CHAPTER THIRTEEN

IMPACT OF BLENDED LEARNING ON PRE-SERVICE TEACHERS' LEARNING OUTCOMES IN WOODWORK IN COLLEGE OF EDUCATION MINNA, NIGER STATE NIGERIA

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ABSTRACT

The study sought to determine the impact of blended learning on pre-service woodwork teachers learning outcomes in college of education Minna. Two research questions were raised and answered and two null hypotheses were formulated and tested at 0.05 level of significance. The study adopted a descriptive survey research design. The study was conducted in colleges of education Minna, Niger State. The population of the study comprised of 53 respondents. The reliability co-efficient of the instrument was 0.77 using split half reliability technique. The study employed the use of descriptive statistics using mean and inferential statistics Z-test to analyze the data and test the null hypotheses. The study found out that, blended learning had positive impact on pre-service woodwork teachers' achievement. The study recommended among others that the government should invest in infrastructure and resources to support blended learning initiatives, to ensure equitable access for all students.

INTRODUCTION

The term "blending" comes from a novel approach to learning whereby face-to-face and electronic are fused together. Blended Learning includes online discussion, such as in mediated asynchronous forums and or remote lessons delivered live through Teams, Zoom, Google Meet or similar. Owston (2018) opined that blended learning is "combining face-to-face learning with technology-assisted learning." In other words, blended learning or hybrid learning is "combining the best features of classroom activities with the best features of online learning, thereby encouraging active and independent learning and shortening classroom time" (Graham 2022). Blended learning depends on the capabilities of digital education pertaining to interactions among students, as well as between students and instructors, which may occur in either synchronous or asynchronous formats.

Blended Learning facilitates the cultivation of vital skills pertinent to the 21st century, including critical thinking, collaborative engagement, and problem-solving abilities, as students acquire proficiency in leveraging technology as an instrument for both educational purposes and effective communication. Poleschuk, et al, (2023) opined that Blended Learning has a positive impact on student outcomes such as performance, attitude and learning achievement in various countries. Karamperidou, et al, (2020). Also postulated that when blended learning is effectively integrated into the classroom, it has strong positive associations with student learning and motivation. For instance, Owston, York, & Malhotra, (2019) carried out study in Canada on university students. The study revealed that blended

learning were more favorable to have more engaging classes. They also reiterated that learning from different sources with various learning tools and websites expanded their knowledge, so their intrinsic motivation increased tremendously. Additionally, Aidarus (2023) conducted study assessing the impact of blended learning approach on student learning outcomes in higher education from the perspectives of the professors and students in Qatar. The findings obtained from the explanatory research included seven variables of these, satisfaction, student perceived usefulness, awareness, and professor perceived usefulness showed significant positive effects, and they influenced student outcomes using the learning approach directly. Blended learning constitutes a prevalent concept within modern educational frameworks. A notable advantage inherent to the blended educational model is its inherent flexibility, permitting both learners and educators to operate independently of geographical and temporal constraints. Nevertheless, it concurrently fosters a context in which educators and learners can leverage the myriad benefits associated with traditional pedagogical methods whenever feasible. The emergence of new technological advancements has significantly influenced the learning process among students in higher education. The new technologies have been embraced by students and led to the growth and popularity of learning using the internet. Thus, many universities use blended approach in higher education.

The relevance of blended learning was underscored by the changes in the educational landscape during the COVID-19 pandemic when stakeholders sought ways of ensuring continuity regardless of the limitations caused by the deadly virus. Online learning represents the use of the internet as a means of interaction between students and teachers. Blended learning (BL) and online delivery (OL) were used by many universities in order to embrace the new challenges in higher education (Zeqiri & Alserhan 2020). Blended learning offers numerous advantages for students such as enhancing motivation and engagement, developing cognitive and social skills, increasing the quality of education, and increasing digital literacy.

Blended learning helps students learn how to work alone, monitor and assess their own learning and work cooperatively with other learners without the lecturer's involvement. This enable the students to have control over the learning and feel that making mistakes is part of learning, and it is useful for achieving eventful mastery. Uz & Uzun (2018) examined 102 undergraduate students in Turkey which revealed that blended learning improved students in terms of self-paced learning. Online learning has become a new building block in education because of its ability to provide a more flexible content and access to instruction without putting time and distance into consideration. Blended learning has been used for presenting learning experiences in different school subjects effectively. According to Martanto, Pramono, & Sanjoto, (2021) blended learning proved highly effective in providing students with social studies skills such as critical thinking, communication, collaboration, problem-solving, and creativity. Blended learning may be taken into consideration as being appropriate for acquiring knowledge of diverse topics in different subjects among which Woodwork Technology is included.

