International Journal of Innovative Research in Medical Science (IJIRMS)
Volume 07, Issue 11, November 2022,
https://doi.org/10.23958/ijirms/vol07-i11/1536

Original article

Student Nurses as Modern Digital Nomads: Developing Nursing Skills Competence and Confidence through Video-Based Learning

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Received 17 October 2022; Accepted 31 October 2022; Published 02 November 2022

Abstract

The nursing staff's skills proficiency is associated with healthcare outcomes. The cornerstone of any nursing curriculum is preparing graduates to deliver safe, high-quality nursing care. The COVID-19 pandemic has, indeed, revolutionized nursing education with the adoption of innovative pedagogical strategies like blended learning. This research aims to evaluate the effectiveness of video-based instruction to determine students' performance and confidence levels in selected nursing procedures. It also intends to investigate the factors that influencing students' nursing skills performance and confidence level. This study employed a quasi-experimental research design. This study included a total enumeration of 44 enrolled students in the nursing diploma program. The researcher divided the students into two groups by quota selection. The control group had a face-to-face teaching session in the lab. For the study group, the students recorded videos of the said procedures three times and submitted them to the faculty through the Blackboard platform. The study group scored significantly higher than the control group in different demonstration times. Specifically, the students from the study group got handwashing performance scores higher in both the first, second trials and during the final evaluation than those in the control group. This study concluded how students' motivation and participation could improve learning outcomes. This blending of web-based training and audio-visual media provides numerous benefits. The mean self-confidence score is significantly higher in the study group than in the control group. This experience illustrates how audio-visual material can be employed to teach other nursing subjects.

Keywords: ***Competency, digital nomads, nursing skills, self-confidence, video-based learning***

Introduction

The quality of care provided to patients in the hospital environment is strongly linked to nurses' correct performance of nursing interventions. The nursing staff's skills proficiency is associated with healthcare outcomes. The cornerstone of any nursing curriculum is preparing graduates to deliver safe, high-quality nursing care [1,2]. Educators face a significant challenge in developing teaching and learning strategies to improve skill acquisition and self-assurance, especially with modern and varied student populations necessitating student-centered, technology-enhanced learning. Moreover, current research studies agree that due to the constant changes, student subjects can already be shaped by education and technology. As society progresses, teaching and learning modalities are also evolving. Through cooperation, virtual communities, instant messaging, and blogging, these innovations raise the level of engagement between human and technological support. The goal of learning transformation aims to integrate higher education into daily life [3].

Marc Prensky first used the term "digital native" term to explore the differences between various age groups and their interactions with technology. It states that younger people tend to be digital natives, fluently speaking the language of technology. Technology has impacted the learning styles of digital natives or those born during the millennial generation. However, moving blended learning was a notch higher due to the COVID-19 pandemic that took the world by storm. Digital nomads have been creating a buzz since early 1997; however, they grew popular in the business world and the academe due to the pandemic [4].

Technology enthusiasts or digital natives are already using mobile education, far from the formal classroom setting. Courses are being redesigned to accommodate technology. This creates an educational opportunity that capitalizes on mobile phones, tablets, computers, and laptops that enable students to become digital nomads - individuals who gather information and knowledge as they move from one learning location to another [5].

The COVID-19 pandemic has, indeed, revolutionized nursing education with the adoption of innovative pedagogical strategies like blended learning. Also known as mixed learning and is defined as the organized integration of face-to-face and online learning. This new environment facilitates access, enhances learner interaction, reduces costs, improves learning quality, and encourages active learning, self-learning, and flexibility [6].

Blended learning's main objective is to infuse a delivery experience that provides the most efficient and effective instruction and effectively generates open communication for teaching and

learning. The blended learning strategy fosters instructor-student communication that balances between stable, coherent influence and boundless Internet access to information. Blending the potential of face-to-face and online education environments must consistently boost flexibility and achieve learning objectives, which is a fundamental feature of blended learning. Consequently, the learning environment should foster autonomy in learning, participation, interaction, self-evaluation, and collaboration [7,8].

