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Effect of Mobile-Based Learning on Second Year Nursing Students' Clinical Competence and Motivation

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Abstract
Back ground:*The evolution of information technology has exerted great influence on nursing education via new pedagogy of knowledge delivery without time and place restriction. Mobile technology revolutionizes nursing education and clinical practice via empowering skills of critical thinking and clinical decision-making through learning.* ***Aim:*** *This study aimed to evaluate the effect of mobile-based learning on second year nursing students' clinical competence and motivation* ***Design:*** *A quasi-experimental research design was used.* ***Subjects:*** *A Purposive sample of all adult second year nursing students (n=90) affiliated at Faculty of Nursing, Helwan University.****Setting:*** *This study was conducted at second year class at the Faculty of Nursing, Helwan University and at the Intensive Care Units at Elsayed Galal Hospital* ***Tools:*** *three tools were used for data collection,(I)Self-administered Questionnaire: it included 2 parts: Student's demographic characteristics and Students' Perception of Mobile Based Learning Sheet(II)Students' Clinical Nursing Competence Tool, (III)Students' Learning Motivation Tool* ***Results:*** *the results of this study supported the hypothesis of the study that, there was highly statistical significant improvement regarding student's clinical competence and motivation from pre to post implementation of program as following; slightly more than three quarter 75.6% of the studied students had satisfactory level of knowledge and slightly less than three quarter 74.4% of them had competent level of practice regarding endotracheal tube care at post implementation of the program and there was highly statistical significant improvement regarding all items of knowledge and practice. Regarding student' motivation less than one third 31.1% had low motivation, 25.6% had medium motivation, 8.9% had upper medium and slightly less than one quarter 24.4% had high motivation at post implementation of the program.****Conclusion:****It can be concluded that, mobile device is a valuable form of technology that can be used in nursing education to promote nursing student's motivation and confidence in learning a clinical nursing skills; motivation and confidence in learning were improved* ***Recommendation:*** *The study recommended integration of Mobile based learning into to the undergraduate nursing curriculum as a complementary strategy for learning*

Keywords: *Mobile learning, Nursing students, Clinical competence, Motivation.*

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I. Introduction

Mobile based learning is defined as the personalized, linked, and interactive use of hand held computers in classrooms, in cooperative learning during fieldwork, and in counseling and guidance. It supports learning that is more situated, experiential and contextualized within specific domains and affords the creation and use of up-to-date and authentic content **(Risling, 2017).**

Mobile learning is an essential educational technology component in higher education. It makes it possible for students to learn, collaborate, and share ideas, so there is a greater need for educational institutions to strengthen the practices in the curriculum and the use of innovative teaching techniques and approaches will be a paramount importance **(Toquero, 2020).** Several researches on mobile learning has been conducted in order to understand the use of mobile devices in educational settings as mobile learning generally, helps students to develop technological skills, conversational skills, find answers to their questions, develop a sense of collaboration, allow knowledge sharing, and hence leverage their learning outcomes **(Sönmez et al., 2018).**

In the nursing training context, common strategies of teaching and learning that are commonly present: lecture and dialogical classes, skills practicing, the development of simulated clinical scenarios and mobile learning. From this perspective there is the need for a closer look at the identification of satisfaction with teaching-learning and the development in the self-confidence of the students who experiences these strategies throughout their training. That is, because the learner's satisfaction and self-confidence are variables that allow

us to identify and evaluate the effectiveness of the teaching and learning strategies used during the training **(Costa et al, 2020)**.

Learning motivation is one of the key properties learners must possess to satisfactorily participate in learning activities. The young generation who has grown up with mobile devices may become more motivated to learn when mobile devices are incorporated in education. A study of undergraduate nursing students demonstrated that learning motivation was positively associated with class satisfaction. Hence, mobile-based learning may enhance the learning motivation and class satisfaction of nursing students (**Gagnon, Gagnon, Desmartis&Njoya, 2016).**

Use of mobile devices for educational purposes among nursing students today is widespread trend. Evidences showed that integrating mobile devices can improve the quality of nursing education by engaging students in learning experience. Integration of Mobile learning (M-learning) in educational settings is an important issue for academic institutions and universities **(Forehand, Miller& Carter, 2017)**.

Global nursing education programs are experiencing the rapid changes according to recent technologies. In particular, the students are witnessing the exponential growth and power of mobile processing. Using mobile devices has become more commonplace, increasing the desire of studentsto become more connected, and have instant access to knowledge anytime and anywhere. At the same time, there has been a rapid growth in the mobile technology including both the hardware and software. Furthermore, smartphones and tablets are considered more attractive for students. This is due to the fact that smartphones and tablets are portable and cheaper if they are compared with desktop PCs, and laptops **(Salameh, Ewais& Salameh, 2020)**.

