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Effect of blended self-directed learning on nursing students: Quasi-experimental approach

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Abstract:

BACKGROUND: Higher education institutions are adapting and innovating like never before to provide highly individualized learning environments for both traditional and non-traditional students. This seismic upheaval in the higher education landscape is being observed across the world. The present study aimed to evaluate the effectiveness of a blended learning approach on nursing students' self-directed learning readiness.

MATERIALS AND METHODS: This study is a quasi-experimental approach in which a non-equivalent control group was used in a post-test design. A comparison was carried out with two separate semester cohort students representing the control and intervention groups which had 24 and 30 students, respectively. This study included first-year nursing students that enrolled in a course called "Anatomy and Physiology" course of nursing education at a private university. The control group received all their teaching face-to-face, and the intervention group used information technology and prescribed activities in their online e-book. The self-directed learning readiness (SDLR) tool measures the learners' readiness in self-directed learning in both groups. This scale comprises three subscales which are "self-management," "desire for learning," and "self-control." An independent-samples *t*-test was conducted to compare self-directed learning readiness in the control and intervention groups. Data were analyzed using IBM SPSS Statistics 25 software to measure the independent *t*-test.

RESULTS: The self-directed readiness scores were significantly higher in the intervention group with $P = 0.019$. The intervention group showed a higher mean value on the subscales of self-management and self-control, which demonstrated a significant difference with P values of 0.018 and 0.028, respectively. The subscale desire for learning was insignificant with a P value of 0.166.

CONCLUSION: This study concluded that the overall results demonstrate that incorporating blended learning using e-books for anatomy and physiology courses in nursing education can contribute to students' readiness for self-directed learning. Specifically, the blended learning teaching and learning strategy had a positive impact on nursing students' capacity for self-management and self-control.

Keywords:

Blended learning, e-book, nursing students, self-directed learning, university

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Introduction

Higher education is undergoing seismic upheaval all over the world, with institutions adapting and innovating more than ever before. One example of this is the use of new technology to create highly individualized teaching and learning

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environments for both traditional and non-traditional students.^[1] To improve course delivery and ensure that students learn more effectively, blended learning components, like online interactions, are being progressively included in traditional learning environments.

Blended learning is the integration of face-to-face learning experiences with

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activities in an online or technology-mediated environment.^[2-4] According to Bazalais and Doleck,^[5] a blended learning method results in greater knowledge acquisition and improved academic achievement. Therefore, a mix of technology-facilitated activities and learning resources provided in various online formats may offer a way to encourage students to be self-directed. As a result, the blended course design carefully combines different modalities of course delivery to give students a flexible and more customized learning experience. Therefore, indicators of preparation for self-directed learning can aid nursing educators in better planning and implementing their pedagogies.

Higher education has begun to pay increasing attention to the idea of self-directed learning. The term “self-directed learning” has a few different definitions, and the terms “active learning,” “independent learning,” and “student-centered education” are frequently used interchangeably in education.^[6] According to Ellis,^[7] adult learners want a self-directed learning experience because it will provide several benefits for them, such as having ownership of the learning process and the expected ability to use a variety of techniques to achieve their learning goals. Self-directed learning specifically helps nursing students develop autonomous learning abilities, as well as accountability, responsibility, and assertiveness, all of which will be important qualities throughout their careers.^[8]

Self-directed learning is driven by internal forces that help learners acquire, synthesize, and internalize knowledge toward their learning outcomes.^[9] However, in adult education, most of the attention has been placed on self-directedness or self-management of learning tasks. Therefore, it is essential for higher education nursing educators to gain knowledge and understanding of student readiness for self-directed learning. This readiness for self-directed learning has a positive influence on student autonomy, critical thinking, and motivation.^[10] Nursing students ready for self-directed learning have demonstrated a desire to learn new information and skills, confidence in their own ability to achieve, and a capacity to easily adapt to environments that provide new educational experiences.^[11]