The pedagogical transition from traditional campus-based learning to distance learning using digital tools can apply to a nursing skills laboratory course. This is a pivotal component of nursing education that can provide concrete reality to help students acquire theoretical and practical knowledge of the actual health needs of the clients. Learning atmosphere, perceived enjoyment, perceived usefulness, system performance, social interaction, subject specificity, and performance expectations positively influenced students' happiness with blended learning. Hence, blended learning is a practical approach in higher education [2,9].

Because videos can be created and watched on portable devices such as cell phones, their use is becoming casual and conversational. It has become a primary form of information among many of today's youth. Video has evolved to share experiences, express creativity, and communicate ideas. Some students are started to utilize videos as their first point of reference when they have a query about a topic due to the availability of videos on practically any subject [10].

Some teachers have become increasingly receptive to the use of technology in the classroom, as seen by the growing number of journal publications and conference presentations on the subject. Videos can be analyzed, sometimes in tandem with other interactive measurement tools. Consequently, the purpose of the present study was to examine the efficacy of video-based education and assessment in determining students' performance and degree of confidence in specific nursing procedures. It also aims to explore the variables that affected students' nursing skills performance and confidence level.

Materials and Methods

Research Design

This study employed a quasi-experimental research design. The quasi-experimental design aimed to establish a cause-and-effect relationship between video-based instruction. Nursing students were assigned to groups based on non-random criteria.

Setting

This study was conducted in the Department of Nursing of the College of Applied Medical Sciences – King Faisal University (KFU).

Participants and Sampling

This study included a total enumeration of 44 enrolled students in the nursing diploma program. Inclusion criteria included: (a) those officially enrolled in the fundamentals of nursing course in the General Nursing Diploma Program at KFU and (b) those who consented freely (**Figure 1**).

Data Collection

Two tools were used for data collection: *Performance Checklists* for *Hand Washing, donning and, doffing sterile gloves procedures* by Kozier and Erbs fundamentals of nursing (2016) [11] and the *Self-confidence in Learning Scale* by Costa, Medeiros, Coutinho, Mazzo, & Araújo (2020) [12].

Tool one (performance checklist for the selected nursing procedures) was adopted by the researchers, and items were scored with two if students performed correctly, one if done incorrectly, and zero if the step was not done.

The Self-Confidence in Learning Scale's second tool comprises eight statements about self-confidence. Both subscales are composed of a five-point Likert scale, namely: 1 = strongly disagree; 2 = disagree; 3 = undecided; 4 = agree; 5 = strongly agree. It also included the student's socio-demographic data: name, age, previous bachelor's degree, and GPA from the previous academic year.

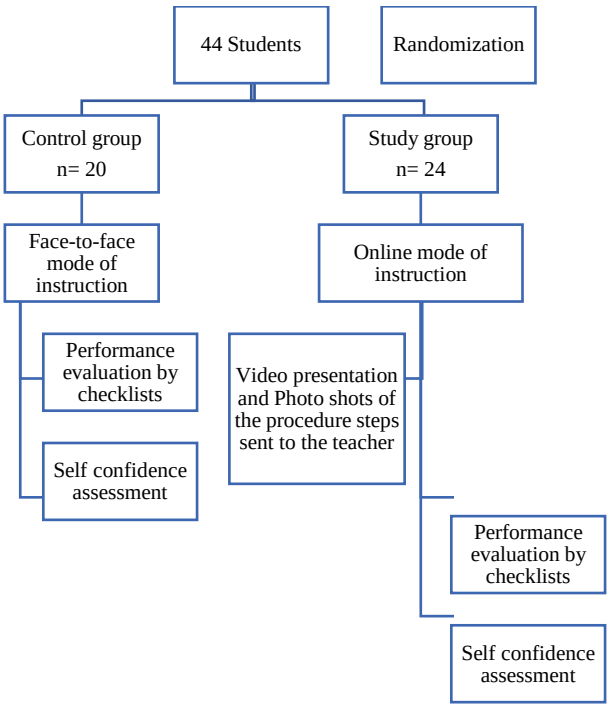

Figure 1: Data Collection and Data Analysis for Quasi-experimental

The theoretical part of the Fundamentals of Nursing course was taught online, At the same time, the practical component was held at the nursing skills lab, with less than 25 students in each section as part of pandemic-imposed regulations. Researchers decided to let the students from both groups perform the Handwashing procedure as part of the assessment. Five juries of experts in the nursing field determined the validity of the tools. The researcher divided the students into two groups randomly by quota selection.