Significance of the study:

Significance of the study

Mobile devices are a regular part of daily life among the younger generations, the number of smartphone users in Egypt is estimated to 23.6 million in 2017, and could reach almost 28 million by 2019. Thus, now is the time to apply mobile device use to nursing education. The young generation who has grown up with mobile devices may become more motivated to learn when mobile devices are incorporated in education.

Use of mobile devices in education highlights the transition from educator-centered teaching to learner-centered education. A study of undergraduate nursing students demonstrated that learning motivation was positively associated with class satisfaction. Hence, mobile-based learning may enhance the learning motivation and class satisfaction of nursing students. However, few studies have investigated how learning motivation can be improved among students and whether motivation is associated with other learning outcomes. Furthermore, the use of mobile-based learning in nursing skill education has not been thoroughly investigated in Egypt.

Aim of the study:

This study aimed to evaluate the effect of mobile-based learning on second year nursing students' clinical competence and motivation through the following objectives:-

1. Assess level of second year nursing students 'perception about mobile based learning pre and post the implementation.
2. Assess level of second year nursing students' clinical competence (knowledge and practice) pre and post the implementation of mobile based learning regarding endotracheal tube care.
3. Assess level of second year nursing students' learning motivation pre and post implementation.
4. Develop and implement mobile based learning program for students regarding endotracheal tube care.
5. Evaluate the effect of mobile-based learning on second year nursing students' clinical competence and motivation regarding endotracheal tube care.

Research hypothesis

There will be a statistical significant improvement in second year nursing students' clinical competence and motivation regarding endotracheal tube care post mobile based learning as measured by tool II and tool III.

II. Methodology:

Research design:

A Quasi-experimental one group pre-test, post-test design was used.

Setting:

This study was conducted at second year class at the Faculty of Nursing, Helwan University and at the Intensive Care Units at Elsayed Galal Hospital.

Subjects:

A Purposive sample of all adult second year nursing students affiliated at Faculty of Nursing, Helwan University, was included in the study. The total number of students was 90 students.

Tools for data collection: Data were collected using the following tools

Tool I:Self-administered questionnaire :This tool was developed by the researcher based on extensive literature review and included **2** parts**:**

Part I: Student's demographic characteristics: This tool contained items regarding student's personal data such as (age, sex**,** economic status, final evaluation at first year as regard to nursing subject**,** type of mobile device used, number of mobile phones owned and monthly mobile expenditure). **(Appendix I)**

Part II: Students' Perception of Mobile Based Learning Sheet:

It was adapted from **(Kihnula, 2017)** to assess students' perception about mobile based learning and was included two main categories: **A)Benefits of mobile learning** as regards to (Portability, Reinforced learning, positive impact on knowledge, Improved performance, Increased interaction and Positive experiences), **B) Obstacles of mobile learning** as regards to (Technical problems, Increased requirements, Effects of long term use and Negative experiences).This instrument is self-reported as the students was respond by agree and disagree. **(Appendix I)**

Tool II: Students' Clinical Nursing Competence Tool

It was developed by the researcher after reviewing the national and international related literature and it was including two parts:-

1st Part: Knowledge assessment questionnaire:

It was developed by the researcher based on the review of the related literature and used to assess students' level of knowledge regarding endotracheal tube care.

2nd Part: Students' Practice Observational Checklist:

The researcher adapted an observational checklist from **(Lynn, 2011)** to assess students' level of practice regarding endotracheal tube care. The check list consists of 25 item (pre, during and after endotracheal tube care)**(Appendix II**).

Tool III:-Students' Learning Motivation Tool

The Instructional Materials Motivation Survey **(IMMS)(Keller, 2010) established (ARCS) model that include** Attention, Relevance, Confidence, and Satisfaction **This model was modified by the researcher to assess** student' learning motivation by mobile learning . The scale is a self-report survey with a total of 36 questions using 5-point Likert scale (1 = strongly disagree, 2 =Disagree, 3 = neutral, 4 = Agree, and 5 = strongly agree). **(Appendix III).**

Operational Design

The operational design of this study included preparatory phase, content validity, pilot study, and field work.

Preparatory Phase

It included reviews of current and post local and international related literatures, and theoretical knowledge of various aspects of the study using books, articles, and internet periodicals and magazines in order to develop the data collection tools.

