Volume 3, Issue 4, 2025

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

STUDENTS PERCEPTIONS & EXPECTATIONS REGARDING DIVERSE TECHNOLOGY BASED NURSING EDUCATION

Fakher Ul Nisa[*1], Mehwish Zareen[2], Rabia Hanif[3]

[*1,2,3]*University of Child Health Sciences NT*

[*1]fakhirulnisa44@gmail.com, [2]mehwishzareen324@gmail.com, [3]rabiahanif1001@gmail.com

DOI: https://doi.org/10.5281/zenodo.15656314

Keywords
ICT (Information & Communication Technology), nursing students, perceptions, expectations, technology, computer, web, training etc.

Article History
Received on 05 May 2025
Accepted on 05 June 2025
Published on 13 June 2025

Corresponding Author: *
Fakher Ul Nisa

Abstract

Introduction: *Technological innovations are changing the face of nursing education, with teachers being expected to integrate best teaching practices in the classroom and to ensure that nursing students are motivated and engaged.*

Objective: *"Students perceptions & expectations regarding diverse technology based nursing education at New Advance College of Nursing, Lahore".*

Materials & methods: *It was descriptive cross-sectional study in nature in which 150 nursing students of Post RN BSN appeared and out of which 109 meet the criterion of the research work and considered for the study. Self-administered questionnaires were used to collect the data from the participants.*

Results: *As 109 nursing students included in the study having age range 18 years to 26 years with mean age of the participants $\bar{X}$= 22.22 years old; Standard deviation= ± 2.3. In the current study 92.66% participants reported that nursing instructors must use technology to make connections to the learning material whereas 6.42% said rarely and only 0.92% disagreed with the statement.Overall, result findings showed that 67.89% nursing students having high level of expectations to use diverse technology for academic purpose and only 32.11% determined low level of expectations.*

Conclusion: *Consequently, result findings showed nursing students having good perception and high level of expectations to use diverse technology for academic purpose. Nursing students expected that basic ICT literacy is also possible with digital devices and by using multiple electronic softwares and multimedia to deliver knowledge and information among nursing students so that they may understand lectured effectively and efficiently.*

INTRODUCTION

Technological devices were portal tools that foster a sense of belonging among students by allowing them to access reference data, communicate more effectively and save time. Technology could be useful, but other considerations, such as versatility and student expectations, could affect a student's preparation and capacity to use technology in a realistic way. According to research, one's assertiveness toward technology has a strong effect on one's ability to use it (Mtshali, N. G., 2019). Modern nursing care has been described as a blend of high tech and high touch, a term that described a nurse's traditional caring and compassion combined with 21st-century health-care technology. In almost every aspect of nursing, technology such as computers and measuring equipment was used. Wireless apps

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

were used by many nurses. Nurses of today must be able to not only care for patients, but also use technology safely and appropriately in their daily work(Greenwood, B., 2019).

A paradigm shift in nursing education was needed to prepare the next generation of nurses for the technology-driven workplace (Bouchaud, Brown, and Swan, 2017). Technological innovations were changing the face of nursing education, with educators being expected to integrate best teaching practices and to ensure that the students were motivated and engaged (Thomas, Reyes, and Blumling 2014).

Taking into consideration students needs was important to establish how the technology should be used, and this should be balanced with appropriate learning styles to achieve the best outcomes (Thomas, Reyes, and Blumling 2014).A study conducted on "the effectiveness of information and communication technology in education" indicated that nursing students lack the confidence to use the technology on their arrival at university, although there was a progressive increase during the first year. The same authors argued that information and communication technology (ICT) skills development has generally been incidental, and despite it being necessary for nurses education, there was no explicit indication of nursing informatics integration into teaching (Ghavifekr and Rosdy, 2015).

It was essential for the newly enrolled nursing students to develop ICT (Information and Communication Technology) competencies to engage with the technology-mediated learning environment, and cannot be assumed to have been part of their previous educational experience (Ghavifekr and Rosdy 2015).The benefits brought by technology make it an ideal tool to prepare the future generation of nurses (Rahman, 2015).

A technology-mediated learning environment, particularly online education, was cost-effective, flexible, and allows access to multiple resources beyond the classroom settings, this being important in nursing education owing to the clinical placements of the students (Harerimana et al., 2016).Technology was reported to facilitate student-centred learning approaches, and to enhance their attention and motivation (Owusu-Agyeman and Larbi-Siaw, 2018). Furthermore, it facilitated teaching beyond the classroom, without being restricted by time and location, promoting self-directed, inquiry-based, collaborative, and lifelong learning, critical thinking, and integrating theory into practice, which were essential to the nursing profession (Harerimana and Mtshali 2017).In the education of healthcare professionals, technology was used to deliver instructions to students and to ensure that there were timely collaboration and communication among and between them, as well as with their educators (Tuominen, Stolt, and Salminen 2014).A study found that nursing students used several aspects of technology, such as emails, to access online course materials or syllabus, assignments, tests and quizzes, announcements, podcasts, and forum discussions (Borboa et al., 2017).

Another study revealed that nursing students perceived that technology could improve their performance, facilitate learning, increase access to resources, and improve communication. (Williamson and Muckle, 2018).Nurse educators should provide learning activities that encourage collaboration and self-directed learning, and were expected to help students to use mobile devices, such as laptops, tablets and smartphones, for communication, academic work, and to access electronic resources. This was essential to make students more independent and to prevent them from relying only on the on- campus ICT (Information and Communication Technology) capabilities (Lee et al. 2018).

In the United States of America (USA), technology was widely used in schools to foster global competitiveness, and was used in line with innovative teaching strategies (McKnight et al., 2016).In Australia, Canada and Denmark, the technology has been integrated into nursing education, with an emphasis on including informatics competencies in the curriculum (Cummings, Borycki, and Madsen 2015).