The control group had a face-to-face teaching session in the lab with the faculty through a demonstration followed by a video

presentation of the said procedure. Then, the students were allowed to practice three times. The lab faculty assessed the student's performance on nursing procedures the same day using Tool 1.

For the study group, For the study group, the students recorded videos of the said procedures three times and submitted them to the faculty through the Blackboard platform. Then, the students were instructed to record a video of their return demonstration. After a week, they sent them back to the instructor to evaluate of their performance using the checklist Tool 1. Afterward, the student's confidence level will be measured after sending the video-recorded re-demonstration using Tool 2.

At the end of the semester, students from both groups were re-evaluated for the performance of the Handwashing procedure as part of the course's final OSCE coverage, using the checklist (Tool 1). As part of the summative assessment, an assessment of the students' self-confidence (using Tool 2) was likewise performed.

Data Analysis

Data were analyzed using IBM SPSS Statistics for Windows, Version 22 (IBM Corp., Armonk, NY). The categorical variables included the student's socio-demographic data: name, age, previous bachelor's degree, and GPA from the previous academic year. The data were documented and presented as frequencies and percentages. The correlation between the overall score of self-confidence in learning and the total scores of the procedures (hand washing, donning, and doffing gloves) were then assessed using the Pearson correlation coefficient (r). Statistical significance was established at $p<0.05$.

Results

Table 1 shows the demographic data of the diploma nursing students. The majority of the students were ≥25 years old (77.3% for those from the study group and 87.5% for the control group), with a mean age of 27.3 ± 2.2 and 27.2 ± 1.6, respectively. Regarding the participants' marital status, 59.1% of the study group are married, while 75% are from the control group. Most participants from the study group have previous degrees in nutrition and business administration (36.4%, and 31.8%, respectively), while 33.3% and 25% from the control group have nutrition and literature degrees. Their mean previous GPA was 3.7 ± 0.6 to 3.8 ± 0.6, respectively.

Table 1: Socio-demographic data of the students in the study & the control groups

Socio-demographic data		Study (n=22)		Control (2=24)	
		No	%	No	%
Age	20- <25	5	22.7%	3	12.5%
	≥ 25	17	77.3%	21	87.5%
	mean ± SD	27.3 ± 2.2		27.2 ± 1.6	
Marital Status	Single	9	40.9%	5	20.8%
	Married	13	59.1%	18	75%
	Divorced	0	0%	1	4.2%
Previous degree	Nutrition	8	36.4%	8	33.3%
	Business administration	7	31.8%	3	12.5%
	Literature	3	13.6%	6	25%
	Biology & Chemistry	1	4.5%	3	12.5%
	Others	3	13.6%	4	16.7%
Last GPA	< 4	16	72.7%	14	58.3%
	≥ 4	6	27.3%	10	41.7%
	mean ± SD	3.7 ± 0.6		3.8 ± 0.6	

SD: Standard deviation

It can be seen from Figures 2 to 4 that the students' performance scores for Handwashing, Donning, and Doffing of Gloves procedures in the study are higher in the study group than that in the control group. The study group scored significantly higher than the control group in different demonstration times.

Specifically, the students from the study group garnered *Handwashing* performance scores of 9.9 out of 10 in both the first and second trials and ten during the final evaluation. The control group members scored 9.5, 9.8, and 10 for the first and second trials and the final evaluation, respectively (Figure 2).