Content Validity

It was ascertained by a Jury consisting of nine experts of professors and lecturers from the medical surgical department; Faculty of nursing and from medicine, surgery and neurology department Faculty of Medicine, Helwan University who revised the tools for clarity, relevance, comprehensiveness, understanding and ease for implementation, according to their opinion modifications were applied.

Pilot study

Pilot study had been undertaken before starting the data collection phase. It was carried out on 10% of participants to test the feasibility and applicability of the tools and to estimate the time needed to complete the tools according to the pilot study necessary modifications were done. The subjects included in the pilot study were excluded from the study sample.

Field workdescription:

1)Assessment phase :

Preparation for Mobile Based Learning:

- A meeting was done to all second year nursing' students that were included in the study to acknowledge them with the objectives of the study and the researcher obtained a written consent from whom accepted to participate.
- The researcher took all the students' names and their phone number to create whats app group and all the studied students were joined.
- On the whats app group , the researcher determine specific time to meet the students to explain the applications that were used in this study
- As Zoom app and Google classroom (easy class) and how to set up these applications on their phone.
- During this phase students' assessment was done pre implementation of the program through interview with them at the second year class to assess their sociodemographic data, Student's perception about mobile

learning, knowledge level about endotracheal tube care using knowledge assessment questionnaire and learning motivation questionnaire.

2) Developmental Phase:

- The students downloaded Zoom **app** on their mobile phone and the researcher made trial to ensure that all studied students successfully used it.
- The students were registeredon **Easy class program** that was established by the researcher.

Implementation phase:

- Data collection was started and completed within academic year 2019- 2020 in the period from beginning of September 2019 until end of April 2020.
- The researcher discussed with students all the concerns and questions about this study through whattsapp group.
- After that the researcher determined specific time for students to meet them together online, three session online was done each one of them was 40 minute

Theoretical part:

- Three teaching Online lectures were given to the 2nd year nursing students through using zoom application to explain endotracheal tube care in two days every lecture was about40 minute
- Teaching lectures included the theoretical background about endotracheal intubation, endotracheal tube care Ventilator associated pneumonia, and ventilator bundle) using printed material (booklet), PowerPoint presentation, Video film, and graphic pictures.
- At the end of the lecture , the researcher made open discussion to allow the students to ask any questions and answered them
- Knowledge assessment questionnaire was done to assess students' level of knowledge immediately after teaching sessions (posttest).The student answered it online though entering easy class program.

Practical part

- Video about endotracheal tube care was sent to all the students.
- The researcher explained whole the procedure again though this video and asked the students to see several time before application on the patients.
- Evaluation of students' performance was made in the clinical setting while doing endotracheal tube care by using observational checklist, it take about 10 minute for each students .
- Students' perception about mobile based learning was administered after implementation of the program (posttest)
- Students' learning motivation was measured again after implementation of mobile based learning.

Evaluation phase:

This phase included evaluation of the effect of mobile based learning on second year nursing student' clinical competence and motivation regarding endotracheal tube care by comparing the results of pre and post implementation.

Administrative Design:

To carry out the study, the necessary approvals were obtained from the dean of faculty of nursing Helwan University to conduct the study.

Ethical considerations:

The ethical research considerations in this study include the following:

1. The research approval was obtained from the ethical committee before starting the study
2. The researcher explained the aim of the study to students who agreed to participate in the study.
3. A written consent was obtained from students who agreed to participate in the study.
4. The researcher assured maintaining anonymity and confidentiality of the subjects' data .
5. Students were informed that they have the right to withdraw from the study at any time.
6. The procedure was not included in the content outlines of 2nd year nursing students' curriculum and it was not included in the evaluation of the students in the first term, and they continued the procedure in the second term.

Statistical analysis:

Data were analyzed using Statistical Program for Social Science (SPSS) version 25.0. Qualitative data (nominal and ordinal) were expressed as frequency and percentage. Quantitative data were expressed as mean and standard deviations

Sample size = 90 students
Graphs: Bar chart
The following tests were done:

- **Chi-square (X^2) test of significance** was used in order to compare proportions between two qualitative parameters.
- **The Wilcoxon signed-rank test** (Z) is the nonparametric test equivalent to the dependent t-test. It is used to compare two sets of scores that come from the same participants. This can occur to investigate any change in scores from one time point to another.
- **Spearman correlation coefficient (P)** measures the strength of association between two variables and the direction of the relationship (positive, negative)
- Probability (P-value)

– P-value ≤0.05 was considered significant.
– P-value ≤0.001 was considered as highly significant.
– P-value >0.05 was considered not significant.