The literature indicated that Denmark has successfully integrated technology in the undergraduate curriculum, while it was still in the early stages in Australia and Canada (Chauvette and Paul 2016).In Africa, many countries introduced technology in higher education, although it was still in embryonic stages in nursing education. In Malawi, the Mzuzu University was consulting with the Nurses

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

and Midwifery Council of Malawi to integrate the technology into the undergraduate and postgraduate nursing curriculum (O'Connor et al., 2016).

In Rwanda, e-learning was introduced into nursing education in 2012, with the aim of using innovative technologies to widen access to nursing education for the working nurses, upgrade the level of nurses and midwives, and fast-track the development of competent nurses and midwives to respond to the country's health needs (Harerimana and Mtshali, 2017).While the impact of technology in the education of healthcare professionals was recognized, the literature revealed that efforts have been placed on training physicians, with limited emphasis on dentistry, pharmacy and nursing training (Frehywot et al., 2013).

In South Africa, the lack of proper integration of technology in nursing education has resulted in nursing institutions lagging behind other higher education programmes(Maharaj 2015).A study conducted on the use of technology by academic staff in South African nursing institutions found that there were limited ICT skills among the faculty and that the majority of staff could manage only a few applications. The same authors indicated that the majority of the nurse educators (60%) did not use technology to teach students, with some using videos, simulations and Power Point presentations (Puckree, Maharaj, and Mshunquane, 2015).

One of the critical challenges in integrating technology, particularly nursing informatics in undergraduate education, was ensuring that nurse educators have the necessary skills and confidence to use the technology for teaching and learning purposes. It was observed that although nurse educators were prepared to use the technology as part of their instruction, they were not equally distributed across the nursing programmes(Cummings et al., 2016).

Developing the competencies of nursing faculty and students, together with integrating key ICT (Information and Communication Technology) competencies in the nursing curriculum should be a priority in many developing countries, as technology-based teaching and learning was being increasingly used to accommodate innovative teaching approaches (Bvumbwe and Mtshali, 2018).

In a technology-mediated learning environment, teachers played essential roles in promoting its use in classrooms (McKnight et al., 2016).Nurse educators were the drivers of the successful integration of ICT in programmes, and need to ensure that nursing students have the necessary skills and were motivated to learn in a technology-driven context (Ndawo, 2016).While the use of technology in teaching brought promises to nursing education, several challenges have been reported to hinder its effective implementation, including poor internet speed, inadequate ICT literacy, and a lack of motivation from the students and faculty (Bello et al., 2017).

Furthermore, there was a lack of ICT support and specialized training to use technology for many faculties and students, which was an obstacle to teaching and learning in higher education (Ghavifekr et al., 2016).Nursing students expected teachers to be at the forefront of technological innovations that engaged them in learning and prepared them for their future career (Hallila et al., 2014).

In educating healthcare professionals, it was important to ensure that nursing students and faculties have the necessary ICT (Information and Communication Technology) skills, and were motivated to use the cutting-edge technologies (Ludwig, Nagel, and Lewis 2017).Teaching institutions should ensure that nursing students and the faculty received adequate training and mentorship in online teaching and learning, with special attention to use Moodle (Modular Object Oriented Dynamic Learning), emails, social media, reference materials, and word processing applications, which were essential in the technology-driven learning environment (Ainsley and Brown, 2009). In view of the above, current study carried out at Sheikh Fatima College of Nursing & Health Allied Sciences, Lahore.

1.1. Objectives

The objective of the current research work as follows:

- ⊙ To assess nursing students perceptions regarding the use of technology by nurse educators.
- ⊙ To identify nursing students expectations regarding the use of technology by nurse educators.

1.2. Research questions

1. What were the nursing students perceptions regarding the use of technology by nurse educators?

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

2. What were the nursing students expectations regarding the use of technology by nurse educators?

1.3. Hypothesis

Null Hypothesis (H_0): There was no statistical significant relationship between demographic data and nursing students perceptions and expectations regarding the use of diverse technology based nursing education.

Alternative Hypothesis (H_A): There was statistical significant relationship between demographic data and nursing students perceptions and expectations regarding the use of diverse technology based nursing education.

1.4. Definition of key terms

⊙ **Perception**

It is the ability to see, hear or become aware of something through senses. The way in which something is regarded, understood or interpreted.

⊙ **Expectations**

It is the act of state of expecting. A strong belief that something will happen or be the case.

⊙ **Technology based nursing education**

It is the integration of instructional technology into the learning environment of nursing colleges and schools.

REVIEW OF LITERATURE

Nursing, the nursing profession, and, of course, nursing education were all impacted by the growth and progress of technology in health care. Nurses played a critical role in incorporating, integrating, and using technology in clinical practices, such as identifying and acting on the effects of patient-related devices and surveillance equipment, as well as the efficient use of electronic health records **(Barnard, 2017)**.

(Alexis Harerimana, Ntombifikile, Gloria Mtshali, 2019) administered a study to explore nursing students perceptions and expectations regarding the use of technology in nursing education. A descriptive quantitative research design was used, and the study was conducted at a selected university in South Africa in which 150 nursing students appeared. The nursing students reported that educators used technology to deliver course instructions (96.7%), and encouraged students to use it for creative or critical thinking tasks (95.3%). They were encouraged by their educators to use their own technology devices (94.7%) and online platforms (94.7%). More undergraduate students perceived that nurse educators used technology at school. Overall, 77.3 per cent of the nursing students expected the use of technology in teaching. The majority of the students (82.1%) from the lower academic levels (first year) had a high expectation of the use of technology. In conclusion, the use of technology in teaching required nurse educators to have adequate skills to make it a powerful tool for teaching and learning. Much more effort should be put in motivating students to use various technological tools, and ensuring that they have adequate skills, particularly at the entry level.

(K. Williamson, Janelle Muckle, 2017) carried out a study in which 375 nursing students appeared and found that almost (99.7%) students owned smartphone and 95% were reasonably comfortable using various technologies. In conclusion, selecting and incorporating technologies tools to successfully support learning among nursing students that was essential to overcome challenges and support the innovative delivery of content and use of technology by students.

(Salyers, 2007) Determined that nursing students had a low level of satisfaction with web-based psychomotor skills training due to problems with the technology, software and hardware.