Woodwork is the activity or skill of making items from wood, and it involves cabinet making, joinery and general carpentry. Muhammad, et al (2019) opined that woodwork is also seen as the activity or skill of making objects from wood by Woodwork craftsmen. It is an integral part of Technical Vocational Education and Training (TVET) programme. It is one of the Technical Education trades offered in Niger State Colleges of Education. The significance of Woodwork technology education cannot be over emphasized because it aims at preparing the

learner with professional competency in the world of work. These need to inspire the younger generation to develop an interest in and embrace the trade. Unfortunately, the opposite is the case within side the use of these days because the concern maintains to witness systematic decline of the pre-service teachers academic achievement.

Academic achievement can be referred to as the quality of knowledge acquired and retained by the students in the course of study. Musa, S.; Kareem, W. B., & Owodunni S. A. (2023) described academic achievement as a performance in school subject as symbolized by score on an achievement test. Student's level of achievement is usually influenced by many factors such as students' readiness, instructional materials, instructional methods and students' satisfaction. However, most researchers consider satisfaction to be one of many factors leading to an efficient blended learning experience (Healy et al, 2017; Karimi, & Ahmad, 2013). Abbas (2018) defines satisfaction as having expectations met or exceeded. Most studies have shown that a lecturer's positive attitude towards blended learning delivers satisfaction and a perception of enjoyment to students may affect their overall levels of achievement. The pedagogical benefits include increased productivity and willingness to participate in learning, with a particular emphasis on space and time flexibility and greater accessibility to materials. Abbas (2018) examines more factors regarding satisfaction with professor–student and student–student interactions. Medina (2018) agrees that student satisfaction can be used to evaluate the success of blended learning.

Blended Learning not only provides more options for students' learning, but it also has other benefits, such as improving access to learning materials and enhancing the quality of learning. Various academic activities such as lecturing, group and individual projects, presentations, resource sharing, and free discussions can be applied in a combination of face-to-face classroom and online learning (Khan, et al, 2012). This approach allows for more dynamic interactions between students and teachers, while still offering the flexibility of online content delivery and it is useful for achieving eventual mastery. Blended learning has become a new building block in education because of its ability to provide a more flexible content and access to instruction without putting time and distance into consideration.

Although computer-mediated communication or online technologies, increasing the interaction of students with their peers and teachers, have been developed to replace face-to-face interaction, the question of whether they can actually replace face-to-face interaction in the traditional classroom remains unanswered. Blended learning allows for flexibility and the use of various digital tools to enhance the learning experience. However, in the Nigerian context, there is limited research on how this method specifically impacts pre-service teachers' learning outcomes in Woodwork. Thus, the study investigates the extent to which blended learning can impact pre-service woodwork teachers' academic achievement and their level of satisfaction with the approach.

STATEMENT OF THE PROBLEM

The educational landscape is evolving rapidly, with flexible and accessible learning becoming essential components of modern pedagogy. These approaches cater to diverse learner needs, promote inclusivity, and enhance engagement through adaptable learning formats. Garrison and Vaughan (2021) opined that the goal is to accommodate diverse learning styles, personal schedules, and preferences, making education more learner-centered. In the wake of technological advancements and the disruptions caused by events like the COVID-19 pandemic, flexible and accessible learning approaches have become more prominent than ever before. Blended learning, which combines online and face-to-face

instruction, has become one of the most widely adopted flexible learning models in higher education and the secondary school settings. This approach allows for more dynamic interactions between students and teachers, while still offering the flexibility of online content delivery. On this basis, the study seek to assess the impact of blended learning on pre-service woodwork teachers' achievement and the level of their satisfaction with blended learning approach in learning Woodwork trades in College of Education Minna, Niger State.

