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The Impact of Blended Learning on Self-Directed Learning Components in Graduate Students of Medical Education at Shiraz University of Medical Sciences

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Abstract

Introduction: One of the most important goals in any educational system is self-directed learning promotion and the development of its components. Nowadays, owing to the growing rate of technology advancements and the availability of free online courses, self-directed learning skills have been increasingly taken into consideration. In this study, the effect of one-semester training using a blended learning method based on LMS (learning management system) on self-directed components was evaluated in undergraduate medical education students at Shiraz University of Medical Sciences.

Method: In this cross-sectional descriptive study, the participants were all graduate students of medical education. We used Fisher, King, and Tague's questionnaire. At first, the questionnaires were completed by the students before attending the workshop which was held at the beginning of the semester as the pre-test. after holding the blended learning method classes at the end of the semester, we performed the post-test.

Findings: SPSS version 22 software was used in this study to analyze the data through using mean, standard deviation, abundance, frequency, and paired T-test. Based on the data analysis using SPSS 22, the mean of self-directed score before the intervention was 160.03 which increased to 175.80 after the intervention.

Conclusion: According to the results, blended learning increased the self-directed components used by students, including self-management, self-control, and willingness to learn. Self-directed components did not have a specific relationship with the demographic data of the individuals, including age, gender, level of education and membership of the faculty, or work experience.

Keywords: *Blended learning; E-Learning; Self-directed*

Introduction

The promotion of self-directed learning and development of its components is the main goal in any educational system. We always expect our students to identify their educational needs without the help of their teachers, obtain the required resources and materials, evaluate themselves, and achieve their educational goals (Yusefi et al., 2011).

Nowadays, with the advancements in technology and the availability of free online courses, self-directed skills have attracted the researchers' attention. Self-directed skills have been highly regarded as a factor in predicting the learners' learning performance and are even a great indicator for predicting success in traditional learning environments and distance education. In the age of technology, education professionals are looking for ways to enhance self-directed learning among learners. Finding these methods and developing them can help us train our graduates in self-directed, self-reliant, and creative activities. Today, educational environments are moving towards digital students who expect their resources to be available at any moment. All faculty members and students in the world can share teaching and learning practices in this way, and trainers must prepare the students for the world of unknown technology education. The history of using the traditional education system has come to an end, and if the instructors do not adapt themselves and do not pay attention to the students' demands and constraints, they will also join history (Sriarunasmee et al. 2015; Kesim & Altinpulluk, 2014).

Blended education, as one of the new phenomena in education, can promote different aspects of self-directed learning in people. The term 'blended learning' originally refers to the combination of e-learning activities with traditionally run classes. Studies have shown that people taking part in online courses learn how to schedule, interact with others, get the resources they need, study, evaluate themselves, and achieve their educational goals (Song &Hill, 2017). Blended learning provides an effective educational setting together with different forms of technology-enabled communication in both traditional and online teaching. There is a close relationship between students' features and the efficacy of learning in the environment of blended learning. Students' learning efficacy can be influenced by their ability to help themselves learn and use learning technologies (Gent et al., 2019).

In this research, we aimed to investigate the effect of a blended education program presented for one semester at Shiraz University of Medical Sciences on the LMS framework and the self-directed learning dimensions in graduate students enrolled in electronic medical education courses in 2017.

Just as many aspects of the current life have been changed by communication technologies and their expansion, the future of education has undergone an alteration. Due to the structure of education that is simply and directly influenced by technological advancements, much attention has been focused on distance learning. Improving educational users from passive to active, creative, productive, and student-oriented structures is effective with the emergence of distance learning courses, not only in education but also in community formation and shaping (Kesim & Altinpulluk, 2014; Siriwongs, 2015).

Today, the use of the Internet has not only helped face-to-face learning, but it has also created online learning courses. Using this technology as a learning tool enables the learners to directly get the knowledge instead of sitting in the classroom. This type of learning can be broader and deeper than learning in traditional classes and encourages the professors to use more "blended learning". Instead of sitting in brick-and-mortar classes, which is time-consuming and has not any pleasure, the utilization of a combination of methods makes the students and professors more creative (Siriwongs, 2015; Amandu & Fronda, 2013).

According to the definitions, learning is the result of either planned or experimental learning that occurs through continuous training or feedback in an individualized entity and the outer representation is in behavior (Peters, 2003; Bates & Poole, 2008).