(Blake, 2010) Reported the obstacles faced by nursing students to web-based learning methods as being 'insufficient computer facilities, problems in online connections and technical problems'.

(Childs, Blenkinsopp, Hall and Walton, 2005) Conducted a systematic review regarding technology obstacles faced by nursing students and revealed that poorly designed training packets and insufficient technology were determined to be the main barriers in electronic learning.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

(Leski's, 2009) Showed that the majority of the nursing students assessed web and computer-based training as positive since it provided new, integrated information and a different point of view, but as also having negative aspects since there was a lack of practical experience.

(Baxter et al., 2009) Performed a study on perception of nursing students regarding technology and found that all the nursing students thought that the simulation was not sufficient in terms of clinical application.

(Hart, 2012) Depicted in the study that the use of the internet can be a double-edged sword. The web can offer opportunities to engage students in a dynamic learning experience, but it can also present challenges in the appropriate use of the technology.

In view of the above literature, it can be determined that the majority of the students from the lower academic levels (first year) had a high expectation of the use of technology. Some researchers reported that nursing students were reasonably comfortable using various technologies whereas some said that nursing students had a low level of satisfaction with web-based psychomotor skills training due to problems with the technology, software and hardware. It is also revealed that poorly designed training packets and insufficient technology were to be the main barriers in electronic learning. In conclusion, the use of technology in teaching required nurse educators to have adequate skills to make it a powerful tool for teaching and learning. Much more effort should be put in motivating students to use various technological tools, and ensuring that they have adequate skills, particularly at the entry level.

METHODOLOGY

3.1. Study design:

The study was descriptive (Quantitative) in nature and cross-sectional study design (observational design) was adopted because the data was collected from many different individuals at a single point.

3.2. Study setting:

The study was conducted at Sheikh Fatima College of Nursing & Allied Health Science, Lahore.

3.3. Duration of study:

The study completed in 6 weeks (from 15-04-2022 to 31-05-2022).

3.4. Study Population:

Nursing students of Sheikh Fatima College of Nursing & Allied Health Science, Lahore.

3.5. Sample size & sampling

In the population of 150nursing students, following sample was drawn for the study by using listed below formulae:

N= Population = 150; n= Sample Size; E= Margin error = 0.05

$$n = \frac{N}{1 + N(E)^2}$$

$$n = \frac{150}{1 + 150(0.05)^2}$$

$$n = \frac{150}{1 + 150(0.0025)}$$

$$n = \frac{150}{1 + 0.375}$$

$$n = \frac{150}{1.375}$$

$$n = 109.09$$

Thus a more suitable sample of n= 109 considered for the study.

3.6. Sampling Technique:

Convenient sampling technique.

3.7. Eligibility Criteria:

Inclusion Criteria:

- Nursing students age range 18-26 years old included in the study.
- Only nursing students of Post RN BSN included in the study.

Exclusion Criteria:

- Nursing students less than 18 years old age excluded from the study.
- Nursing students other than Post RN BSN programme excluded from the study.

3.8. Data collection method

Self-administered questionnaire were used to collect the data from the study participants.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

3.9. Ethical consideration

This study was approved by the ethical review committee of the institution and performed in accordance with the principles of Committee. To ensure their voluntary participation, inform consent was obtained from all the participants. All participants had autonomy to withdraw their consent at any time during the stipulated period of the study.

3.10. Data Analysis

The descriptive data statistically investigated using SPSS (Statistical Package for Social Sciences) version 20. Results inferred through frequencies and percentages to check the accuracy of data. Data was represented in graphs, tables and MS excel used to check the accuracy of data.

RESULTS:

Preparing the future generation of nurses for the technology-driven working environment requires a paradigm shift in their training (Bouchaud, Brown, and Swan 2017). Nurse educators need to engage the students and empower them to use technology for learning purposes (McKnight et al., 2016); taking into consideration their needs and expectations is important. However, this should be balanced with adequate learning styles to achieve the best learning outcomes (Thomas, Reyes, and Blumling 2014). Current study undertaken at Sheikh Fatima College of Nursing & Allied Health Science, Lahore in which 150 nursing students of Post RN BSN appeared and only 109 included in the study whereas rest of the participants excluded from the study because they didn't meet the eligibility criteria of the research work. Total 109 participants appeared in the study having age range 18 years to 26 years and 21.10% from the age group of (18-20) years; 50.46% belonged to the age group of (21-23) years and remaining 28.44% having age group (24-26) years old with mean age of the participants $\bar{X}$= 22.22 years old; Standard deviation= ± 2.3as depicted in the (Table no. 4.1. & figure no. 4.1.).

In the quantity of 109 participants only 4.59% married and 95.41% married nursing students included in the current research work. There were 59.63% students were from 1st year and 40.37% from 2nd year reported in the study as indicated in the (Table no. 4.1.& figure no. 4.2.).

Table 4.1. Demographic data of the participants

Variables	Frequency	Percentage (%age)
Age		
18-20 years	23	21.10
21-23 years	55	50.46
24-26 years	31	28.44
Total	**109**	**100.00**
Mean = $\bar{X}$ = 22.22 years; standard deviation = ± 2.3		
Marital status		
Married	5	4.59
Unmarried	104	95.41
Total	**109**	**100.00**
Program of the study		
Post RN BSN	109	100.00
Level of the study		
1st year	65	59.63
2nd year	44	40.37

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Total	**109**	**100.00**
Religion		
Muslim	106	97.25
Non-muslim	3	2.75
Total	**109**	**100.00**