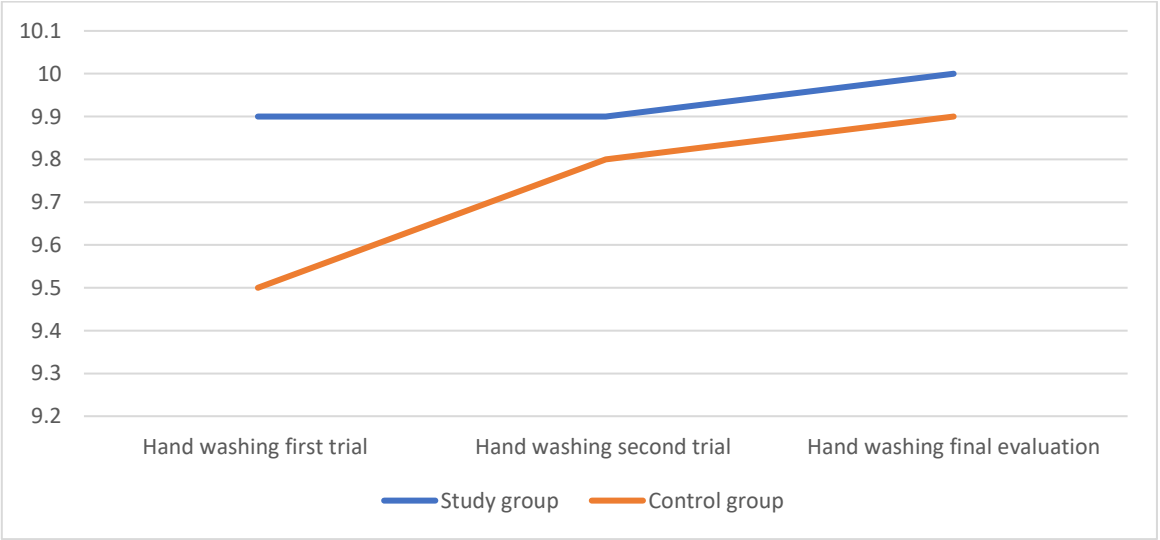

Figure 2: Comparison between the two groups' Performance Scores on Handwashing Procedure

For the *Donning of Gloves procedure*, those from the study group obtained performance scores of 4.9 out of 5 for the first time and 5 for both the second trial and the final evaluation. For those from the control group, performance scores were 4.6, 4.7, and 5.0 for the first and second trials and the final evaluation, respectively (**Figure 3**).