RESEARCH OBJECTIVES

The main objective of this study was to examine the impact of blended learning on pre-service woodwork teachers' learning outcomes at the College of Education Minna. Specifically, the study intends to;

I. Determine the impact of blended learning on pre-service woodwork teacher's academic achievement in college of education Minna.
ii. Examine the level of pre-service woodwork teacher's satisfaction on the use of blended learning in college of education Minna.

RESEARCH QUESTIONS

The study developed the following research questions:

i. What is the impact of blended learning on the academic achievement of pre-service woodwork teachers at the College of Education, Minna?
ii. What is the level of satisfaction of pre-service woodwork teacher's on the use of blended learning in College of Education Minna?

RESEARCH HYPOTHESES

There is no significant difference in the mean response of woodwork pre-service teachers and woodwork lecturers on the impact of blended learning on woodwork service teacher's achievement in college of education Minna Niger State.

H 2 e is no significant difference in the mean response of pre-service woodwork chers and woodwork lecturers on pre- service woodwork teacher's satisfaction in e use of blended learning in college of education Minna Niger State.

METHODOLOGY

Research Design

The study adopted a descriptive survey research design. The study was conducted in college of educati linna, Niger State. The population of the study comprised of all Woodwork le teachers in-training in College of Education Minna, Niger state. Total echnique was used to select all the Woodwork lecturers and teachers in-training llege of Education Minna. Two research questionnaires were used. One of the onnaires consists of 10 items focused on the effect of blended learning on the academic hievement of pre-service teachers in woodwork in College of Education, Minna. The second questionnaire consist of 10 items seeking information on the level of pre-service teachers' and lecturers satisfaction on the use of blended learning use in teaching woodwork in College of Education Minna. The instrument used for data collection is a structured questionnaire developed by the researcher. The two questionnaires were designed using Likert-type scale of SA=Strongly Agree, A=Agree, D=Disagree, SD=Strongly Disagree for research question one and Very satisfied, satisfied, Unsatisfied, Very unsatisfied were used for research question two. The instrument was subjected to face and content validation by three experts. The reliability co-efficient of the instrument was 0.77 using split half reliability

technique. Copies of the questionnaire were administered to the respondents by the researcher with the help of two research assistants, who were briefed by the researcher. The copies of the questionnaire were distributed and retrieved after two weeks. The retrieval of the instrument was also done through personal contact and with the help of the two research assistants. Mean and standard deviation were used to answer all the research questions while inferential statistics Z-test was used to test the null hypotheses at 0.05 level of significance. In taking decision, any item with mean of 3.50 and above was regarded as agree while item with mean less than 3.50 was regarded as disagree. If the t-cal is more than the t-tab, the null hypotheses were rejected; but if the t-cal is less than the t tab, the null hypotheses was accepted.

Research Question 1: What is the effect of blended learning on pre- service woodwork teachers' academic achievement in College of Education Minna, Niger State?

Data for answering research question one is presented in table 1

Table 1: Mean of pre-service woodwork teachers on effect of Blended learning on their Academic Achievement.

S/NO	Items	X1	SD	X2	SD	X_A	SD_A	Remark
1.	I have better grades in classes that combine online and face to face instructions	3.83	1.03	3.67	1.37	3.75	1.20	Agreed
2.	Face to face and blended learning have improved my study habit	3.51	1.20	4.00	.00	3.76	0.60	Agreed
3.	My performance has dropped since the introduction of blended and face to face learning	2.91	1.46	2.67	2.67	2.79	1.66	Disagreed
4.	The internet has resources to support students in their homework.	3.77	1.43	4.83	.41	4.30	0.92	Agreed
5.	Using blended learning enables me to be exposed to a variety of activities.	3.83	1.05	3.83	1.47	3.83	1.26	Agreed
6.	Using blended learning enhances my study effectiveness.	4.09	1.28	4.17	1.17	4.13	1.23	Agreed
7.	Using blended learning environment offers easy access to learning content.	3.70	1.64	4.33	1.21	4.02	1.43	Agreed

S/NO	Items	X1	SD	X2	SD	X_A	SD_A	Remark
8.	Using a blended learning environment makes writing tests easier.	3.98	1.57	4.00	1.55	3.95	1.56	Agreed
9.	The use of the internet promotes communication among students.	3.70	1.30	4.33	.82	4.02	1.02	Agreed
10.	The Internet has resources to support students in their homework.	3.60	1.60	3.67	1.37	3.64	1.49	Agreed
	Gran Mean	**3.69**	**1.36**	**3.95**	**1.12**	**3.82**	**1.24**	

Table 1. Shows that, respondents agreed with all the items except item 3 with mean values ranging between 3.64 - 4.30. This signified that all the items excepted are effects of BL on students' academic achievement, while item 3 is not.