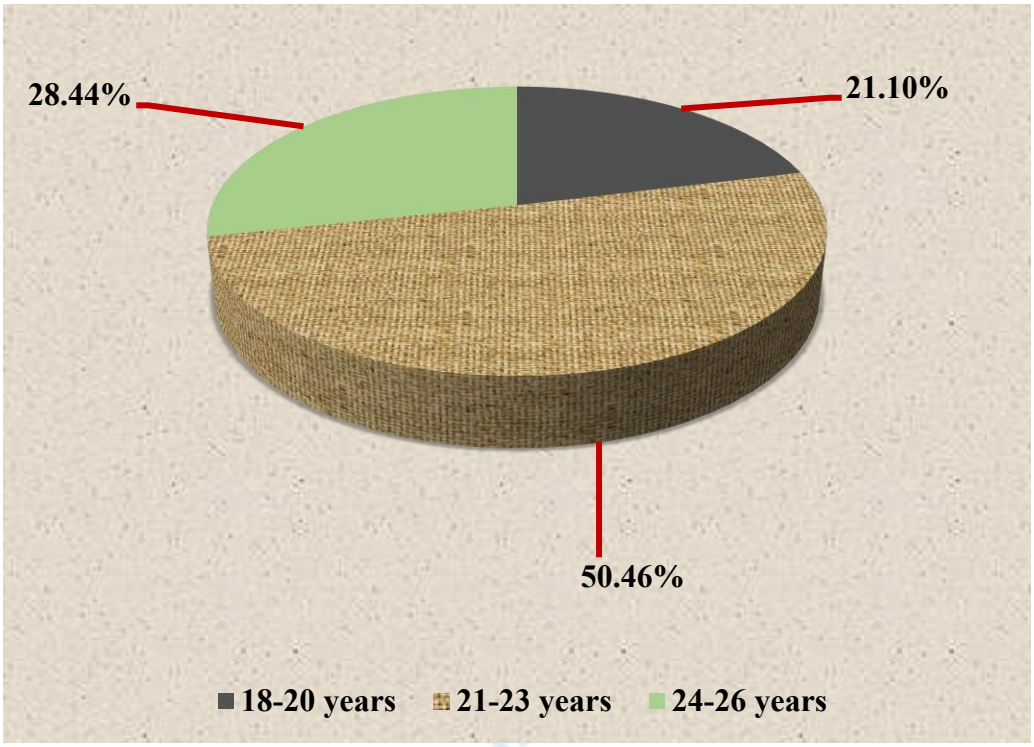

Figure 4.1. Age of the participants

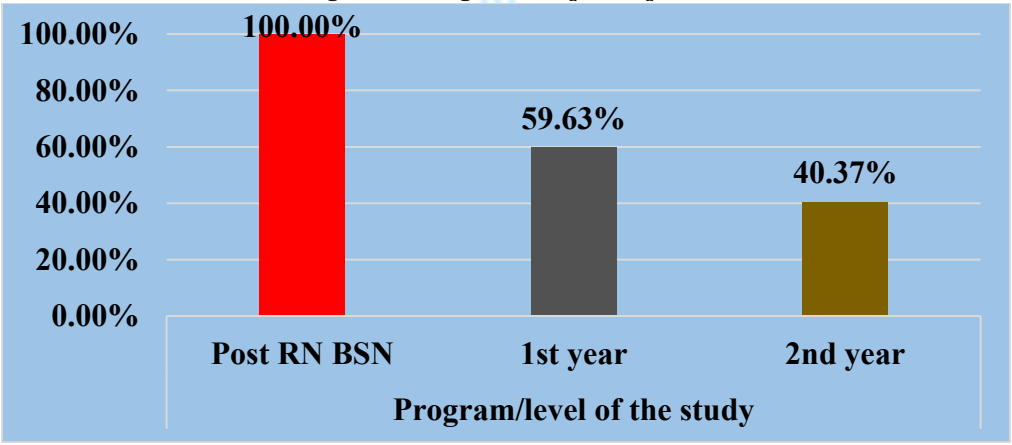

Figure 4.2.Program/level of the study of the participants

As there were 109 nursing students appeared in the study and regarding the perception of diverse technology 68.81% reported that nursing educator must use technology to deliver course instructions whereas 22.94% participants responded that some of the instructors use technology to deliver instructions and only 8.26% passed negative remarks.84.40% respondents said that technology can be used to

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

maintain student's attention in the class room while others were slightly agree/disagree. In the current study 92.66% participants reported that nursing instructors must use technology to make connections to the learning material whereas 6.42% said rarely and only 0.92% disagreed with the statement as depicted in the (Table no. 4.2.).

Regarding the encouragement of educators to use technology 78.90% respondents replied that nursing educators encourage students to use their own technology devices to deepen their learning whereas 87.16% said that nursing students must use online platforms to communicate with themselves or other students in/outside the college/school and 91.74% reported that nursing students use technology for creative or critical thinking tasks as shown in the (Table no. 4.2.)

Table 4.2.Nurse's perceptions regarding diverse technology based nursing education

Questions	Responses	Frequency (f)	Percentage (%age)
Nursing educators use technology to			
Deliver course instructions	None	9	8.26
	Very few	11	10.09
	Some	14	12.84
	Most	13	11.93
	Almost all	21	19.27
	All	41	37.61
Total		**109**	**100.00**
Maintain students attention	None	3	2.75
	Very few	5	4.59
	Some	9	8.26
	Most	14	12.84
	Almost all	41	37.61
	All	37	33.94
Total		**109**	**100.00**
Make connections to the learning material audio or video	None	1	0.92
	Very few	2	1.83
	Some	5	4.59
	Most	11	10.09
	Almost all	65	59.63
	All	25	22.94
Total		**109**	**100.00**
Nursing educators encourage students to			
Use their own technology devices to deepen their learning	None	1	0.92
	Very few	1	0.92
	Some	21	19.27
	Most	39	35.78
	Almost all	21	19.27
	All	26	23.85
Total		**109**	**100.00**
Use online platforms to communicate with themselves or other students in/outside the school	None	3	2.75
	Very few	4	3.67
	Some	7	6.42

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

	Most	19	17.43
	Almost all	23	21.10
	All	53	48.62
Total		**109**	**100.00**
Use technology for creative or critical thinking tasks	None	1	0.92
	Very few	2	1.83
	Some	6	5.50
	Most	16	14.68
	Almost all	23	21.10
	All	61	55.96
Total		**109**	**100.00**

In the population of 150 nursing students only 109 included in the study and participants suggested the areas in which they expect educators should use technology for academic purpose. 88.07% participants expected that technology must be used in learning management system and only 2.75% replied never as indicated in the (Table no. 4.3.).

