb.2006.12.001>
- Loureiro, F., Sousa, L., & Antunes, V. (2021, October 8). Use of digital educational technologies among nursing students and teachers: An exploratory study. *Journal of Personalized Medicine*, 11, 1-13. doi:<https://doi.org/10.3390/jpm11101010>
- Lwanga, S., & Lemeshow, S. (1991). Sample size determination in health studies a practical manual.
- Nuuyoma, V., Lauliso, S., & Chihururu, L. (2023). Perspectives of nursing students on challenges of e-learning during early stages of the COVID-19 pandemic. *Curationis*, 46(1). doi:10.4102/curationis.v46i1.2358
- Rathnayake, S., Jagoda, T., Dassanayake, D., Dharmarathna, N., Herath, C., & Dharmaratne, S. (2022). The impact of COVID-19 on nursing education in Sri Lanka: A reflective analysis. *International Health Trends and Perspectives*, 2(1), 26-34.
- Roksa, J., & Kinsley, P. (2019). The role of family support in facilitating academic success of low-income students. *Research in Higher Education*, 60(1), 1-22. doi:DOI:10.1007/s11162-018-9517-z
- Sampath, P.A.U., & Warnakulasuriya, S.S.P. (2024). Cross cultural adaptation of the 'comprehensive evaluation of use of technology in education' instrument for use among the Sinhala speaking nursing students in Sri Lanka. *Sri Lankan Journal of Nursing*, 3(1), 24-34. doi:DOI: <https://doi.org/10.4038/sljn.v3i1.44>
- Yatigammana, K., & Wijayarathna, G. (2021). Students' perceptions of online lecture delivery modes: higher education during Covid-19 pandemic and beyond. *International Journal of Emerging Technologies in Learning (iJET)*, 16(21), 58-73. doi:<https://www.learntechlib.org/p/220530/>.