



Effect of Educational Technology Usage on Student's Clinical Skills, Competencies and Satisfaction at School of Nursing in Sokoto State, Nigeria

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ABSTRACT

Background: Technology allows the most difficult tasks to become seamlessly easy and more efficient. In education, technology has allowed the dissemination of knowledge to be dispersed instantly and it allows for quicker and more effective communication. A critical reflection on what nursing educators should consider now in order to better support the clinicians of the future is also included with a particular focus on existing informatics curricular supports. **Aim:** The study aimed at assessing the effect of the use of educational technology on student clinical skills, competency, and satisfaction at schools of nursing Sokoto state. **Methodology:** A quasi-experimental design was used for the study, A total of 239 respondents, with pre-test/post-test injection and hand hygiene clinical Competency observation checklist and a researcher-developed a questionnaire for satisfaction. **Results:** The findings of the study revealed that the effect of educational technology on student clinical competence skills based on hand hygiene difference of 2.36 with $t(186)=9.837$, $p<0.05$, hence, the experiment group performed better than the control group in hand hygiene competencies and injection procedure with mean 1.12 with $t(186)=3.556$, $P<0.05$ The satisfaction with teaching/learning using reusable learning object, both experiment, and control groups were relatively satisfied with the reusable learning object educational technology The mean levels of satisfaction was 26.54 and 26.38 for experimental and control groups respectively $r(92)=0.425$, $r^2=0.18$ (18%), $P<0.05$ **Conclusion:** The RLOs were successful in supporting the students understanding of clinical procedures such as injection and hand hygiene issues, resulting in effective ability and confidence to meet their clinical competency.

Keywords: Learning Object, Technology, Clinical Competency, Effectiveness, Satisfaction

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Introduction

Over a decade ago, reusable learning objects (RLOs) were described by David Wiley, (2009). As occupying the “position of technology of choice in the next generation of instructional design, development and delivery” The concept of an RLO appears extremely attractive in the potential it offers for learning material to be packaged, shared, and reused in many different contexts and by many different people. As reported by Friesen, significant resources have been invested in

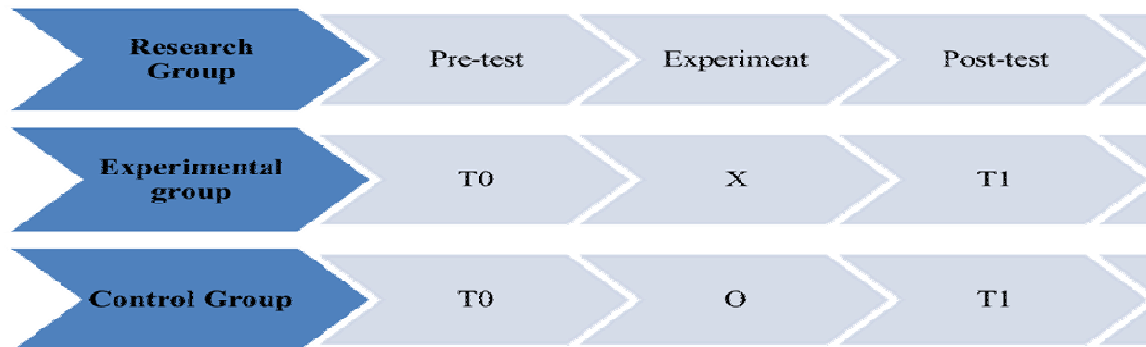
projects aimed at developing RLOs and in establishing learning object repositories (LORs) that can manage and make available searchable collections of RLOs. There now exist internationally many thousands of RLOs in many different repositories, Point to the growing population of LORs, learning object referatories, open courseware initiatives, learning management systems, and institutional repositories. We follow their usage of the word “repository” as covering all such systems. Some of these repositories are

reasonably well known, but many other RLOs exist in more obscure environments and may not be easy to find, learning objects are scattered across servers housed in academic departments and colleges, campus libraries, state and federal government agencies, community-based consortia, professional societies, and even commercial entities.” As the benefits of sharing educational resources have become internationally recognized, the importance of these resources being openly available for reuse and repurposing has received increasing emphasis (e.g., the recent draft statement from the World Open Educational Resources (OER) Congress at UNESCO, (Sinclair, Mike, Yau, & Hagan, 2013). The Nursing education system should

produce graduates that are well equipped to work in an evolving highly technological environment. This calls for the integration of Information Communication Technology (ICT) into nursing education curricula at all levels. In line with this, the Nursing and Midwifery Council of Nigeria revised the curriculum for General Nursing and Midwifery in 2013 and added ICT courses, (Evans, 2012).

Methods and Materials

A quasi-experimental design was used for the study (experimental control group, non-randomized, pre-test post-test), and a researcher-developed a questionnaire for satisfaction



The target population constituted of students in their first year of nursing training in School of Nursing Usumanu Danfodio University Teaching Hospital Sokoto UDUTH, with a total of 158 students and College of Nursing Sokoto with 239 students. The study area has a total population of 397 students.