94.50% nursing students expected that we should use technology to detect plagiarism in academic purpose while 75.23% responded Podcasts and video casts can be used to record lectures or later use. 92.66% respondents reported that social media also can be used as a teaching and learning tool as well as 51.38% suggested that technology also can be used for simulation and educational games to enhance the knowledge among students as shown in the (Table no. 4.3.).

In the sample of 109 participants 79.82% expected technology can be used in academic purpose to communicate and collaborate whereas 97.25% suggested educators can also publish electronic resources e.g., quizzes, assignments, homework and practical problems via technology.

92.66% nursing students expected that basic ICT literacy is also possible with digital devices and 89.91% reported that we can also use multiple electronic softwares and multimedia to deliver knowledge and information among nursing students so that they may understand lectured effectively and efficiently as mention in the (Table no. 4.3.). Overall, result findings showed that 67.89% nursing students having high level of expectations to use diverse technology for academic purpose and only 32.11% determined low level of expectations as shown in the figure no. 4.3.

Table 4.3.Nurse's expectations regarding diverse technology based nursing education

Questions	Responses	Frequency (f)	Percentage (%age)
Areas in which nursing students expect educators to use technology for academic purpose			
Learning management system	Never	3	2.75
	Rarely	4	3.67
	Occasionally	6	5.50
	Frequently	45	41.28
	Very frequently	51	46.79
Total		**109**	**100.00**
Reference management software such as Endnote	Never	2	1.83
	Rarely	6	5.50
	Occasionally	9	8.26
	Frequently	54	49.54

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

	Very frequently	38	34.86
Total		**109**	**100.00**
Turnitin to detect plagiarism	Never	1	0.92
	Rarely	3	2.75
	Occasionally	2	1.83
	Frequently	34	31.19
	Very frequently	69	63.30
Total		**109**	**100.00**
Podcasts and videocasts (record lectures for later use or review)	Never	4	3.67
	Rarely	11	10.09
	Occasionally	12	11.01
	Frequently	21	19.27
	Very frequently	61	55.96
Total		**109**	**100.00**
Social media as a teaching and learning tool	Never	1	0.92
	Rarely	2	1.83
	Occasionally	5	4.59
	Frequently	78	71.56
	Very frequently	23	21.10
Total		**109**	**100.00**
Simulations or educational games	Never	11	10.09
	Rarely	19	17.43
	Occasionally	23	21.10
	Frequently	33	30.28
	Very frequently	23	21.10
Total		**109**	**100.00**
Free, web-based content to supplement course-related materials	Never	1	0.92
	Rarely	1	0.92
	Occasionally	5	4.59
	Frequently	79	72.48
	Very frequently	23	21.10
Total		**109**	**100.00**
Online tools to communicate or collaborate	Never	4	3.67
	Rarely	10	9.17
	Occasionally	8	7.34
	Frequently	18	16.51
	Very frequently	69	63.30
Total		**109**	**100.00**
Search tools to find references or other information online for class work	Never	4	3.67
	Rarely	6	5.50
	Occasionally	16	14.68
	Frequently	54	49.54

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

	Very frequently	29	26.61
Total		**109**	**100.00**
Published electronic resources (e.g. quizzes, assignments, homework, practical problems)	Never	1	0.92
	Rarely	1	0.92
	Occasionally	1	0.92
	Frequently	96	88.07
	Very frequently	10	9.17
Total		**109**	**100.00**
Early-alert systems designed to catch potential academic trouble timeously	Never	3	2.75
	Rarely	6	5.50
	Occasionally	9	8.26
	Frequently	23	21.10
	Very frequently	68	62.39
Total		**109**	**100.00**
Software to create videos or multimedia resources	Never	1	0.92
	Rarely	1	0.92
	Occasionally	9	8.26
	Frequently	79	72.48
	Very frequently	19	17.43
Total		**109**	**100.00**
Basic ICT literacy with digital devices	Never	1	0.92
	Rarely	2	1.83
	Occasionally	5	4.59
	Frequently	11	10.09
	Very frequently	90	82.57
Total		**109**	**100.00**

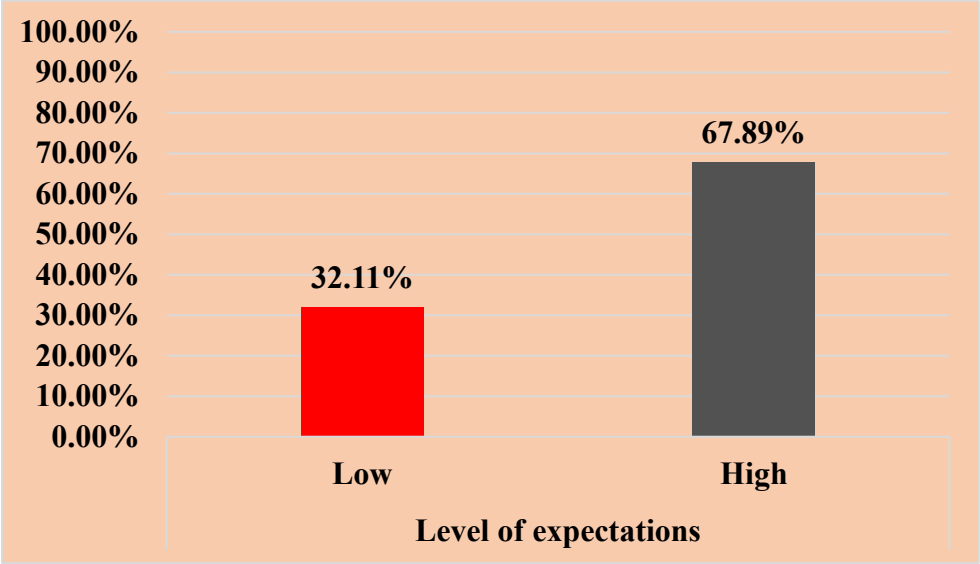

Figure 4.3.Level of expectation regarding diverse technology based nursing education

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

There were 109 participants appeared in the study & to check the association between demographic data and expectations of the nursing students chi-square test was performed. Significance level between variables set as ($p<0.05$) as mentioned in the (Table no. 4.4.). Age, marital status and level of the study had direct association with the expectations of nursing students regarding diverse technology in nursing education. 1st year students having higher expectations as compared to 2nd year students depicted chi-square testvalue=X^2=0.999; p-value= 0.000 ($p<0.05$). As well as unmarried students reported higher expectations as compared to married ones as indicated in the (Table no. 4.4.).