Different terminologies are used for e-learning, and it is so hard to define it comprehensively. The commonly used terms include Internet learning, network learning, computer assisted learning, and web-based learning. All of these terms mean that learners are far from a teacher or educator, and that they use technologies, usually computers, to access teaching materials, interact with teachers and other learners, and receive support (Peters, 2003, Khan, 2005).

Experts consider e-learning as a collection of intelligence packs as well as self-assessment tests that can be accessed electronically at anytime, anywhere (Neumeier, 2005; Valiathan, 2020). Therefore, e-learning is a combination of ideas, learning principles, and information and communication technology. Technology alone cannot guarantee that an e-learning program is successful, but communication and information tools and technologies should support educational and learning activities (Peters, 2003; Khan,2005).

Concerning communication methods, e-learning is divided into two kinds of online and offline communication (Synchronous and Asynchronous communication). Offline communication consists of activities that do not happen at one time. Educational CDs, blogs, digital libraries, and e-mails are all asynchronous communication tools. Offline communication helps students to access the curriculum at any time based on their career and family status (Khan, 2005; Neumeier, 2005).

Online learning is an activity that occurs at a time. In online learning, the learner communicates with the teacher and other learners or with content at a time. Chat, video conferencing, and virtual classrooms are tools for online communication. The relationship between the students and the teacher, other students, and other learning materials provides a condition in which the participants feel more comfortable with the group's mood and feel belonging to the group, use quick and timely feedback from the lecturers and classmates, and keep pace with others in the curriculum.

Various studies have shown that online communication can motivate and improve students' learning. Therefore, online communication solves one of the most important disadvantages of distance education, which is the lack of live and dynamic interaction between the learner and the teacher.

Blended Learning

Blended learning is a flexible learning process that comprises face-to-face learning, individual learning, and online collaborative learning. Usually, 70-90 percent of the courses are delivered electronically. If we consider teaching methods to be on a spectrum, blended learning is an educational method between face-to-face learning and electronic courses (Khan, 2005).

The key factor in blended learning is choosing the right combination of materials and methods that have the greatest impact with minimal cost. To create a powerful combination program, one can use a variety of educational and media methods, including classroom tutorials, web-based tutorials, compact discs, videotapes, simulations, books, conferences, articles, PowerPoint slides, instructional manuals, etc. (Valiathan, 2020).
Self-directed learning is defined as a process of personal motivation that helps a person identify his/her learning needs, classify the learning objectives, and locate the resources; individuals who need to learn run the process with a suitable strategy, evaluate it, and achieve the desired goals (Song & Hill, 2017, Saks & Leijen, 2014).

Self-directed learning deals with adult education. As defined by Fisher, King, and Tague, through self-directed learning individuals find their own learning needs from the learning goals, identify the resources and materials used for learning, selecting, and performing proper strategies to learn, and evaluate their learning outcomes. No matter whether others help them or not, they start to work and take the initiative (Garrison, 2005; Fisher et al., 2001).

In adult education, self-directed learning consists of three dimensions:

Motivation or willingness for learning, self-management, and self-control. Fisher, King, and Tague express that self-directed learning needs too much intelligence, talent, and capability. They believe that self-directed people enjoy a high level of self-awareness, acceptance of learning responsibility, and advancement with no help from others. They are curious, are eager to learn, have high self-esteem, and are able to manage time efficiently. They can plan for their assignments and succeed in solving problems and performing self-assessment effectively (Fisher et al., 2001).

Given the ever-increasing advancements in technology and the increasing willingness of the individuals to learn in virtual environments, such as distance learning and education, training through voices, etc., paying attention to self-directed learning components, especially for medical science majors, is an appropriate approach used to optimize education (16).

Virtual education or distance education requires specific infrastructure, including personal planning, adaptation and organization, and all of these are self-directed learning components (Sittiwong & Manyum, 2015). It has been stated that the virtual program, according to Tyler and Garrison, makes the student curious and helps him/her try to remember and learn, face different challenges, change, enjoy learning, be motivated, insist on learning, and be independent, self-reliant and purposeful. She then states that in this environment, educators should improve the educational environment and curriculum as one of the elements of learning enhancement, and the trainer in the LMS environment assigns the tasks to the students themselves. This does not mean that he/she does not teach lessons, but it means that the trainer should plan the structure of this class to see which student is more readily prepared, better asks, is better in summarization, and has self-efficacy and self-management. The professors here develop the skills of acceptance of mistakes, discuss challenging questions, and then guide them toward the correct answer. Self-care situations, self-assessment, and reflection are provided. (Sriarunrasmee et al.,2015; Sittiwong & Manyum, 2015).