Limitations of the study:

- There were some problems in network service with some students and some student refuse to complete in this study.
- The findings of this study are limited and cannot be generalized to all nursing students as this study is only collected from one course and only one topic which is related to endotracheal tube care.

Results:

- **Table 1** shows that more than half of studied subjects 60% were 20 years and more with mean age 19.74 ± 0.81. Also, 57.8% were female. Majority of the studied students 92.2% had moderate economic status. Besides, more than half 55.6% had very good in the final evaluation at first year as regards to nursing subject. Nearly all students 97.8 used smartphones and more than three-quarters 78.9% had one phone. As regards to monthly mobile expenditure more than half of the studied subjects 58.9% spent from 51 to ≤ 100 pound for mobile used with mean score of monthly expenditure 74.41 ± 32.59.

- **Figure (1)** shows that all the studied students (100%) had unsatisfactory level of knowledge at pre implementation of the program then changed to slightly more than three quarter 75.6% of the studied students had satisfactory level of knowledge regarding endotracheal tube care at post implementation of the program.

- **Figure (2)** reveals that all the studied students 100% had incompetent level of practice at pre implementation of the program then changed to slightly more than 74.4% of the studied students had competent level at post implementation of the mobile based program regarding endotracheal tube care.

- **Figure (3)** reveals that, slightly more than two thirds of the studied students 67.8% had low motivation, slightly more than one quarter 26.7% had medium motivation at pre implementation of the program then changed to less than one third 31.1% had low motivation, 25.6% had medium motivation, 8.9% had upper medium and slightly less than one quarter 24.4% had high motivation at post implementation of the program.

- **Table (2)** demonstrates that there was highly statistically difference between pre and post implementation of mobile-based learning on nursing students' regarding Perception of mobile based learning, students' level of knowledge for endotracheal tube care, students' level of practice for endotracheal tube care and students' learning motivation of mobile based learning (Z= 6.19, P= 0.000& Z= 8.24, P= 0.000 & Z= 8.18, P= 0.000 & Z= 5.39, P= 0.000) respectively.

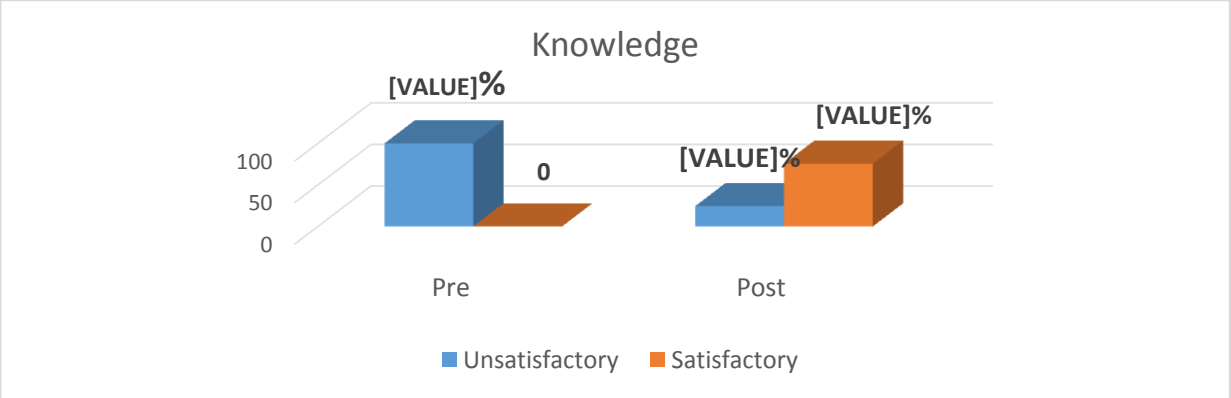
- **Table (3)** shows that there was highly statistically significance between age, economic status, and studied nursing student's level of knowledge at post implementation of the program (x^2 = 12.99, P = 0.000&x^2 = 13.67, P = 0.001 respectively).while there was statistically significance between final evaluation at first year as regards to nursing subject monthly mobile expenditure and studied nursing student's level of knowledge at post implementation of the program (x2 =13.30, p=0.004 &x^2 =9.38, p=0.009* respectively.