Table 4.4. Association of demographic data with expectations of the nursing students regarding diverse technology based nursing education

Variables	Nursing students expectations regarding diverse technology	
	Low	High
Age		
18-20 years	12	11
21-23 years	15	40
24-26 years	8	23
Total	**109**	
X^2= 1.000; p-value= 0.000		
Marital status		
Married	3	2
Unmarried	4	100
Total	**109**	
X^2= 1.000; p-value= 0.000		
Level of the study		
1st year	10	55
2nd year	31	13
Total	**109**	
X^2= 0.999; p-value= 0.000		

***Significant p<0.05**

5.1. DISCUSSION

In the current research work total 109 participants appeared in the study having age range 18 years to 26 years and 21.10% from the age group of (18-20) years; 50.46% belonged to the age group of (21-23) years and remaining 28.44% having age group (24-26) years old with mean age of the participants $\bar{X}$= 22.22 years old; Standard deviation= ± 2.3as depicted in the (Table no. 4.1. & figure no. 4.1.).

Our study is similar to the findings of (Alexis Harerimana, Ntombifikile, Gloria Mtshali, 2019) administered a study to explore nursing students perceptions and expectations regarding the use of technology in nursing education. A descriptive quantitative research design was used, and the study was conducted at a selected university in South Africa in which 150 nursing students appeared.The majority of the students from the lower academic levels (first year) had a high expectation of the use of technology. In our study, it is cleared that students from lower academic levels having higher expectations than senior ones.

Our current result findings dissimilar to the findings of (Baxter et al., 2009)whoperformed a study on perception of nursing students regarding technology and found that all the nursing students thought that the simulation was not sufficient in terms of clinical application.Because in our study 51.38% expected that educators must use simulation and educational games to enhance the capabilities of nursing students

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

but didn't determine that simulation wasn't sufficient from clinical perspectives.

We agreed with the findings of (Childs, Blenkinsopp, Hall and Walton, 2005)whoconducted a systematic review regarding technology obstacles faced by nursing students and revealed that poorly designed training packets and insufficient technology were determined to be the main barriers in electronic learning but our study didn't show any barriers faced by students during electronic learning.

Here we disagreed with the findings of (Blake, 2010) who reported the obstacles faced by nursing students to web-based learning methods as being 'insufficient computer facilities, problems in online connections and technical problems'. As well as no doubt, our academic system face lack of resources but its not a major problems, if we have capacities to manage with minimum and scarce resources then we can proceed with lack of resources not only in academic life but also in our practical lives. Scarce resources doesn't matter, here human capital and personal motivation also play an integral role to be equipped with the technology learning. When we talk about the learning of the students then insufficient computers, interrupted internet connections aren't big issues. We believe that if a person having aptitude of learning then he/she can learn with insufficient resources. From management point of view, a good manager cope up with the scarce resources, here we need to enhance the nursing educator's management skills so that they further deliver them.

Here we agreed with the findings of (Childs, Blenkinsopp, Hall and Walton, 2005)who conducted a systematic review regarding technology obstacles faced by nursing students and revealed that poorly designed training packets and insufficient technology were determined to be the main barriers in electronic learning.But here we would like to say that it was the instructors/trainers duty to check the training material and technology before delivering them. On the other side, might be nursing trainer having insufficient knowledge and practical experience regarding technology. Here, it is really imperative for the nursing educators to upgrade their own computer and other technology skills, accordingly. We verified the research work of (McKnight et al., 2016)who showed in a technology-mediated learning environment, teachers played essential roles in promoting its use in classrooms. Not only teachers but also aptitude of nursing students is also mandatory to learn anything because if a student doesn't want to learn then how teachers can equip him/her with the academic materials.

As study conducted by (Puckree, Maharaj, and Mshunquane, 2015) found that there were limited ICT skills among the faculty and that the majority of staff could manage only a few applications. The same authors indicated that the majority of the nurse educators (60%) did not use technology to teach students, with some using videos, simulations and Power Point presentations. From this study, researcher showed that only educators can improve the technology skills of nursing students but it is impossible that all the nursing educators having insufficient computer skills then still students having no knowledge about technology. Here we would like to say that thorough mutual efforts (Nursing educators & students) nursing students can be equipped with the right use of technology.

In our result findings students having good perception and high level of expectations regarding diverse technology based nursing education. But perceptions and expectations aren't enough to be better equipped with the technology. Here's need to the right use of gadgets, smartphones, tablets, internet and other devices.

In another case we recommended and verified the findings (Lee et al. 2018)as they showed that nurse educators should provide learning activities that encourage collaboration and self-directed learning, and were expected to help students to use mobile devices, such as laptops, tablets and smartphones, for communication, academic work, and to access electronic resources. This was essential to make students more independent and to prevent them from relying only on the on- campus ICT (Information and Communication Technology) capabilities. Only technology is sufficient from learning perspectives of medical students, never, practical experience and practice improve their clinical expertise. As technology having some pros and cons too. At some situations, there would be some errors incurred in the technology and how we re-compensate it during the care of patients. Here, we disclose by saying that although technology is important in such globalization across the world but we can't completely

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

rely on it. We learn the students through our learning experiences so that they may overcome any obstacles during their professional period.

5.2. CONCLUSION

Consequently, result findings showed nursing students having good perception and high level of expectations to use diverse technology for academic purpose. Nursing students expected that basic ICT literacy is also possible with digital devices and by using multiple electronic softwares and multimedia to deliver knowledge and information among nursing students so that they may understand lectured effectively and efficiently.