The self-directed learning readiness (SDLR) tool is used to measure the student’s readiness in self-directed learning in both the traditional instruction approach and the blended learning approach. Self-directed learning readiness (SDLR) is the degree to which a student has the attitude, aptitude, and characteristics necessary for self-directed learning.^[9] The previous study also stated that using anatomy and physiology e-books as a blended learning tool in nursing education can be an effective way to enhance students’ learning experiences, retention

of knowledge, and engagement and improve academic performance.^[12,13]

The purpose of the present study was to determine the impact of traditional and blended learning on the preparation of nursing students for self-directed learning readiness. This study investigated the efficacy of blended learning as a deliberate and strategic modality to improve students’ readiness for self-directed learning adopting an enhanced virtual blended learning environment which is an e-book. This is appropriate for the current pandemic crisis.

Materials and Methods

Study design and setting

A non-equivalent control group and a post-test design comprised the quasi-experimental approach used in this study’s research design. The “Anatomy and Physiology” course served as the foundation for the evaluation, and two distinct semester cohort students represented the control and intervention groups, respectively. The different cohort intakes help to minimize the risk of contamination bias. Contamination bias arises when participants in a control group are given or exposed to instructional materials intended for the intervention group.^[14] The study was conducted at the Universiti Kuala Lumpur (Royal College of Medicine Perak).

Study participant and sampling

This study is comprised of first-year nursing students enrolled in the “Anatomy and Physiology” course in a diploma nursing program. The participants are from two separate semester cohort students representing the control and intervention groups which had 24 and 30 students, respectively. The participant was open to all students in the two cohorts, and their participation was voluntary. This course is one of the courses offered during semester 1 for diploma in nursing program. The control group students were taught using face-to-face lecture instruction and blended learning group students used the e-book for teaching-learning instruction. The survey using SDLR tool was conducted at the end of the course, after completing the lesson in the anatomy and physiology course for both groups. The participants were briefed on the SDLR tool before answering the survey.

Traditional course (control) vs. blended course (intervention) structures

The control group only participated in face-to-face instruction, including tutorials and lectures in the classroom that lasted an average of two hours, as well as practical work in the anatomy laboratory. The intervention group used the technology for online lectures for 30 minutes, and during the remaining 90 minutes,

they watched animated videos, learned about cadaver dissection, and engaged in other participatory exercises as prescribed in their online e-book. The instructional material in this course design of blended learning and traditional learning was incorporating the concept of self-management, desire to learn and self-control. The educator served as a disseminator of knowledge in a lecture format, delivering the information and answering questions asked by the students in traditional learning. The traditional course did not have any access to the online course materials to be used in the blended course. However, in blended learning, students focused on finishing homework assignment, quizzes, watching topic videos, dissection of the cadaver, and reading the smart learning notes in the e-book.

Data collection tools and technique

The data were collected using the self-directed learning readiness instrument that was adopted by the researchers. A priori permission was sought to use the self-directed learning readiness nurse education (SDLRNE) tool from Fisher *et al.*^[9]

This scale comprises three subscales which are 13 items relating to “self-management,” 12 items relating to “desire for learning,” and 15 items relating to “self-control.” The ability of students to manage themselves in a learning environment is indicated by self-management items concerning setting priorities, managing their time to focus on their studies, arranging learning activities, and having the self-control to accept responsibility for their own actions. The desire for learning items brings about realistic awareness of personal needs and characteristics of self-concept. Self-control items are knowing that students take responsibility for their education by establishing goals and devoting study hours which was one of the self-control elements.

The 40 items scale is measured on a five-point Likert scale: 5 = strongly agree, 4 = agree, 3 = unsure, 2 = disagree, and 1 = strongly disagree, and four items require reverse scoring. The range of possible scores for the total SDLRNE is 40–200. It was explained that a total score greater than 150 indicates readiness for self-directed learning.^[9] The total score for the subscales is 65 (self-management), 60 (desire for learning), and 75 (self-control). Multiple research studies have established the validity of the SDLRNE scale. The SDLRNE scale is chosen as the tool here to measure the learners’ readiness. The research by Fisher *et al.*^[9] showed that self-management, learning desire, and self-control all had Cronbach’s alpha values of 0.857, 0.843, and 0.830, respectively. However, for this study the reliability test Cronbach’s alpha values obtained for the constructs were 0.843 for self-management, 0.727 for the desire for learning, and 0.784 for self-control. The validity of

the content was established by the senior educators from the nursing department and elsewhere, and the questionnaires have undergone small changes to customize to the organization’s needs. The data were analyzed using IBM SPSS Statistics 25 software where the findings were presented using tables. A parametric independent *t*-test was used to compare students’ self-directed learning readiness between learners in the control and intervention groups. Both groups have a normally distributed population with the intervention (*P* = 0.163) and control (*P* = 0.121).