- **Table (4)** clarifies that there was highly statistically significance between age, Final evaluation at first year as regards to nursing subject, monthly mobile expenditure and student's level of practice at post implementation of the program (x^2 = 11.25 , P = 0.001&x^2 = 41.11, P = 0.000 &x^2 = 31.59, P = 0.000 respectively)**.**

Table(1):Percentage Distribution of the Studied Subjects as Regards to their Demographic Characteristics (n= 90)

Items	N	%
Age		
Less than 20	36	40.0
20 and more	54	60.0
Mean ± SD	**19.74 ± 0.81**	
Gender		
Male	38	42.2
Female	52	57.8
Economic status		
Low	4	4.4
Moderate	83	92.2
High	3	3.3
Final evaluation at first year as regards to nursing subject		
Passable	2	2.2
Good	18	20.0
Very Good	50	55.6
Excellent	20	22.2
***Types of mobile device used**		
Smartphones	88	97.8
Netbooks	2	2.2
Laptops	16	17.8
Tablets	13	14.4
Number of mobile phones		
One	71	78.9
Two	19	21.1
Monthly mobile expenditure/pound		
≤ 50	23	25.6
51 to ≤ 100	53	58.9
101 to 150	14	15.6
Mean ± SD	**74.41 ± 32.59**	

Figure (1): Percentage Distribution of the Studied Nursing Students' Level of Knowledge pre and post the Implementation of Mobile Based Learning Regarding Endotracheal Tube Care



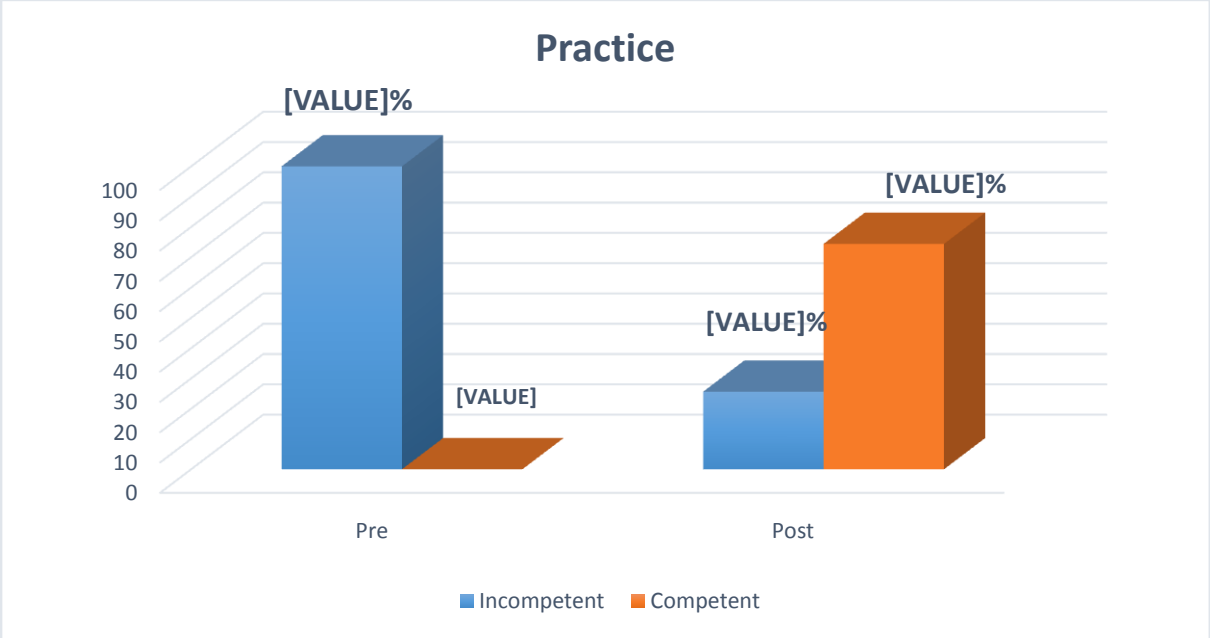


Figure (2): Percentage Distribution of the Studied Nursing Students' Practice pre and post the Implementation of Mobile Based Learning Regarding Endotracheal Tube Care.