The sample size was determined using Karan & Biswa, 2013 since the main aim of the work is to compare control and experimental group. Systematic random sampling technique was employed to pick the respondents, data generated were analyzed using the statistical package for social sciences (SPSS) version 24. The socio-demographic characteristics were analysed using frequency and percentages A constant mean of 2.5 was used to ascertain the agreement or non-agreement of the respondents with questionnaire items, inferential statistic tools like t-test was also

used to test the stated hypothesis at a significant level of 0.05.

The instrument was subjected to a supervisory team and a 5-member panel of juries for vetting for face validity. Content validity was done by experts in educational technology.

Ethical approvals were collected from the Research and Ethics Committees in Ahmadu Bello University, Zaria UDUTH ethical committee and Sokoto state ministry of health to conduct the study in the school of nursing UDUUTH and college of nursing science Sokoto informed consent was gained from them after explicit explanation on the procedures involved in the study. The participants were made to understand that participation in the study was fully voluntary and at any point in time a participant has the right to withdraw from the study and a reference number provided to them in case of any undue treatment or inquiry.

Results

Table 1: Socio-demographic characteristics of both studied groups

Variables	School of Nursing UDUTH n=90		College of Nursing Science n=90	
	Intervention Group		Control Group	
	F	%	F	%
Age				
15-30	84	93.3	79	87.8
31-40	6	6.7	11	12.2
Gender				
Male	35	38.9	30	33.3
Female	55	61.1	60	66.7
Year of Study				
Year 1	90	100	90	100

Depicts demographic information of respondents from both SON and CNS. There were 90 respondents representing 100% from each institution. The age groups from SON and CHS were 15-30 and 31-40 with 84 (93.3%) and 6 (6.7%); and 79 (87.8%) and 11 (12.2%) respectively. These implied that most

of the respondents were within the age bracket of 15 – 30. The gender of the respondents from SON and CNS were male and female with 35 (38.9%) and 55 (61.1%), and 30 (33.3%) and 60 (66.7%) respectively. These suggested that most of the respondents were female.

Table 2: Effect of Educational Technology on student clinical competence skills for hand hygiene procedure (Pre & Post-intervention)

Group	Pre-Intervention		Post-Intervention	
	Experiment n=94	Control n=94	Experiment n=94	Control n=94
Mean ± SD	4.15 ± 0.943	4.10 ± 0.423	6.47 ± 1.872	4.11 ± 1.388
Mean (%)	4.15 (50.30)	4.10 (49.70)	6.47 (61.18)	4.11 (38.82)
Mean Difference (%)	0.05 (0.60)		2.36 (22.35)	

SD=Standard Deviation

The Effect of Educational Technology on student clinical competence skills gives results of pre-intervention and post-intervention on the effect of reusable learning object technology on student clinical competence skills based on hand hygiene procedure with mean difference of 0.05 representing 0.60% and 2.36 representing 22.35% respectively.

For pre-intervention, since the intervention was **not** given to the students the result suggested a very low effect of reusable learning object technology on student clinical competence skills. But when intervention was given to the students the result indicated the reasonable effect of reusable learning object technology on student clinical competence skills based on hand hygiene procedures.

Table 3: Effect of Educational Technology on student clinical competence skills for injection procedure (Pre & Post-intervention)

Group	Pre-Intervention		Post-Intervention	
	Experiment n=94	Control n=94	Experiment n=94	Control n=94
Mean ± SD	4.15 ± 0.823	4.10 ± 0.330	6.47 ± 2.304	4.11 ± 2.025
Mean (%)	4.06 (50.59)	3.97 (49.41)	6.18 (54.98)	5.06 (45.02)
Mean Difference (%)	0.095 (1.18)		1.12 (9.96)	

SD=Standard Deviation

Table 4.3 depicts results of pre-intervention and post-intervention on the effect of reusable learning object technology on student clinical competence skills based on injection procedure with a mean difference of 0.095 representing 1.18% and 1.12 representing 9.96% respectively.

For pre-intervention, since the intervention was **not** given to the students the result suggested a very low effect of reusable learning object technology on student clinical competence skills. But when intervention was given to the students the result indicated the reasonable effect of reusable learning object technology on student clinical competence skills based on injection procedure.

Table 4: Level of satisfaction with Educational Technology as a method of teaching/learning among student nurses

Group	Experimental n=94	Control n=94
Mean ± SD	26.54 ± 3.127	26.38 ± 3.186
R	0.425	
r ² (%)	0.18 (18)	

SD=Standard Deviation

r=Correlation/Relationship

Table 4.8 gives the level of satisfaction with reusable learning objects as a method of

teaching/learning among student nurses in Sokoto State and the corresponding satisfaction level was 18%.