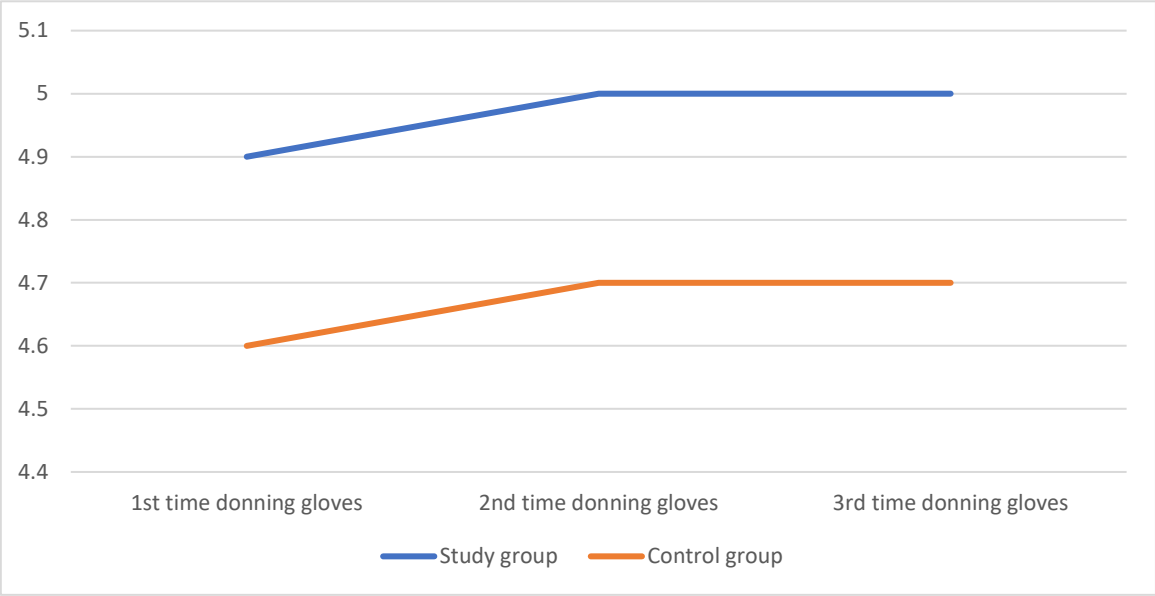

Figure 3: Comparison between the study and control groups' Performance Scores in Donning of Gloves Procedure

For the performance scores on *the Doffing of Gloves* procedure, those from the study group obtained performance scores of 4.3 (out of 5) for the first trial, 4.6 for the second trial, and 4.9 for the final evaluation. For those from the control group, performance scores were 4.3, 4.5, and 4.7 for the first and second trials and the final evaluation, respectively (**Figure 4**).

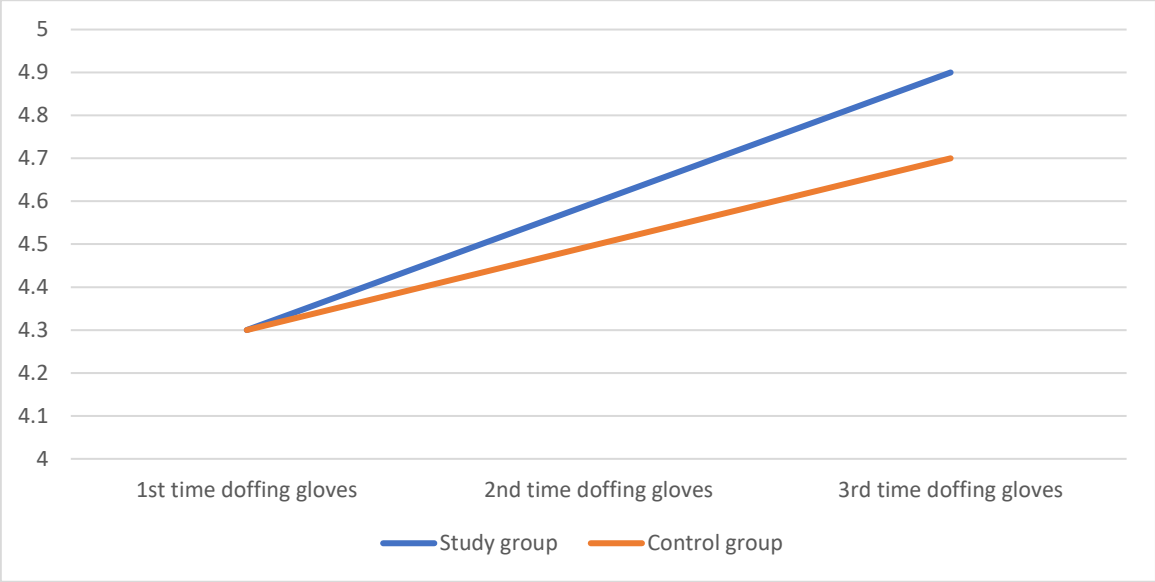

Figure 4: Comparison between the study and control groups' Performance Scores on Doffing of Gloves Procedure

Table 2 displays a comparison between the study and control groups' mean score of self-confidence in learning. The mean score of self-confidence is significantly higher in the study group (39.31±1.2) compared to the control group (36.2±4.1) (P= 0.002*).

Table 2: Comparison between the study and control group's mean scores of Self-confidences in Learning

	Min- Max	Mean ± SD	t-test (P)
Study	36- 40	39.31±1.2	3.3 (0.002*)
Control	26- 40	36.2±4.1	

**: Statistically significant at $p \leq 0.05$*

Table 3 displays the correlation between total student performance scores and self-confidence scores. There was a significant positive correlation between the overall score of self-confidence in learning and the total scores of handwashing, donning, and doffing gloves (r= 0.83, P= 0.001).