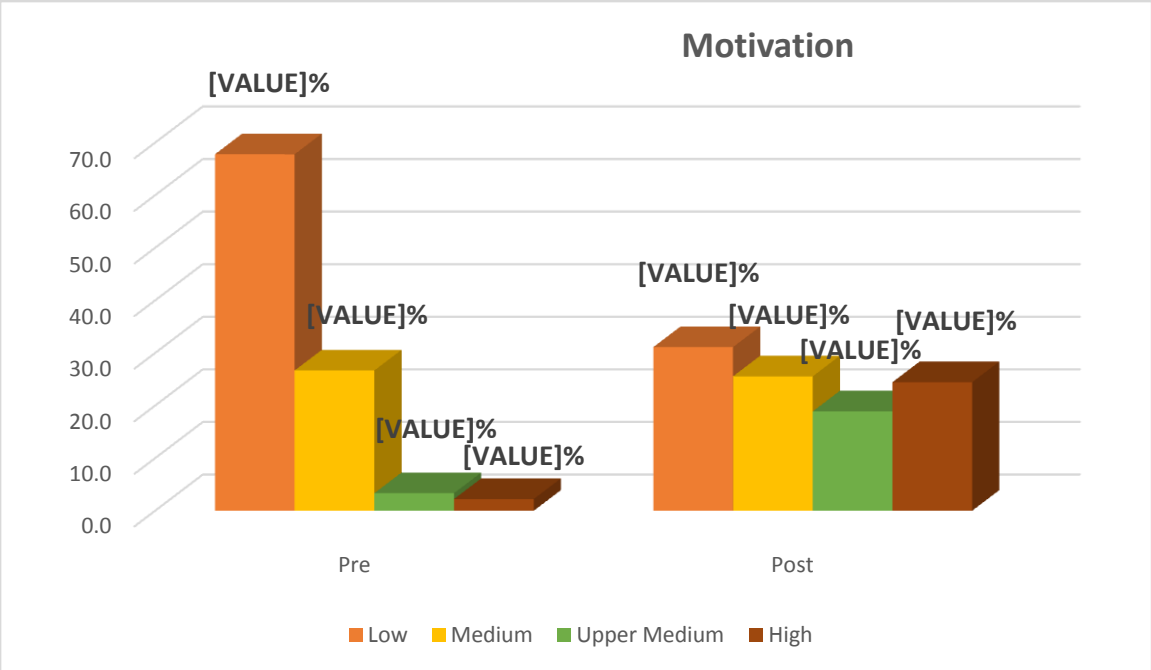


Figure (3): Percentage Distribution of the Studied Nursing Students' Motivation pre and post the Implementation of Mobile Based Learning Regarding Endotracheal Tube Care.

Table 2: Effect of Mobile-Based Learning on Nursing Students' Regarding Perception about Mobile Based Learning, Clinical Competence and Motivation.

Items	Pre	Post	Z test	P value
	Mean ± SD	Mean ± SD		
Perception of mobile based learning	1.18 ± 0.39	1.65 ± 0.47	6.19	**0.000****
Knowledge	1.00 ± 0.00	1.75 ± 0.43	8.24	**0.000****
Practice	1.00 ± 0.00	1.74 ± 0.43	8.18	**0.000****
Motivation	1.40 ± 0.66	2.36 ± 1.16	5.39	**0.000****

***Significant (S) p > 0.05 **Highly Significant (HS) p > 0.001**

Table (3): Relation Between Studied Nursing Students' Levels of Knowledge Post the Implementation of Mobile Based Learning Regarding Endotracheal Tube Care and Their Demographic Characteristics.

Items	knowledge (post)				χ^2	P value
	Unsatisfactory		Satisfactory			
	N	%	N	%		
Age						
Less than 20	16	72.2	20	29.4	12.99	0.000**
20 and more	6	27.3	48	70.6		
Gender						
Male	9	40.9	29	42.6	0.021	0.88
Female	13	59.1	39	57.4		
Economic status						
Low	4	18.2	0	0.0	13.67	0.001**
Moderate	18	81.8	65	95.6		
High	0	0.0	3	4.4		
Final evaluation at first year as regards to nursing subject						
Passable	1	4.5	1	1.5	13.30	0.004*
Good	10	45.5	8	11.8		
Very Good	7	31.8	43	63.2		
Excellent	4	18.2	16	23.5		
Number of mobile phones						
One	58	77.3	13	86.7	0.65	0.41
Two	17	22.7	2	13.3		
Monthly mobile expenditure						
≤ 50	11	50	12	17.6	9.38	0.009*
51 to ≤ 100	8	36.4	45	66.2		
101 to 150	3	13.6	11	16.2		

Table (4) Relation between Studied Nursing Students' Level of Practice Post Implementation of Mobile Based Learning Regarding Endotracheal Tube Care and Their Demographic Characteristics.