Ethical consideration

Ethical approval for the adoption of blended teaching for the intervention group was obtained from the institution’s ethical board (UNIKL REC/2021/03) after acceptance of the research study. Written participant information was provided with an explanation of the study. Informed consent was obtained from all participants. They can withdraw from the study at any time without consequences.

Results

According to the results, the intervention group had 30 participants, compared to 24 in the control group. The total number of female nursing students participating in control and intervention groups in the study is higher than that of male nursing students [Table 1]. The majority of nurses came from the non-sciences secondary educational background [Table 1]. The age of the participants in the control and intervention groups is 18 years. Control and intervention have the same characteristics such as age and educational background, so the self-directed learning capability of the dependent variable is influenced by the intervention rather than by the characteristics of the sample [Table 1]. The proportion of participants in the intervention group who scored high on the self-directed learning readiness scale was higher than that of the control group students [Table 2].

Table 1: Comparison on the characteristic of participants between control group (n=24) and intervention group (n=30)

Variables	Control group n (%)	Intervention group n (%)	<i>P</i>
Gender			0.732
Male	4 (16.7)	4 (13.3)	
Female	20 (83.3)	26 (86.7)	
Students’ secondary education background			0.661
Science	6 (25)	6 (20)	
Non-science	18 (75)	24 (80)	
Age			
18	24 (100)	30 (100)	

An independent-samples *t*-test was conducted to compare self-directed learning readiness in the control and intervention groups. The total mean value of self-directed learning readiness scores for control and intervention was significantly different with a high mean value for self-directed learning readiness score in the intervention group by 8.29 ($P < 0.05$). Among students who participated in blended learning, the average effect size for readiness for self-directed learning is 0.660. The intervention group showed a higher mean value on the subscales of self-management and self-control, which demonstrated a significant difference with *P* values of 0.018 ($P < 0.05$) and 0.028 ($P < 0.05$), respectively. With a $P > 0.05$, the subscale of desire for learning was not significant [Table 3].

Discussion

According to this study, learners who were taught and learned through traditional methods or blended learning had different levels of readiness for self-directed learning. The literature has suggested that a blended learning environment can enhance self-directed learning.^[15,16] In addition, the quality of readiness of nursing students was significantly raised by incorporating the self-directed learning strategy through an educational intervention program.^[17] To ensure competent lifelong professionals, nursing training institutions should give the required tools to embrace self-directed learning as a primary teaching strategy.^[18] Blended learning integration can improve teaching effectiveness to a good level.^[19] According to Essel Awuni and Mohammed,^[20] e-books were the resource that health tutors utilized the most when teaching and learning.

The present study showed that learners were prepared and self-directed to learn the anatomy and physiology course in the blended learning environment based on the mean SDLR in blended learning as compared to the mean SDLR in traditional learning. This result demonstrates that the blended learning environment outperformed the traditional face-to-face teaching environment. Akgunduz and Akinoglu^[21] reported that information and communications technology tools can indirectly develop learners' self-directed learning skills. Other studies by John and Michael^[22] revealed that self-directed learning readiness (SDLR) is an internal factor that can certainly be used as a predictor for the success of the learning process that results in the satisfactory achievement of student learning. Another study that is in line with the results states that through the blended learning strategy, students are seen to be more aware and skilled in managing their time and studying independently.^[23] Therefore, blended learning strategies will help students to organize their learning activities in a focused manner, and it can help students achieve habits and readiness to learn independently. Therefore, the use of blended instruction is more effective than traditional instruction in terms of developing self-regulated and self-directed learning skills and readiness.