Table 3: Correlation between total student skill scores and self-confidence scores

	Overall self-confidence score	
Overall nursing performance score	*r*	*P*
	0.83	0.003*

r: Pearson coefficient
**: Statistically significant at $p \leq 0.05$*

Discussion

The Covid-19 pandemic drastically changed the landscape of nursing education on a global scale alongside the implementation of strict protocols to mitigate and further prevent the spread of infection. With the closure of schools, the students' in-person classes, skills laboratory sessions, and clinical placements were either suspended or restricted, especially in hard-hit places [13]. There

was a massive, unplanned transition from traditional learning to an exclusively online learning setup with the help of digital tools, learning management systems, and educational websites to prevent disruption and ensure continuity of teaching and learning [14].

Educational practices during this critical time were best described using several terms. *Emergency remote education or teaching* was delivered in various delivery modes such as distance education, e-learning, online education, and homeschooling. It was further posited that the term is used to describe the mass changes made during Covid-19 and other similar crises, for an activity that arises out of necessity and with necessary haste, in contrast with online courses which are initially planned and designed to be delivered virtually [15-17]. This also involves using available remote teaching devices for educational content that would typically be delivered physically or as hybrid or blended courses. However, course delivery will be shifted back to its original design once the situation goes back to normal.

The Fundamentals of Nursing course, a comprehensive and indispensable course with theoretical and clinical components, introduces students to the essential knowledge and procedures necessary to provide quality patient care. The concepts and principles of nursing care are covered in the theoretical aspect. The clinical sessions, which mostly take place in a skills laboratory, enable the teaching of nursing procedures in a standardized and structured manner to improve procedural skills performance and to apply the learned theories into practice in preparation for real-life practice. This is achieved through the supervision of an instructor through Peyton's four-step approach: demonstration, deconstruction, comprehension, and *performance* and, of course, feedback [18,19].

This course was offered during the study setting's first year, the second semester of the nursing diploma program. Data collection for this undertaking was done almost a year after the pandemic started, when there was a downward trend in the number of Covid cases and less stringent restrictions, thereby permitting hybrid delivery of the course. Since this is a foundation course and students are still in the crucial and primary stage of psychomotor skills acquisition, they need ample time and guidance to practice and develop these skills during their laboratory sessions. However, the current situation posed a challenge to maximizing their learning because of these pandemic-related restrictions. It is then imperative for nursing educators to utilize various pedagogical approaches to facilitate students' engagement in the learning process during this critical time [20,21].

Other innovative strategies like technology were adopted apart from the traditional face-to-face delivery, an integral approach in nursing education. Regulatory bodies and policymakers proposed the utilization of virtual simulation (low to high precision simulators) as a substitute for clinical experiences since it allows flexibility and can augment/complement the health sciences students' clinical experiences during the current COVID-19 health crisis [22]. Furthermore, Kim *et al*. (2016) suggested that simulation-based nursing educational approaches strongly impact the psychomotor domain. However, since its effect is also proportional to its fidelity level, it is suggested that various educational approaches be utilized to meet all the educational objectives [23].

The use of mobile devices in higher education, such as tablets and mobile phones, have also been reported to improve learning through better observations, promote higher motivation, improve feedback from instructors, increase sharing of knowledge and opinions, improved coherence, improve the structure, improved preparations, and increased reflection [24].

For this study, blended learning was utilized, proven in various literature, to improve learning outcomes in health professions education courses like Fundamentals of Nursing. The term was defined as a method where online theoretical content is blended with the hands-on practical application or mentor-based instruction [25]. It is an efficient, cost-effective delivery method for workforce training because it helps improve students' confidence, reduce stress, and enhance awareness and self-evaluation. These benefits were further elucidated in a plethora of literature for both nursing and other fields [26-28].

In contrast, Lathi *et al*. (2014) highlighted that no statistically significant difference was noted between e-learning and traditional learning groups regarding knowledge, skills, and satisfaction in a systematic review of 11 experimental studies [29]. In addition, few studies reported no significant difference in the student's test scores in the two groups of e-learning and traditional training. It is likewise worth noting that even though e-learning was regarded as a practical and valuable nursing skill development strategy, students still preferred a combination of traditional training methods with e-learning [30-33].