Items	Practice (post)				χ^2	P value
	Incompetent		Competent			
	N	%	N	%		
Age						
Less than 20	16	69.6	20	29.9	11.25	0.001**
20 and more	7	30.4	47	70.1		
Gender						
Male	16	69.6	22	32.8	9.46	0.002*
Female	7	30.4	45	67.2		
Economic status						
Low	3	13	1	1.5	5.54	0.06
Moderate	19	82.6	64	95.5		
High	1	4.3	2	3		
Final evaluation at first year as regards to nursing subject						
Passable	1	4.3	1	1.5	41.11	0.000**
Good	15	65.2	3	4.5		
Very Good	5	21.7	45	67.2		
Excellent	2	8.7	18	26.9		
Number of mobile phones						
One	**20**	**87**	**51**	**76.1**	**1.2**	**0.27**
Two	**3**	**13**	**16**	**23.9**		
Monthly mobile expenditure						
≤ 50	16	69.6	7	10.4	31.59	0.000**
51 to ≤ 100	5	21.7	48	71.6		
101 to 150	2	8.7	12	17.9		

III. Discussion :

Presence of mobile technology allowed students to continue learning outside of classroom settings and during their everyday duties. Technological interventions permitted students to practice their clinical skills without compromising patient safety.Adding mobile technology in pre-registration nursing education improved nursing performance, prepared students for the practice and enhanced critical thinking skills leading to saver patient care. The presence of mobile technology increased the students' confidence and improved efficiency and organizational skills during clinical practice

Part I: Student's Demographic Characteristics

As regards studied nursing students' age and gender, the present study showed that, more than half of studied subjects were females aged twenty years and more with mean age 19.74 ± 0.81and majority of the studied students had moderate economic status. This may be because the students of this study were in the same study year (2nd year) and the old belief that nursing is profession to female so most of nurses in Egypt are females and from families with moderate economic status. This finding was supported by**Costa et al., (2020)** in the study entitled "Satisfaction and self-confidence in the learning of nursing students: Randomized clinical trial, who reported that most students were female and the most frequent age group was from twenty one to twenty three years old .

In the same line the result of the current study confirm with **Salameh, Ewais. & Salameh. (2020)** who accomplished the study about Integrating M-Learning in Teaching ECG Reading and Arrhythmia Management for Undergraduate Nursing Students, and stated that the majority of the participants in both control group and experimental group were between twenty two to twenty four years of age. Concerning the participants' gender, 65.4%, 57.7% of the participants were female in both control group and experimental group respectively

Concerning type of mobile phone used, the present study showed that nearly all students used smartphones and more than three-quarters had one phone. This may be due to the fact that smartphones and tablets are portable and cheaper if they are compared with desktop PCs, and laptops, this makes smartphones available and affordable for a wide range of students. Nowadays, most of the students are using smartphones on regular bases. These findings were in accordance with **Salameh et al., (2020)** whoreported that 100% of the students owned Smartphone's and they use it on a regular basis. This data is higher than previous studies which found that majority of the students owned mobile devices **Briz-Ponce et al., (2017)** who studied Learning with mobile technologies–Students' behavior.

On the same line **Boruff& Storie (2014)** in the study about Mobile devices in medicine: a survey of how medical students, residents, and faculty use smartphones and other mobile devices to find information, mentioned that most of the studied sample owned smart phone device

Regarding student's evaluation of nursing subject at first year, the present study showed that more than half of the studied nursing students had very good in the final evaluation at first year as regards to nursing subject. This study results consistent with **Nagah, (2017)** who mentioned in the study entitled **"**High fidelity simulation versus traditional teaching for second year nursing students" that a higher percentage of the traditional group had very good evaluation at nursing subject at first year.

As regards to monthly mobile expenditure, the present study mentioned that more than half of the studied subjects spent from fifty to one hundred pound for mobile used with mean score of monthly expenditure 74.41 ± 32.59. This may be due to that this charging amount is the most suitable money for using phone in internet use. This finding goes in the parallel line with**Iqbal & Bhatti (2016)** who discussed "What drives m-learning? An empirical investigation of university student perceptions in Pakistan, The results of this study suggest that more than 51% of the students' monthly mobile bill exceeds Rs. 500. It means students generally have a monthly mobile budget suitable for subscribing to Internet/SMS packages and thus are in a position to engage in m-learning

Part III: Students' Clinical Nursing Competence

The current study clarifies that all the studied nursing students had unsatisfactory level of knowledge at pre implementation of the program then changed to slightly more than three quarter of them had satisfactory level of knowledge regarding endotracheal tube care at post implementation of the program. In addition to the study demonstrated that, a general improvement in student' competent level of practice at all items regarding endotracheal tube care at post implementation of mobile based learning program compared to pre implementation with a highly statically difference were observed in pre-test and post-test at p value < 0.01 with total practice mean **0.01 ± 0.03** at pre implementation compared to **0.75 ± 017** post the implementation.