5.3. Recommendations

♦ Nursing instructors should us computer-based training to deliver right knowledge among nursing students.

♦ Provide students written material too consisted on technology to upgrade their computer skills

♦ Always start with the basic skills of the computer to learn students effectively and efficiently.

♦ Provide them opportunities for practice because in medical field practical expertise are more imperative than technology because at some conditions an error can be occurred in the technology. So there must be some substitute of it, through practice and practical experience they can work in such situations.

REFERENCES

1. Alexis Harerimana, Ntombifikile, Gloria Mtshali (2019). Nursing Students' Perceptions and Expectations Africa Journal of Nursing and Midwifery Regarding the Use of Technology in Nursing Education; Volume 21; No. 2.
2. K. Williamson, Janelle Muckle, (2017). Student's perception of technology use in nursing education.
3. Salyers, V.L. (2007). Teaching psychomotor skills to beginning nursing students using a web enhanced approach: a quasi-experimental study. International Journal of Nursing Education Scholarship, 4(1).
4. Blake, H. (2010). Computer-based learning objects in healthcare: the student experience. International Journal of Nursing Education Scholarship, 7(1):Article 16.
5. Childs, S., Blenkinsopp, E., Hall, A., Walton, G. (2005). Effective e-learning for health professionals and students barriers and their solutions. A systematic review of the literature-findings from the HeXL project. Health Information and Libraries Journal, 22(Suppl.2), 20–32.
6. Leski, J. (2009). Nursing student and faculty perceptions of computer-based instruction at a 2-year college. Journal of Nursing Education, 48(2), 91-95.
7. Baxter, P., Akhtar-Danesh, N., Valaitis, R., Stanyon, W., Sproul, S. (2009). Simulated experiences: Nursing students share their perspectives. Nurse Education Today, 29(8), 859–866.
8. Hart, C. (2012). Technology and Nursing Education: An Online Toolkit for Educators, The Journal of Continuing Education in Nursing, 43(9), 393-394.
9. Bouchaud, M., Brown, D., & Swan, B. A. (2017). Creating a new education paradigm to prepare nurses for the 21st Century.
10. Thomas, T. L., I. Reyes, and A. Blumling. (2014). "Technology and Teaching: Avoiding the Pitfalls, Increasing Student Engagement, and Improving Outcomes." Journal of Nursing Education and Practice 5 (3): 33–35. https://doi.org/10.5430/jnep.v5n3p33.
11. Ghavifekr, S., and W. A. W. Rosdy. (2015). "Teaching and Learning with Technology: Effectiveness of ICT Integration in Schools." International Journal of Research in Education and Science 1 (2): 175–91.
12. Rahman, A. A. (2015). "Development of a Nursing Informatics Competency Assessment Tool (NICAT)." PhD thesis, Walden University.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

13. Harerimana, A., N. G. Mtshali, H. Ewing, F. Maniriho, E. Kyamusoke, A. Mukankaka, D. Mukamana, and J. Mugarura. (2016). "E-Learning in Nursing Education in Rwanda: Benefits and Challenges. An Exploration of Participants' Perceptives." IOSR Journal of Nursing and Health Science 5 (2): 64–92.
14. Owusu-Agyeman, Y., and O. Larbi-Siaw. (2018). "Exploring the Factors that Enhance Student- Content Interaction in a Technology-Mediated Learning Environment." Cogent Education 5 (1): 1–21. https://doi.org/10.1080/2331186X.2018.1456780.
15. Tuominen, R., M. Stolt, and L. Salminen. (2014). "Social Media in Nursing Education: The View of the Students." Education Research International 2014:1–6.
16. Williamson, K. M., and J. Muckle. (2018). "Students' Perception of Technology Use in Nursing Education." Computers, Informatics, Nursing 36 (2): 70–76.
17. McKnight, K., K. O'Malley, R. Ruzic, M. K. Horsley, J. J. Franey, and K. Bassett. (2016). "Teaching in a Digital Age: How Educators Use Technology to Improve Student Learning." Journal of Research on Technology in Education 48 (3): 194–211.
18. Cummings, E., E. M. Borycki, and I. Madsen. (2015). "Teaching Nursing Informatics in Australia, Canada and Denmark." Studies in Health Technology and Informatics 218:39–44.
19. Chauvette, A., and P. Paul. (2016). "History of Nursing Informatics in Canada." Canadian Journal of Nursing Informatics 11 (4).
20. O'Connor, S., J. Gallagher, N. Wamba, C. Moyo, G. B. Chirambo, and J. O'Donoghue. (2016).
21. "Establishing Long-Term Nursing Informatics Capacity in Malawi, Africa." Studies in Health Technology and Informatics 225:1013–4.
22. Frehywot, S., Y. Vovides, Z. Talib, N. Mikhail, H. Ross, H. Wohltjen, S. Bedada, K. Korhumel, A. K. Koumare, and J. Scott. (2013). "E-Learning in Medical Education in Resource Constrained Low- and Middle-Income Countries." Human Resources for Health 11 (4): 1–15.
23. Maharaj, S. (2015). "The Status of Usage of Information Technology Systems within Campuses of the KwaZulu-Natal College of Nursing." Master's dissertation, Durban University of Technology.
24. Puckree, T., S. Maharaj, and N. Mshunquane. (2015). "Status of Usage of Information Communications Technology by Academic Staff at a Selected Nursing Training Institution in South Africa." International Journal of Educational Sciences 8 (3): 511–9.
25. Bvumbwe, T., and N. Mtshali. (2018). "Nursing Education Challenges and Solutions in Sub Saharan Africa: An Integrative Review." BMC Nursing 17 (3): 1–11.
26. Ndawo, M. G. (2016). "Lived Experiences of Nurse Educators on Teaching in a Large Class at aNursing College in Gauteng." Curationis 39 (1): 1–9.
27. Bello, U. L., L. Hassan, U. Yunusa, I. Abdulrashid, R. H. Usman, and K. N. Nasidi. (2017). "Challenges of Information and Communication Technology Utilization among Undergraduate Community Health Nursing Students in Tanta University, Egypt." American Journal of Nursing 6 (3): 274–9.
28. Ludwig, P. M., J. K. Nagel, and E. J. Lewis. (2017). "Student Learning Outcomes from a Pilot Medical Innovations Course with Nursing, Engineering, and Biology Undergraduate Students." International Journal of STEM Education 4 (33): 1–14.
29. Vargo-Warran, J. (2016). "A Quantitative Study of Nursing Faculty's Personal and ProfessionalUse of Technology." 2 (2): 1–8.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

30. Ainsley, B., and A. Brown. (2009). "The Impact of Informatics on Nursing Education: A Review of the Literature." Journal of Continuing Education in Nursing 40 (5): 228–32.