Moreover, blended learning allows the students to be active participants in their learning resulting in self-regulation. Likewise, Van Laer and Elen (2015) argued that there is an interplay of seven factors in a blended learning environment that initiates and maintains learner behavior, justifying better performance, namely: topic relevance, tailored learning environment, learner control, scaffolding, interaction, reflection cues, and calibration cues [34]. This could be why, apart from yielding better nursing procedures performance scores, the students in the study group also got higher self-confidence in learning scores than those in the control group.

Self-confidence refers to a person's belief that he or she can complete a task or achieve a desired goal. It is essential in clinical nursing practice because it facilitates the students' accurate and precise completion of their tasks and builds relationships and trust with their patients. Hence, the goal of laboratory sessions in the nursing curriculum is for the instructors to develop students' competence and confidence to practice effectively as professionals [35]. Bandura's Social Learning Theory posits that self-confidence emanates from four sources: performing a task or behavior, observing another person perform the task or behavior, emotional arousal, and verbal persuasion(36). Hence, the instructors' use of different teaching modalities like blended learning, exposure to different topics, use of different equipment, lecture-demonstration of the procedure, students' return-demonstration, and instructors' feedback to the students can facilitate the development of students' self-confidence [37].

Likewise, the collaboration also enhances effective learning. In a blended learning program, students can collaborate with others, engage in discussions, and provide helpful feedback to one another. It likewise leads to higher-level thinking skills and boosts students' confidence and self-esteem. This will eventually positively affect students' enthusiasm and behavior, leading to improved performance and higher engagement [37]. This was evident in studies by Abdelkadeer A. & Elcokany N. (2022) and Hayrettin T *et al*. (2015), who reported that the majority of the study participants have a high level of self-confidence in learning [38,39].

Overall, this study proposes that blending web-based training supported by human touch and media can yield better outcome attainment of nursing students' performance and self-confidence in learning in a Fundamentals of Nursing course. The literature highlighted that this teaching modality provides numerous benefits such as flexibility in scheduling, the opportunity to repeat or review materials when the need arises, timely feedback, and to actively participate in individualized knowledge-construction activities [40,41].

Limitations

The results of this study cannot be generalized due to the small sample size and convenience selection of participants. This study is only conducted on one patch of students. No random assignment between study and control group.

Conclusions

This study concluded how students' motivation and participation could improve learning outcomes. This blending of web-based training and audiovisual media provides numerous benefits. An additional benefit is obtaining the self-confidence of the students during the course. The mean self-confidence score is significantly higher in the study group than in the control group. This experience illustrates how audiovisual material can be employed to teach other nursing subjects.

Ethics approval and consent to participate

Consent was obtained or waived by all participants in this study. Before conducting this study, ethical approval was obtained from Scientific Research's Deanship number KFU- REC/2021-05-10 since it involves human participants. Once the participants were identified, they were informed through informed consent. This included a description of the research process and information about confidentiality. Participants remained anonymous by assigning codes to them. Information gathered was treated with utmost confidentiality and privacy. Only the researchers had access to this information. There was no harm or risk to the participants. They were instructed to withdraw from the study anytime. The researchers were also available to answer any questions they may ask by providing their contact details.

Data Availability

Data that support the findings of this study are available from the corresponding author, [N. M. E], upon reasonable request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding Statement

Authors should state how the research and publication of their article was funded, by naming financially supporting bodies followed by any associated grant numbers in square brackets.

Authors' contributions

NME: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Roles/Writing - original draft; Writing - review & editing.: Data curation, Investigation, Formal analysis, Writing - review & editing. JJ: Writing, review & editing, Data curation; Investigation; Methodology; Writing - review & editing. MBL: Writing - review & editing. MMS: Writing - review & editing. OM: Writing - review & editing. All authors have read and approved the manuscript.

Acknowledgments

The authors appreciate the students who participated in this study.

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