Research Question Two: What is the level of pre-service Woodwork Teachers and Lecturers' satisfaction on the use of blended learning in college of education Minna?
Data for answering research question two is presented in table 2

S/NO	Items	X1	Sd1	X2	SD	XA	SDA	Remark
1.	If a new opportunity arose, I would choose receiving traditional instruction again.	3.40	1.21	3.17	1.33	3.29	1.27	Unsatisfied
2.	I am used to the face to face approach only	3.04	1.32	3.00	1.10	3.02	1.21	Unsatisfied
3.	Using face to face only improves my achievement	2.83	1.40	3.17	1.72	3.00	1.59	Unsatisfied
4.	Blended learning is time consuming.	2.89	1.34	2.50	1.22	2.70	1.28	Unsatisfied
5.	Blended learning is technically difficult.	3.11	1.18	3.67	1.37	3.39	1.28	Unsatisfied
6.	Blended learning needs training.	3.36	1.22	4.00	1.10	3.68	1.16	Satisfied
7.	I am satisfied with the blended learning environment.	4.26	1.42	4.00	1.67	4.13	1.55	Satisfied
8.	I am confident in the blended learning environment.	3.96	1.38	3.83	1.83	3.90	1.61	Satisfied

S/NO	Items	X1	Sd1	X2	SD	XA	SDA	Remark
9.	Using blended learning environment is convenient.	3.83	1.18	4.17	1.18	4.00	1.18	Satisfied
10.	I wish blended learning was common at all educational institutions globally.	3.60	1.47	4.33	.52	3.97	1.00	Satisfied
	Grand Mean	**3.16**	**1.31**	**3.58**	**1.30**	**3.38**	**1.31**	

Table 2 shows that respondents are in agreement with item 6, 7, 8, 9, and 10 with mean values ranging between 3.43 - 4.13 signifying that the respondents are satisfied with the use of blended learning approach in teaching and learning of woodwork trades while item 1, 2, 3, 4 and 5 with mean values ranging between 2.70-3.39 signify that the respondent are unsatisfied with the items on the level of pre-service teachers and lecturers satisfaction with the use of blended approach. However, the standard deviation of all the respondents is less than 1.95 which is an indication that the respondents are not too far from each other in their responses.

Hypothesis 1. There is no significant difference in the mean response of pre-service Woodwork teachers' and lecturers on the effect of blended learning on students' academic achievement in college of education Minna Niger State.
Result for testing hypothesis one is presented in table 3

Table 3: T-test analysis of the mean responses of Woodwork pre-service Woodwork teachers' and lecturers on the effect of blended learning on students' academic achievement in college of education Minna Niger State.

Group	F	Sig.	t	Df	Sig. (2-tailed)
Between Groups	.461	.500	-1.251	51	.217
Within Groups			-1.707	8.206	.125

The analysis of the result presented in table 3. Revealed that since the p-value which is 0.50 is greater than 0.05, this implies that there is no significant difference in the mean responses of both groups of respondents. Therefore the null hypothesis of no significant difference in the mean responses of woodwork pre-service teachers and woodwork lecturers on the impact of blended learning on woodwork pre- service teachers' achievement in college of education is not rejected.

Hypothesis 2. There is no significant difference in the mean responses of pre-service Woodwork teachers and lecturers' level of satisfaction on the use of blended learning in college of education Minna

Data for testing hypothesis one are presented in table 4.

Table 4: T-test analysis of the mean responses of pre-service Woodwork teachers and lecturers' level of satisfaction on the use of blended learning in college of education Minna, Niger State.

Group	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference
Between Groups	1.123	.29	-2.698	51	.009	-5.2234
Within Groups			-3.499	7.758	.008	-5.2234

The analysis of the result presented in table 4. Revealed that since p-value 0.29 is greater than 0.05, this implies that there is no significant difference in the mean responses of both groups of respondents. Therefore the null hypothesis of no significant difference in the mean responses of woodwork pre-service teachers and woodwork lecturers on the woodwork pre-service teacher's satisfaction in the use of blended learning in college of education is not rejected.