31. Borboa, D., M. Joseph, D. Spake, and A. Yazdanparast. (2017). "Perceptions and Use of Learning Management System Tools and other Technologies in Higher Education: A Preliminary Analysis." Journal of Learning in Higher Education 10 (2): 17–23.

ANNEXURE-I

STUDENTS PERCEPTIONS & EXPECTATAIONS REGARDING DIVERSE TECHNOLOGY BASED NURSING EDUCATION

QUESTIONNAIRE

DEMOGRAPHIC DATA OF THE PARTICIPANTS

Direction: Encircle (O) or tick (✓) the most appropriate responses

Age	☐ 18-20 years ☐ 21-23 years ☐ 24-26 years
Marital status	☐Married ☐ Unmarried
Level of the study	☐1st year ☐2nd year
Programme of the study	☐Post RN BSN
Religion	☐Muslim ☐Non-muslim

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

ANNEXURE-II

QUESTIONNAIRE

Nursing students perceptionsregarding diverse technology based nursing education

Sr. No.	Questions	Responses					
		None	Very few	Some	Most	Almost all	All
Nursing educators use technology to							
1	Deliver course instructions						
2	Maintain students attention						
3	Make connections to the learning material audio or video						
Nursing educators encourage students to							
4	Use their own technology devices to deepen their learning						
5	Use online platforms to communicate with themselves or other students in/outside the school						
6	Use technology for creative or critical thinking tasks						

ANNEXURE-III

QUESTIONNAIRE

Areas in which nursing students expect educators to use technology for academic purpose

Sr. No.	Questions	Responses				
		Never	Rarely	Occasionally	Frequently	Very frequently
1	Learning management system					
2	Reference management software such as Endnote					
3	Turnitin to detect plagiarism					
4	Podcasts and videocasts (record lectures for later use or review)					
5	Social media as a teaching and learning tool					
6	Simulations or educational games					
7	Free, web-based content to supplement course-related materials					

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

8	Online tools to communicate or collaborate					
9	Search tools to find references or other information online for class work					
10	Published electronic resources (e.g. quizzes, assignments, homework, practical problems)					
11	Early-alert systems designed to catch potential academic trouble timeously					
12	Software to create videos or multimedia resources					
13	Basic ICT literacy with digital devices					

ANNEXURE-IV

CONSENT FORM

This is stated that,I Miss_____student of Post RN Bachelors of Nursing and working on a research project titled **"Students perceptions & expectations regarding diverse technology based nursing education"**for the completion of our degree.

Purpose of the study:

You are invited to participate in this study conducted by, Miss_____. The purpose of this research is to "Students perceptions & expectations regarding diverse technology based nursing education at Sheikh Fatima College of Nursing and Allied Health Sciences, Lahore."

Study procedure:

You will be asked to fill a questionnaire which will take about 10-15 minutes.

Possible Risk of Discomfort:

There will be no any risk associated with this research.

Potential Benefits to the Subjects:

This research study may determine the perceptions of students regarding diverse technology based nursing education and identify the level of expectations among them to use the technology for academic purpose.

Protection of Confidentiality

We will do everything we can to protect your privacy. Your identity will not be revealed in any publication resulting from this study.

Voluntary Participation

Your participation in this research study is voluntary. You may choose not to participate and you may withdraw your consent to participate any time. You will not be penalized in any way should you decide not you participate or to withdraw from this study.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

CONSENT

I have read this consent form and have been given the opportunity to ask questions. I give my consent to participate in this study.

Participant's Signature _____ Date: _____

ETHICAL DECLARATION

I (Supervisor), declare that

- Miss ~~~~~~~~~~~~~~~~~~~~ having ID no. ~~~~~~~~~~
- Miss ~~~~~~~~~~~~~~~~~~~~ having ID no. ~~~~~~~~~~
- Miss ~~~~~~~~~~~~~~~~~~~~ having ID no. ~~~~~~~~~~

understand that plagiarism and falsification of data are serious academic misconduct. The project entitled "Students perceptions & expectations regarding diverse technology based nursing education at Sheikh Fatima College of Nursing and Allied Health Sciences, Lahore." is prepared by reviewing all ethical aspects of World Medical Association (WMA) and institution. Furthermore, I have read and understood the institution's "Regulations governing student's academic conduct concerning assessment" and the institution's policy on research integrity which are set out for nursing degree programme.

The project fulfills the ethical requirement of the institution and participants encouraged to ask questions and answered to all the queries. The confidentiality of the information will be maintained and data will be used only for study purpose. The members of ethical committee reviewed the project and satisfied with the undertaking of the investigator.

_____

The Supervisor

CERTIFICATE OF APPROVAL

Ref. No. _____ Date: _____

NEW ADVANCE COLLEGE OF NURSING, LAHORE

This is to certify that the committee has evaluated the research project titled, **"Students perceptions & expectations regarding diverse technology based nursing education at Sheikh Fatima College of Nursing and Allied Health Sciences, Lahore."**and found the proposed study to be in accordance with the guidelines. The proposed study has been *approved* by the committee. Any changes in the protocol should be notified to the committee for prior approval.

Convener _____	
_____	_____

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Member	Member
_____ Member	_____ Member