The self-management and self-control subscales varied between the traditional teaching and learning environment and the blended learning environment. The learners from the blended learning environment had a high mean value of self-management (50.00) and self-control (59.80). The subscale desire for learning had no difference in blended learning and the traditional teaching-learning environment. These results demonstrate how learners' SDLR attributes in the blended learning, teaching, and learning environment were influenced by the subscales of self-management and self-control. The teaching and learning strategy adopted does appear to have an impact on the nursing students' capacity for self-management. In terms of self-management, blended learning students performed better than traditional learning students. Effective

Table 2: Distribution of self-directed learning readiness (SDRL) scoring in the control group (n=24) and intervention group (n=30)

Total SDLR score	Control (n=24)		Intervention (n=30)	
	n (%)	Mean	n (%)	Mean
Score <149	8 (33.3%)	-	10 (23.3%)	-
Score >150	16 (66.7%)	-	30 (76.7%)	-
Total post-SDLR	-	151.71	-	160.00

Table 3: Comparison of mean difference for post self-directed learning readiness (SDRL) and subscales between control (n=24) and intervention group (n=30)

Variable	Group	Mean	SD	S.E Mean	Mean difference	Independent <i>t</i> -test			Cohen <i>d</i>
						<i>t</i>	df	<i>P</i>	
Total SDLR	Control	151.71	12.571	2.566	-8.292	-2.413	52	0.019*	0.660
	Intervention	160.00	12.526	2.287					
Self-management	Control	46.58	5.571	1.137	-3.417	-2.447	52	0.018*	0.664
	Intervention	50.00	4.690	0.856					
Desire for learning	Control	48.42	4.471	0.913	-1.783	-1.402	52	0.166	0.386
	Intervention	50.20	4.752	0.868					
Self-control	Control	56.71	5.026	1.026	-3.092	-2.262	52	0.028*	0.619
	Intervention	59.80	4.965	0.906					

SD=standard deviation, SE=standard error. NOTE: * $P < 0.05$ is significant. Levene's test indicated that the homogeneity of variance was met for these variables

pedagogical self-management may have a significant impact in students' overall readiness for self-directed learning. Previous studies on Egyptian and Taiwanese nursing students reported higher self-management scores.^[24,25] Students in blended learning had stronger self-control than those in traditional learning. This demonstrates how students who employed blended learning methodologies were in charge of their education and exhibited self-control. The findings of other studies showed that the mean score on the self-control subscale is higher.^[25-27] Although students in blended teaching methods exhibit an increase in the mean value of their desire to learn, this rise is not statistically different from that of students in traditional teaching methods. The present study demonstrates that regardless of the teaching-learning strategy, the students in both groups had a similar desire to learn. One of the earlier studies carried out by Devi *et al.*^[28] found that traditional learning students scored higher in the desire for learning than hybrid learning students in their study. However, the present study concluded that students' readiness for self-directed learning is affected by blended learning teaching and learning strategies.

Conclusion

The use of blended learning has been quantitatively demonstrated to show that there is a significant difference in learners' readiness for self-directed learning between those who followed blended learning teaching and learning strategies and those who followed traditional teaching-learning strategies. There were also significant differences in the self-management and self-control subscales between the students who used the blended learning teaching and learning strategy and those who used the traditional teaching and learning strategy. Thus, blended learning teaching and learning strategies using e-books can be recommended in nursing education to help support learners' readiness to learn independently and to enhance positive attitudes toward learning. Therefore, the study finding is also useful to improve the nursing curriculum that could develop the capacity of nursing students for self-directed learning. Nurse educators should determine the needs of the students to provide student-centered learning particularly in "Anatomy and Physiology" course. However, the limitation identified for the study was only on one course first to assess the success of the blended teaching methodology before it can be introduced to other courses, and the sample size for the study depends on the students enrolled in the course and present at the time the questionnaire. Therefore, the findings cannot be generalized for other courses. Suggestions to improve future study are that it may be beneficial to look at the perceptions and levels of satisfaction of the educators using the blended learning environment.

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Conflicts of interest

There are no conflicts of interest.

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