DISCUSSION OF FINDINGS

Table 1. Presents a comprehensive analysis of the effect of blended learning on students' academic achievement at the college of education Minna, addressing Research Question One. The findings, expressed through mean scores, demonstrate an overwhelming agreement among respondents regarding the positive impact of blended learning. The study is in line with Owston (2018) who find out that blended form of instruction is accommodating learners' needs academically, promoting critical thinking skills and allowing interaction among learners. Similarly, Harahap, F., Nasution, N. E. A., & Manurung, B. (2019) argued that blended learning, with its combination of online and face-to-face instruction, fosters a more engaging and effective learning environment. Study carried out by Uz and Uzun (2018) examined 102 undergraduate students in Turkey which revealed that blended learning improved students in terms of self-paced learning. The students who took part in a blended learning instruction mode outperformed. The mean scores in this study, particularly for statements such as the creation of a user-friendly learning environment and the improvement of overall performance, align with the idea that blended learning has positive impact on pre-service teachers' achievement. The weighted mean score of 3.82 further supports the consensus among students, reinforcing the positive perception of blended learning's efficacy in enhancing academic achievement.

Table 2. Presented result on the extent to which woodwork pre-service teachers are satisfied with blended learning. The results indicated that students in the study were very satisfied with learning in a blended learning environment. The findings reveal a positive perception among respondents. The mean scores, ranging from 3.43 to 4.13 indicate agreement on the level of satisfaction pre-service teachers have with blended learning in woodwork technology. This is similar with the study of Abbas (2018) whose study found that students are highly satisfied with blended learning and have a strong interest in using available technologies, influenced by students' expectations, convenience in the course scheme, and implementation. Kumrow (2007) attests that students' engagement, satisfaction and motivation increase dramatically if they are exposed to a blended instruction model. This signifies that when students are satisfied with the use of blended learning approach, it can change the way they think and also enhance their academic achievement. Rasheed, R. A., Kamsin, A., & Abdullah, N. A. (2020) contend that lack of sufficient digital literacy among teachers or students can disrupt

learning, so positive attitudes towards blended learning can decrease accordingly. These also show that lack of satisfaction with the use of blended learning approach can hinder pre-service teachers' achievement.

CONCLUSION

This study sought to investigate the impacts of blended learning on Woodwork pre-service teacher's academic achievement in Woodwork. Additionally, pre-service teachers 'and Woodwork lecturers level of satisfaction with the use of blended learning was explored. Based on the collected data, it was revealed that blended learning contributed significantly to pre-service teachers' academic achievement. Additionally, pre-service teachers and lecturers' perceptions were positive towards blended learning. The data collected also revealed that pre-service teachers and lecturers were satisfied with the use of blended learning approach in teaching and learning of Woodwork. Considering the impact of blended learning approach on Woodwork pre-service teachers, all stakeholders of education can be encouraged to implement it successfully.

RECOMMENDATIONS

Based on the findings and conclusion of this study, the following recommendations were made:

1. The study on the impact of blended learning on pre-service teachers should be conducted in other trade courses offered in Colleges of Education Nigeria.
2. Government should take the responsibility of training and re-training lecturers on blended learning approach for better learning outcomes.
3. Government should invest in infrastructure and resources to support blended learning initiatives, to ensure equitable access for all students.

References

Abbas, Z. I. (2018). Blended Learning and Student Satisfaction: An Investigation into an EAP Writing Course. Advances in Language and Literary Studies 9(1). https://doi.org/10.7575/aiac.alls.v.9n.1p.102.

Aidarus, F. (2023). Assessing the Impact of the Blended Learning Approach on Student Learning Outcomes in Higher Education from the Perspectives of the Professors and Students: A Qatar Case. Unpublished doctoral dissertation, University of Portsmouth, England.

Daramola, F. C., (2018). Perception and utilization of electronic resources by undergraduate student: The Case of Federal University of Technology Library, Akure. *American Journal of Educational Research,* 4 (5) 366-370.

Daskan, A., & Yildiz, Y. (2020). Blended Learning: A Potential Approach to Promote Learning Outcomes. International Journal of Social Sciences & Educational Studies, 7(4), 103-108.