Adult students have previously been trained in traditional systems with full access to the teacher; the question is whether they can be successful now that they are entering a new process, i.e. e-learning on the Web platform. In other words, will these students be confused?

Therefore, this study aimed to find out the difference between self-directed skills before and after a semester of blended education.

Materials and Methods

Fifty-eight graduate students studying at Shiraz University of Medical Sciences were selected to participate in the study in 2017; they were majoring in medical education and were enrolled in the study using the census method. Three of them were excluded from the study due to lack of sufficient time to complete the questionnaires. Therefore, 55 students remained in the research. Then, in the first workshop held, the purpose of the study was explained by the researcher. Then, the participants filled out the questionnaires and signed the consent form if they were willing to take part in the study.

In this study, the Fisher et al. standard questionnaire was used. It was first created in 2001 by Fisher et al. and its validity and reliability were confirmed by them (Fisher et al., 2001). Again, in 2010, another study by these researchers was retested and its validity and reliability were reaffirmed. Based on this article, the findings of the Fisher's test revealed that for the three subscales of self-management, willingness to learn, and self-control, Cronbach's alpha was 0.86, 0.85, and 0.89, respectively; also, the total reliability coefficient was estimated 0.95 (Garrison, 2005).

Torabi and colleagues at Isfahan University in a study of 400 teachers confirmed the validity and reliability of the Fisher et al.'s questionnaire. Cronbach's alpha for the whole questionnaire was 0.88, and for the three subscales of self-management, self-control, and willingness to learn, it was 0.77, 0.66, and 0.74, respectively (Torabi et al., 2013).

In the workshop, Fisher et al.'s questionnaire was provided to the students and completed by them. The virtual workshop was prepared by the computer team of the college, and a username and password were given to each student; also, they were provided with a special cyberspace to exchange information with their faculty and peers.

Then, the first semester of the students' education began, which was presented in a "blended" form. The cyberspace provided included face-to-face training on the Web and using the virtual classroom, audio CDs, Open forum with other professors and students and peer-to-peer groups. In this cyberspace, students learn, plan, search, and evaluate, and the supervisor has the role of the analyst.

At the end of one semester after working on "blended" method, during one of the exams, the students again filled out the questionnaire and their consent to continue their participation in the study was obtained. Initially, a number was given to each student to be identified in the second stage with the same code. The questionnaires were collected and sent to the statistician.

Method of Questionnaire Analysis

Self-directed learning scale was designed and evaluated by Fisher et al. and originally contained 52 items, but the final version of this scale was externally validated with 42 items (15). Therefore, this scale has 42 items and three sub-scales for self-management, a willingness to learn, and self-control. The sub-scales are as follows:

Self-management: 1, 2, 3, 4, 5, 6, 7, 21, 22, 28, 31, 33, 37
Willingness to learn: 1, 11 12, 13, 14, 16, 23, 24, 25, 26, 27, 31
Self-control: 8, 11, 15, 17, 18, 19, 21, 29, 32, 34, 35, 38, 36, 39, 41, 41

The scores for each of the following sub-scales were added to obtain those for each sub-scale. To get the total score of the questionnaire, we assembled the entire questions of the questionnaire. This gave a range of 41 to 215. The higher scores indicate the greater willingness of the respondents to learn, and vice versa (Fisher et al., 2010).

Results

In this study, to describe the data, we used descriptive statistics including mean and standard deviation for quantitative variables; also, for categorized variables, we used frequency and percentage. The participants in the study were in the age range of 21 to 53 years old with a mean of 35.09 ± 7.68 years.

After the confirmation of age distribution normality of men and women by the Kolmogorov–Smirnov test, the result of the t-test revealed that no statistically significant difference existed between the mean age of both sexes (p-value = 289). 54.5% of the participants (30) were female and 45.5% of them (25) were male.

Among the students of virtual medical education, 67.3% had a bachelor's degree, 14.5% master's degree, and 18.2% PhD degree. Also, 19.1% of them were medical students, 34% nursing, 10.6% midwifery, 4.3% management, 17% health, and 14.9% were related to other medical sciences. Totally 7.3% of these students were employed as faculty members, and only 5.5% of them had a history of

attending educational workshops. The mean work experience in these virtual students was 11.46 ± 6.16 years.