Table 5: t-test results for comparison between experiment and control groups in relation to the hand hygiene competencies

Group	Experiment n=94	Control n=94
Mean ± SD	6.47± 1.872	4.11± 1.388
Mean (%)	6.47 (61.18)	4.11 (38.82)
Mean Difference (%)	2.36 (22.35)	
df	186	
t-test	9.837	
P-value	0.001	

α = Level of Significance, 0.05

SD=Standard Deviation

df =Degrees of Freedom

Table 4.7 shows the t-test results for testing the significant differences between experiment and control groups in relation to hand hygiene competencies. The mean of hand hygiene competencies of experiment and control groups were 6.47 representing 61.18% and 4.11 representing 38.82% respectively, and the mean difference was 2.36 representing 22.35%. At the level of significance, 0.05, there was a significant difference between experiment and control groups with $t(186)=9.837$, $P<0.05$, hence, the null hypothesis was rejected.

Therefore, the experiment group performed better than the control group in hand hygiene competencies.

Discussion of Findings

Sociodemographic characteristics

The findings of the results implied that most of the respondents were within the age bracket of 15 – 30. While 60 (66.7%) of the respondent were female. These suggested that most of the respondents were female. Since the study focused on year 1 in both institutions; SON and CNS have a total sample of 90 representing 100%. These revealed that all the respondents were in year-1 of their study.

Effect of Educational Technology on Student Clinical Competence Skills for Hand Hygiene and Injection Competency

This study revealed the Effect of reusable learning object technology on student clinical competence skills for hand hygiene procedures with a mean difference of 2.36 (22.35%) and injection procedure with a mean difference of 1.12 (9.96%). respectively as compared with experimental and control groups. The study is in congruence with the study by Williams et, al on Using reusable learning objects (RLO) in injection skills teaching suggests that the RLOs have had a positive impact on student knowledge (91.7%), on on-course success (91.7%), and knowledge retention (88.8%), as reported by this participant group. These partially support

findings by. Eyyam & Yaratan, (2014) found that technology had positive effects on academic achievement. These findings are supported by other studies describing the educational benefits of RLOs in blended learning settings in healthcare curricula (Williams et al., 2015; Bath, Windle, et al., 2011). A study by Mikhail, et et, 2018 utilized multiple methods of analysis, Teaching Sensor Technology and crowd-sourcing with Reusable Learning Objects. The study reveals that Reusable learning objects were effective teaching tools as demonstrated by excellent scores (A) received by the students for all RLO quizzes.

The similar positive responses of the PGD and MPH students suggest that the flexibility of the RLOs makes them suitable for multi-professional learning perhaps providing support for having shared open repositories for healthcare education (Wharrad HJ, Windle R 2010). There is conclusive evidence that digital equipment, tools, and resources can, when effectively used, raise the speed and depth of learning in nursing clinical practice.

Level of Satisfaction with Educational Technology as a Method of Teaching/Learning among Student Nurses

The study shows the level of satisfaction with reusable learning objects as a method of teaching/learning among student nurses and the corresponding satisfaction level was 18%, the finding is supported by (Wharrad et al, 2012) According to the student's design of the RLO's was very suitable and they were satisfied with the granularity and context of the RLO's. However, not all students liked the RLO or some of the media used, though these students were in the minority Supported by military et al (2015). On how digital technologies facilitate student satisfaction in higher education institutions, The study shows Significant correlations and relationships on the students' satisfaction over used digital technologies in the teaching and learning process.

Hypothesis

There is no significant difference between experiment and control groups in relation to hand hygiene and injection competencies.

The mean difference was 2.36 representing 22.35%. At the level of significance, 0.05, there was a significant difference between experiment and control groups with $t(186)=9.837$, $P<0.05$, hence, the null hypothesis was rejected. Therefore, the experiment group performed better than the control group in hand hygiene competencies. The mean difference was 1.12 representing 9.96%. At the level of significance, 0.05, there was a significant difference between experiment and control groups with $t(186)=3.556$, $P<0.05$, hence, the null hypothesis was rejected. However, the experiment group performed better than the control group in injection competencies.

Which in agreement with the research by Hextall, Wharrad & Leonardi, (2011) on Teaching tools in Evidence-Based Practice: evaluation of reusable learning objects (RLOs) for learning about Meta-analysis; the study reveals that Students rated their understanding of meta-analysis as improved after a lecture and further improved after completing the RLOs (Wilcoxon paired test, $p < 0.01$ in all cases). Another Quasi-experimental study by Seung-Yoon Oh 2006 on the effects of reusable motivational objects in designing reusable learning object-based instruction, results showed significant effects of RMO on designers' performance but not on their attitudes. The effects of MDA were not supported. It is presumed that participants' insufficient knowledge of instructional design, unfamiliarity with materials, and short performance time contributed to the insignificant results. However, participants' reactions to the RMO and MDA were marginally positive in the post hoc surveys.

Conclusion

Based on the findings, it was concluded as follows: The students have an excellent level of awareness on e-learning and they have a

high level of utilization of e-learning. The study also concluded there was a statistically significant relationship between nursing students' level of awareness and utilization of e-learning in the nursing schools of North-Western Nigeria.

Recommendations

Based on the research findings, the following recommendations were made:

1. Students' awareness of the use of information technology especially e-learning should be improved and maintained by the school management in each school through introducing module mobile.
2. State governments and Non-governmental Organizations should provide adequate ICT resources in the nursing schools to enhance accessibility and utilization by the students.

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