THE LEARNER READINESS FOR ONLINE LEARNING: SCALE DEVELOPMENT AND UNIVERSITY STUDENTS' PERCEPTIONS

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THE READINESS OF UNIVERSITY STUDENTS FOR ONLINE LEARNING

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Abstract

The purpose of this study was to determine university students' readiness for online learning. Mainly due to the study a multidimensional instrument for university students' readiness for online learning (ROLS) developed and validated. The study adopted qualitative research method based on quantitative data. The participants of the study comprised 297 university students who were selected using randomly sampling model. The data were collected via readiness for online learning scale (ROLS) and analyzed using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to establish the construct validity of the ROLS model. In addition, a series of one-way ANOVA were conducted to investigate the effect of demographic variables on readiness of online learning. Through confirmatory factor analysis, ROLS was validated in two dimensions: computer literacy (CL) and computer based self-confidence (CSC). The results revealed that students' levels of readiness were high in computer literacy and computer based self-confidence. In the study it was also found out that perception of students' self-confidence while using computer caused significant statistical differences in two dimensions; the students who had higher level (very good, good) of self-confident perception while using computer students exhibited significantly greater readiness in the dimensions of CL and CSC than those who had lower level of self-confident perception. There was no statistical difference in the two dimensions of ROLS in terms of gender, and the participant students at Faculties of Education had similar levels in all readiness dimensions than the other participants in other faculties.

Keywords: Online learning, readiness, online learning measurement, university students

1. Introduction

During the COVID-19 pandemic, students have faced big challenges to interact with interface to access their lessons to online and have found them in an urgent need to adapt and use technologies to acquire delivering instruction. The best way to meet the needs of learners and help them overcome these challenges is through from learning technologies and their application that was becoming increasingly necessary. However, new information to old in the form of online learning has been given to the prerequisite 'readiness for online learning'. Increasingly numbers of educational institutions have been adopted online learning methods those are deemed ineffective as learners don't use and incorporate what they have learned into their classroom due to readiness for online learning. Learners need to build their capacity in three types of knowledge (technological, pedagogical, and technological pedagogical) through online learning(Anderson,2004).The theory of action of online learning is to facilitate learners' learning through selecting the most appropriate technologies in terms of their purpose of learning. Learners are equipped with tools and methods to become a changing agent in their own context as the schools' transit to online learning. To develop

perspective on how learners effectively integrate and use technologies through online education differentiates learning environment and learning preference while technology has begun to embed itself as a part of online education (Smith, 2005).

To deal with establish a knowledge base in information and Communications Technology (ICT), there is ongoing debate about whether design and implementation of online learning can be progressed without the guidance of a pedagogical knowledge (Alonso ,2005). The best use of technology in delivering and assessing learning outcomes through online have been coming into selecting and integrating technology as a tool in educational environment, especially in higher education increased pedagogical knowledge of learners within technology enhanced, effective instruction.

Recent evaluations of online learning have been an emphasis on readiness of online learning suggest that online learning methods those are deemed ineffective as learners don't use and incorporate what they have learned into their classroom due to lack of readiness for online learning (Alonso et al.,2005; Hayashi et al.,2004;Summers et al.,2005). Thus, the readiness level learners should be taken into consideration prior to such innovation. As for the users of this new learning environment, online learning readiness is a key in determining whether interactive learning community is facilitated by technology enhanced effective instructional strategies.

Around the worldwide, online learning is affecting the educational environment and has been labeled as a tool that can enhance effective and efficient teaching and learning. However, while it is increasingly used in many educational institutions observations have been shown that online learning readiness focus on the computer-based literacy in performing tasks, including perceived ability to computer –based self efficacy and its relevance in learning styles as learners may select learning activities congruent with their learning styles (Erlich et al., 2005; Loomis, 2000; Lee et al., 2002; Miller, 2005; Vuorela and Nummenmaa, 2004)

Though studies have shown the importance of online learning in education, the place of implementation has posed serious challenges, and appalling performance of learners' readiness for online learning, and particularly in three categories based on computer literacy, computer based self-efficacy and learning styles have been the consequence. Hence, this study considered to determine learners' readiness for online learning in particular for university students, intending to find out the level of computer-based abilities through online learning.

1.1. Literature Review

The online learning strategies need essential skills in transition to online, technology-oriented instruction with its focus on forming instructional design principles facilitated by high authenticity, high interactivity and high collaboration (Ring and Mathieux, 2000). Different terminologies bring together recent developments in both practice and understanding of online learning, all of these term have been used that learner is at a distance from instructor and the learner uses from a web as a medium to access the learning materials and acquire knowledge (Khan,1997;Carliner,1999).

The delivery types of online education are classified as asynchronous and synchronous allowing learner's free time zone and location in distance. In asynchronous method, learner can access the online materials anytime with no time and space while synchronous method allows for the learner real time interaction between students and instructors. A fully online learning systems with its asynchronous and synchronous activities can be used designing

online learning to achieve the educational goal and objectives. The main features of the online learning are proposed a theory under discussion of 'connectivisim' (Siemens, 2004). The theory of action includes (1) the empowerment in selecting and integrating technology tools in technology-enhanced effective instruction (2) increased pedagogical knowledge and skills of learning community in designing and developing high-impact instruction that leads to enduring understanding (3)improved student engagement through the use of technology in online and face-to-face classes, (4)forming a learning community in which the community from diverse background collaborate, share, reflect, and support each other, and (5) changed roles in teachers to become a mentor leading and facilitating meaningful learning opportunities for not only providing effective technology-rich instruction but also gaining new skills in men (Taylor,2001).