We tested the hypotheses and compared the participants' scores in the pre-test and post-tests; also, we compared all the skills studied in this research using paired t-test. Based on the findings, all the skills significantly improved after the educational intervention; Table 1 displays the results.

Table 1. Comparison of self-directed skills in students before and after blended learning

P-Value	df	t	Difference between pre-test and post-test	Post-test		Pre-test		
				Standard deviation	Mean	Standard deviation	Mean	Scale
<0.001	54	-5.26	-15.76	15.27	175.80	17.64	160.03	self-directed skills

The components of self-directed learning were compared using t-tests (Tables 2-4)

Table 2. Comparison of self-management skills in students before and after blended learning

P-Value	df	t	Differences in the mean	Post-test		Pre-test		
				Standard deviation	Mean	Standard deviation	Mean	Scale
<0.001	54	-4.80	-5.23	5.97	94.52	53.6	70.47	self-management

Investigation of self-management skills before and after blended training and comparing them with each other also showed a df = 54 and p-value <0.001, which again showed a significant difference between this component after the educational intervention. (<0/001)

Another t-test was run to compare the participants' willingness to learn before and after blended learning. The results are shown in Table 3.

Table 3. Comparison of willingness to learn in students before and after blended learning

P-Value	df	t	Differences in the mean	Post-test		Pre-test		
				Standard deviation	Mean	Standard deviation	Mean	Scale
<0.001	54	-4.29	-83.3	54.4	80.52	45.5	96.48	willingness to learn

As shown in the Table, after the investigation of the students' willingness to learn, before and after the blended training, we also achieved a df = 54 and p-value <0.001, which again indicates an enormous increase of this component after the educational intervention.

To test the difference between self-control skills in students before and after blended learning, we performed another t-test. The results are shown in Table 4.

Table 4. Comparison of self-control skills in students before and after blended learning

P-Value	df	t	Differences in the mean	Post-test		Pre-test		
				Standard Deviation	Mean	Standard Deviation	Mean	Scale
<0.001	54	-5.26	-6.50	6.39	69.54	6.95	03.63	self-control

As seen in the Table, in the study of the self-control component and comparison of the pre-test and post-test of this component, the standard deviation was 54 ($p < 0.001$), indicating a significant difference between the components before and after the intervention.

Discussion

According to the results, the individuals' self-management after the end of the semester of undergoing blended education significantly increased. In other words, blended training revealed a positive effect on the self-directed skills of the students. The result of the present study is consistent with those of Sherifa Idros's study (2010) on educational intervention based on LMS; the results revealed a significant effect of blended learning on the students' awareness of their role in learning, and an increase in self-directed skill (Idros et al., 2010). Another study in Thailand indicated that education based on blended learning not only increased the students' communication skills, but it also led to an increase in life skills which prepared them for their successful future life (Sriarunasmpee et al., 2015). Their results are consistent with those of this study. Several other studies have confirmed the results of the present research as well (Sittiwong & Manyum, 2015; Torabi et al., 2013; Idros et al., 2010; Seyvova & Kaya, 2014; Noh & Kim, 2019; Egizzi, 2015; Adina & Mohib, 2020).

Moreover, the results of a study conducted at a nursing school in Istanbul by Amine Seniava (2014) indicated that blended education increased the students' self-directed skills; although the age range of the participants in their study was lower than that of ours, the results are in the same line with ours, suggestive of the increase in self-directed learning components. In another study, Noh and Kim (2019) indicated that self-directed learning courses using blended coaching are effective methods that enhance the implementation part of self-directed learning competence and satisfaction of clinical practice among nursing students in clinical settings.

In another study by Egizii (2015), on adults' self-directed learning and the role the graduates play as professionals, the researcher concluded that self-directed skills could be considered as a starting point for educational leaders and enhancement of effective relations with key informants such as graduates and the authorities. He recommends that we need to use different strategies to increase and strengthen the self-directed skills and their components in our students.

In a study performed at a French university, the researchers concluded that teachers who had student-centered approaches to teaching necessarily did not design their blended learning courses as student-centered classes. Moreover, it was revealed that the students' self-directed learning was satisfactorily developed only in three out of seven student-centered blended learning courses. Further, the study suggested that online peer review and online forum discussion activities should be provided by the lecturers who teach the students who improve their self-directed level (Adina & Mohib, 2020). Also, another study conducted by Ruchan et al. (2018) revealed that the experimental group subjects' self-regulated and self-directed scores were considerably different from those of the control groups; it was indicated that the use of blended instruction was highly influential in terms of developing self-regulated and self-directed learning skills. As shown, the experimental group participants asserted that the blended learning environment had the benefit of rich content, easy accessibility, effective guidance, and

motivation. Finally, in a qualitative study conducted by Bosch and Pool (2019), it was revealed that self-directed learning was used by the students; they recommended that the combined blended learning design model should be used as a means to set up a learning presence.