From the researcher point of view, this result may be due to the variety of teaching materials which result in an increase in students' knowledge base and the reason that mobile learning positively affects learning performance can be listed as follows: it provides learning anywhere, anytime, supports student-centered

education and provides learning according to individual differences and needs. Therefore, the conclusion could be drawn that, the use of mobile technology contributes positively towards the competence of future nurses and ultimately improves patient safety

These study results are in harmony with **Kim and Park (2019),** who conducted a meta-analysis to evaluate the impact of smartphone-based mobile learning on nursing education. The data of 10 studies that met the inclusion criteria from different databases were analyzed. It was determined that smartphone-based mobile learning has a significant effect on nursing students' knowledge, skills, confidence in performance and learning attitudes.

This study results was well- matched with **Rowe, Frantz &Bozalek (2012)** who carried outthestudy regarding "Nursing students' perception on learning about preterm newborn clinical assessment" suggested, the application of mobile technology had a positive effect on the clinical competence as it improved the knowledge level as well as practical skills. The findings of this study reveal, that the positive outcomes of mobile technology were similar with the results of using videogames to improve clinical skills and create new knowledge that conducted by **(Monti et al. 2015)** who indicated the beneficence of mobile technology in nursing education, especially concerning learning of clinical competence. The results also suggest, that the students along with the patients benefits of the presence of mobile technology in clinical environments. The students also considered it as an important tool to learning during practice and they would prefer using it future workplaces.

Part IV: Students' Learning Motivation

Concerning student's learning motivation, the current results demonstrated that the motivation level of the studied students were significantly higher in all four domains (attention, relevance, confidence, and satisfaction) after implementation of mobile learning, as following; slightly more than two thirds of the studied students had low motivation, slightly more than one quarter had medium motivation at pre implementation of the program then changed to less than one third had low motivation, slightly more than one quarter had medium motivation, slightly less than one fifth had upper medium and slightly less than one quarter had high motivation at post implementation of the program.

This may be due to the subjects of this study were mostly younger- generation students. Young students use mobile devices as an integral part of their lives, and familiarity increases their motivation to learn.

This result is congruent with **Huang & Hew, (2016)** who clarified in the study of " Measuring Learners' Motivation Level in Massive Open Online Courses" that as regards to the attention dimension, the total mean score was 3.58, the highest score was item 8(M=3.96), the lowest scores were item 2&3(M=3.19). It suggests that learners' motivation levels were positive in the attention scope. According to the data, learners were most satisfied with the amount of repetition in courses (M=3.96). Learners think that the materials and quality of the writing were acceptable (M=3.19), but there is still room for improvement.

Concerning relevance dimension, there were highly statistically significant differences for all items of relevance dimension pre to post the program implementation with p value <0.01 and the mean score of it was 2.79 ± 0.77at pre implementation compared to 3.48 ± 0.82post the implementation.This goes in the same direction with **Huang et al.,2016** who stated in the relevance dimension, the total mean score was 3.77, the highest score was item9 (M=4.26), and the lowest score was item 2 (M=3.33). It showed that learners thought the learning materials were quite relevant to their interest or work.

IV. Conclusion:

Based on the findings of the present study, it can be concluded that: slightly more than three quarter 75.6% of the studied students had satisfactory level of knowledgeand slightly less than three quarter 74.4% of the studied students had competent level of practice regarding endotracheal tube care at post implementation of the program and there was highly statistical significant improvement regarding all items of knowledge and practice. More over regarding student' motivation slightly more than two thirds of the studied students 67.8% had low motivation, slightly more than one quarter 26.7% had medium motivation at pre implementation of the program then changed to less than one third 31.1% had low motivation, 25.6% had medium motivation, 8.9% had upper medium and slightly less than one quarter 24.4% had high motivation at post implementation of the program.

As well the results of this study supported the hypothesis of the study that, there was highly statistical significant improvement regarding student's clinical competence and motivation from pre to post implementation of program. This study demonstrated that a mobile device is a valuable form of technology that can be used in nursing education to promote nursing student's motivation and confidence in learning a clinical nursing skills; motivation and confidence in learning were improved

V. Recommendations

Based upon results of the current study, the following recommendations are suggested:

1. Create new mobile applications to be used in both theoretical and clinical curriculums.
2. Introduce adequate training programs to both instructors and students on using mobile application in education.
3. Provision of E-courses and blended courses wherever possible in nursing education.
4. Nursing educator should investigate ways to enhance their learner motivation by engaging them in the learning experience and reinforcing their self – learning behaviors.
5. Mobile based learning be added to the undergraduate nursing curriculum as a complementary strategy to the existing ones, especially in teaching topics related to Primary Health Care, in which simulation studies and experiments are still incipient.
6. Institutions are encouraged to promote improvements in the laboratory infrastructure and in the faculty capacity to work with the mobile learning strategy.

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