Garrison, D. R., & Vaughan, N. D. (2021). Blended Learning in Higher Education: Framework, Principles, and Guidelines. Jossey-Bass.

Graham, C. R. (2013). A framework for institutional adoption and implementation of blended learning in higher education. The Internet and Higher Education. 18, 4-14.

Healy, S., Colombo-Dougovito, A., Judge, J., Kwon, E., Strehli, I., & Block, M. E. (2017). A practical guide to the development of an online course in adapted physical education. *Palaestra, 31*(2), 48-54.

Harahap, F., Nasution, N. E. A., & Manurung, B. (2019). The effect of blended learning on student's learning achievement and science process skills in plant tissue culture

course. *International Journal of Instruction*, 12(1), 521–538.
Karamperidou, Despina, Theodorou, N., Dreesen, T., Brossard, M., Kamei, A. & Santiago Ortiz Correa, J. (2020). Unlocking Learning: The co-creation and effectiveness of a digital language learning course for refugees and migrants in Greece, Innocenti Research Report, UNICEF Innocenti – Global Office of Research and Foresight, Florence. https://www.unicef-irc.org/publications/1158-unlocking-learning-digital-language-learningrefugees-and-migrants-greece.html
Karimi, L., & Ahmad, T. B. T. (2013). Perceived learning and satisfaction in a blended teacher education program: An experience of Malaysian teacher trainees. *Contemporary Educational Technology*, 4(3), 197-211.
Khan, A. I., Noor-ul-Qayyum, Shaik, S., Ali, A. M., & Bebi, Ch. V. (2012) Study of Blended Learning Process in Education Context. *International Journal of Modern Education and Computer Science*, 4(9), 23–29. https://doi.org/10.5815/ijmecs.
Kumrow, D. E. (2007). Evidence-based strategies of graduate students to achieve success in a hybrid web-based course. Journal of Nursing Education, 46(3), 140–145.
Lin, Y.W., Tseng, C.L. & Chiang, P.J. (2017). The effect of blended learning in mathematics course. EURASIA *Journal of Mathematics Science and Technology Education* 13(3),741-770. DOI 10.12973/eurasia.2017.00641a
Martanto, S. D., Pramono, S. E., & Sanjoto, T. B. (2021). The implementation of blended learning in social studies learning for 21st century skills enhancement. *Journal of Educational Social Studies*, 9–18.
Medina, L. C. (2018). Blended learning: Deficits and prospects in higher education. Australasian Journal of Educational Technology, 34(1).
Muhammad, A. H., Yahaya, A. D. & Hassan M. B. (2019) Skills Improvement Need Of Woodwork Teachers in Technical Colleges Of Yobe State, Nigeria. *International Journal of Innovative Information Systems & Technology Research* 7(1):39-49
Musa, S., Kareem, W. B., & Owodunni S. A. (2021). Effects of basic podcast and vodcast methods on general woodwork student's retention and ability in in technical colleges in FCT, Abuja, Nigeria. *Journal of Information, Education, Science and Technology* (JIEST),7 (2), 119-128.
Okaz, A. A., (2015). *Integrating Blended Learning in Higher Education*. Article in Procedia - Social and Behavioral Sciences. DOI: 10.1016/j.sbspro.2015.04.086
Owston, R. O. N. (2018). Empowering learners through blended learning. *International Journal on E-Learning*, 17(1), 65-83.
Owston, R., York, D. N., & Malhotra, T. (2019). Blended learning in large enrolment courses: Student perceptions across four different instructional models. Australasian Journal of Educational Technology, 35(5), 29-45.
Rasheed, R. A., Kamsin, A., & Abdullah, N. A. (2020). *Challenges in the online component of blended learning: A systematic review*. Computers & Education, 144, 103701.
Poleschuk, Svetlana, Dreesen, T., D'Ippolito, B. & Cárceles, J. (2023). Unlocking Learning: The use of education technology to support disadvantaged children's language learning and social inclusion in Italy, Innocenti Research Report, UNICEF Innocenti – Global Office of Research and Foresight, https://www.unicef-irc.org/publications/1687-unlocking-learning.html
Zeqiri, J., Alserhan B. A. (2020), "University student satisfaction with blended learning: a cross-national study between North Macedonia and Jordan", *International Journal of Technology Enhanced Learning*, in press.