In the end, it is of interest to note that concerning the effect of the skills described above, Faeze Abdolmajid et al. (2010) in a study carried out on self-directed skills and culture point out that cultural values have a very significant effect on communication strategies, learning, and self-management. Although such skills are personal and unique in individuals, the impact of culture on the enhancement of these skills cannot be denied. (Ahmad & Abdolmjid, 2010).

Conclusion

After all, the results showed that blended education positively impacted the students' self-control skills, self-management skills, and willingness to learn.

This can encourage educators to use this kind of education and incorporate it into educational curriculum; since in the combination of learning the facilitator plays a role, the use of this kind of training can highlight the role of the faculty members as facilitators and diminish their traditional role; therefore, they can persuade the students to have a high degree of self-directedness while acquiring the knowledge and skills in a particular discipline. As a result, in the future, we will have high-quality professional staff who have learned how to successfully overcome different challenges.

However, as to demographic variables which were examined separately, the result showed that no significant difference existed in most of the skills. Also, no important difference was found between the self-directed index and self-directed workshop. Although this result can be attributed to the low number of participants in the workshops, the marginalization of this result may show an increase in the skills of those who participated in these workshops. In other words, these workshops can be used to promote self-directional components along with other trainings.

Considering these results, we can conclude that the use of blended learning based on the Web in the first semesters of studies, when the students need to organize their minds, can increase their readiness for long-term study in medicine, enhancing their preparedness and preventing their confusion and embarrassment. Therefore, one-semester blended education causes a significant increase in self-directed components. As Kemp and van der Westhuizen (2022) highlight, one of the strategies to be applied for the promotion of these 21st-century skills is the development of self-directed learning. Although in this study it was hardly possible to control the interventional variables, it can be said that all the factors that may have an impact on our results can be considered as the components of blended education. For example, a student who spontaneously searches for workshops and participates in these workshops during a semester is trying to increase his/her success and self-esteem in education, thereby doing an aspect of blended education

All in all, the blended training that is currently underway on the LMS platform at Shiraz University of Medical Sciences can increase the self-directed components of students; therefore, using this educational method, especially for medical professions that need high levels of self-directed learning is highly recommended.

Suggestions

According to the results of this research, it is recommended that the authorities should pay more attention to the educational curriculum in the form of blended education due to the high educational costs, the great amount of energy in this area, and the lack of educational spaces. As Van der Westhuizen and

Bailey (2022) highlight, self-directed learning is essential for success in the 21st century.; in their study, they present a new model for self-directed learning as an optimal educational experience. To sum up, the comparison of the overall results of this study with those of other similar studies shows that the results are in the same line with those of all previous studies; in fact, no results were found to be in contrast with the results of the previous research, but with regard to the relationship among the demographic data and the rate of self-directedness of the individuals, the researchers believe that considering the contradiction of these results with those of other researchers, including the education level , there is a need for further studies with a larger sample size in different cultural contexts. It is also suggested that researchers in the future should repeat this research with a higher sample size and use a control group.

Limitations

Finding a homogeneous sample, especially in such variables as age, field of study, and level of education as a control sample was almost impossible for such research; therefore, as seen, this research was conducted without a control group. Another limitation was the inadequate culture of research in our country, which makes people unwilling to fill out research questionnaires, and, as mentioned, we excluded three of them from the study in the pretext.

References

Adinda D, Mohib N. (2020). Teaching and instructional design approaches to enhance students' self-directed learning in blended learning environments. *Electronic Journal of eLearning*18 (2), 162-174.

Ahmad BE, Abdolmajid F. (2010). Self-directed learning and culture: A study on Malay adult learners. *Procedia - Social and Behavioral Sciences*7, 254-63.

Amandu GM , Fronda DC. (2013). Using modle e-learning platform to foster student self-directed learning: experiences with utilization of the software in undergraduate nursing courses in a Middle Eastern University. *Procedia - Social and Behavioral Sciences* 93,677-83.

Bates T, Poole G. (2008). *Effective teaching with technology in higher education*. San Francisco: Jossy-Bass..

Bosch C, Pool J. (2019). Establishing a learning presence: Cooperative learning, blended learning, and self-directed learning. In Technology-supported teaching and research methods for educators. (pp51-74), IGI Global.

Egizii R. (2015). Self-directed learning, andragogy and the role of alumni as members of professional learning communities in the post-secondary environment. *Procedia - Social and Behavioral Sciences*174,1749-0.

Fisher M, King J, Tague G. (2001). The development of self-directed learning readiness scale for nursing students. *Nurse Education Today* 21, 516-525.

Fisher M, King J,Tague G. (2010). The self-directed learning readiness scale for nursing education revised: A confirmatory factor analysis. *Nurse Education Today* 30, 44-8.

Garrison DR.(2005). E-learning in the 21st century. London and New York: Routlledge Falmer.

Geng S, Law KM, Niu B. (2019). Investigating self-directed learning and technology readiness in blending learning environment. *International Journal of Educational Technology in Higher Education* 16(1),1-22.

Idros SNS, Mohamed AR, Esa N, Samsudin MA, Daud KAM. (2010). Enhancing self-directed learning skills through e-SOLMS for Malaysian learners. *Procedia - Social and Behavioral Sciences* 2(2) ,698-706.

Kemp A, van der Westhuizen Ch. (2022). Self-directed learning with technology for 4th-year engineering graphics and design students. In Christo van der Westhuizen, Mncedisi C Maphalala, Roxanne Bailey .*Blended learning environments to foster self-directed learning* .South Africa: OSIS Books.

Kesim M, Altinpulluk H. (2014). A theoretical analysis of MOOCs types from a perspective of learning theories. *Procedia - Social and Behavioral Sciences*186,15-9.

Khan BH. (2005). Managing e-learning: Design, delivery implementation and evaluation[Internet]. Hershey: Information Science Publishing. Available from:http://BooksToRead.com/elearning.

Neumeier P. (2005). A closer look at blended learning -parameters for designing a blended learning environment for language teaching and learning. ReCALL17(2),163-178.

Noh GO, Kim DH. (2019). Effectiveness of a self-directed learning program using blended coaching among nursing students in clinical practice: A quasi-experimental research design. BMC Medical Education 19(1),1-8.

Peters O. (2003). Learning with new media in distance education. In *Handbook of Distance Education* (pp 88), edited by Moore M and Anderson W. New Jersey : Lawrence Erlbaum Associates Publishers..

Ruchan UZ, Adem UZ. (2018). The influence of blended learning environment on self-regulated and self-directed learning skills of learners. *European Journal of Educational Research* 7(4),877-886.

Saks K, Leijen A. (2014). Distinguishing self-directed and self-regulated learning and measuring them in the e-learning context. *Procedia - Social and Behavioral Sciences* 112,190-8.

Şenyuva E, Kaya H. (2014). Effect self directed learning readiness of nursing students of the web based learning. *Procedia - Social and Behavioral Sciences*152,386-92.

Siriwongs P. (2015). Developing students' learning ability by dint of self-directed learning. *Procedia - Social and Behavioral Sciences*197, 2074-9.

Sittiwong T, Manyum W. (2015). The Study of students' opinions on the knowledge management system to support online instruction for self-directed learning. *Procedia - Social and Behavioral Sciences*176,750-6.

Song L, Hill J.(2007). Aconceptual model for understanding self-directed learning in online invironments. *Journal Of Interactive Online Learning* 6(1),27-42.

Sriarunrasmee J, Techataweewan W ,Mebusaya RP. (2015). Blended learning supporting self-directed learning and communication skills of Srinakharinwirot University's first year students. *Procedia - Social and Behavioral Sciences*197,1564-9.

Torabi N, Abdollahi B, Aslani G, Bahrami A. (2013). A validation of a self-directed learning readiness scale among preliminary school teachers in Esfahan. Procedia - Social and Behavioral Sciences83,995-9.

Valiathan P. (2020). Designing a blended learning solution. Instructional Design Expert, NIIT Ltd[Internet] Available from http://wwwdocstoc.com/docs/2261631/Designing-a-Blended-Learning-solution-What-Is-Blended-learning.

van der Westhuiza Ch, Bailey R. (2022). In Christo van der Westhuizen, Mncedisi C Maphalala, Roxanne Bailey, *Blended learning environments to foster self-directed learning* (pp.1-29), South Africa: OSIS Books.

Yousefi A, Gordanshekan M. (2011). A review on development of self-directed learning. *Iranian Journal Of Medical Education*10(5),776-83.