Mainly due to the theory of connectivisim, information is needed to design in the most appropriate instructional strategies for digital age, while at the same time 'connectivisim''to guide development of effective learning materials (Siemens, 2004; Downes, 2006). Siemens (2004) has been suggested same guidelines based on connectivism theory for designing and developing high-impact instruction so that teachers will be equipped with tools and methods to become a changing agent in their own context as the schools transit to online learning. Below explains of these guidelines for designing high-impact online learning materials while, at the same time developing high-impact instruction for instructors.

Differentiation with Technology includes essential knowledge to differentiate content, product, and process using differentiation strategies and technology tools focuses on a research-based instruction model that enables participants to design online and face-to-face instruction framed by technology integration theories are aimed at providing skills for participants to incorporate best, evidence-based methods of teaching and assessment into their classroom. Participants establish a repertoire of meaningful, engaging, and innovative ways of delivering instruction. Provide practical insights and structure to develop authentic assessment (Carliner, 1999).The early twenty first century, the theory of action of 'online learning' has particular focused on developing technology enhanced, effective instruction. It has produced 'semantic web', therefore, web 2.0 tools are most appropriate technologies have followed more quickly upon than previous ones. The various Web 2.0 and digital tools are available freely to participants. They are grouped based on their purposes and uses so that learners and instructors can build understanding on not only how to use these tools but also how to integrate them into their lessons. There are 29 tools can be actively engaged in (1)differentiation; Explain Everything, Storyboard That, Voki, Seesaw, Toontastic, Story jumper, Book Creator, Chatter kids, LearningApps, and Seesaw (2) teaching Methods: Canvas, Play posit, Word wall, Woo clap, Mindmeister, Edpuzzle, Padlet, Google tools (3) assessment; Google Form, Quizzes, Kahoot, Mentimeter, Bubble.us Socrative (4) collaboration; Whiteboard.fl, Twiddle, Awwapp, Google Jam board, Group Map (5)mentoring; Vedubox We use an LMS that can be used as a virtual classroom.

There is ongoing debate about whether student learning influenced more by conventional instruction or audiovisual and computer media, research showed that audiovisual and computer media as technology vehicles promote more learning benefit than conventional instruction (Clark, 1983). Evidence also suggested that student learning gains more benefit from technology enhanced effective instructional strategies using a particular technology to deliver instruction (Schramm, 1997).

Learners need to gain knowledge for a better online, technology-based delivery of instruction. Institutions should offer an effective online learning experience for learners who need essential skills in transition to online, technology-oriented instruction with its focus on

forming learning materials designed properly to engage the learner and promote teach (Cole, 2000). Even though the opportunities for learners to construct meaning from presented during the online sessions that addresses these issues are abundant, most require monetary and time investments which are unlikely to be satisfied by learners.

Anticipated impact on instructional strategies include real life models and simulations integrated with technology tools leads to enduring understanding while facilitating student learning (Clark,2001). The audiovisual and computer media is only merely vehicles however, high –impact instruction need to promote medium does influence student learning (Kozmo,2001).More recently, the importance of *'computer literacy'* with regard to implementing online learning has been highlighted. The computer literacy level of learners affects learners' achievement and attitudes towards to readiness for online learning (Muse, 2003; Lee et al, 2002; Erclich et al, 2005).

Evidences suggest that user-friendliness of online technologies can affect learners' attitudes towards to online learning thus, they can achieve reasonable results. In addition, it is recognized that online learning, like other types of learning requires a sense of self-efficacy in the belief of learners' *'can do'* preference (Wang and Newlin,2002;Vuorela and Nummenmmaa,2004). Computer based self-efficacy is a powerful facilitator to improve learners' attitudes and academic performance in the manner of 'can do' beliefs that lead to them to reach higher degree of educational goals. The predictive power of computer based self-efficacy relative to readiness for online learning is distinguished in motivation and self-confidence of learners towards to online learning environment. Moreover, learning styles are usually given responsibility for learner in online learning. Learner acquire technology-oriented instruction with their own learning style ,therefore, the learning styles are linked to readiness for online learning as a support for learners who initially preferred their own learning style through online learning.

1.2. Research Questions

The purpose of this study was to examine the concept and the underlying dimensions of students' readiness for online learning. The study explored the following four research questions:

1. What is university students' level of readiness for online learning?

2. Does gender of university students make any significant differences in their level of readiness for online learning?

3. Do the students at Faculty of Education have any significant differences compared to students in other faculties in terms of their level readiness for online learning?

4. Does university students' perception of self-confidence of computer use cause any significant differences in terms of their level of readiness for online learning?

2. Method

2.1. Research Design

The study utilized qualitative research method based on quantitative data. The qualitative data can be used to provide description and benefits of qualitative methods are that they allow to discover new variables and relationships to reveal and understand complex processes (Miles and Huberman, 1994).

2.2. Participants

The ROL was distributed to 306 university students through Google form. A total of 297 students completed the survey from a variety of undergraduate students with different majors. The participants consisted of 246 females (%82, 8) and 51males (%17, 2). Regarding their age, the age average of age was 19.95 (SS=1.69). The demographic information of the participants is given in Table 1 below.

Table 1. Demographic Variables

Variables		N	%
Gender	Male	51	17.2
Female		246	82.8
Age	Under 20	216	72.7
Upper 20		81	27.3
Total		279	100
Faculty	Education	198	66.33
Other		99	33.3
Perception of	Poor	54	18.2
self-confidence	Good	192	64.6
Very good		51	17.2

2.3. Research Instrument

In the study the *Readiness for Online Learning Scale (ROLS)* was used as the data collecting tool. For this purpose, an exploratory factor analysis (EFA) using factor was conducted to determine the factor structure. EFA is performed in the early stages of developing ROLS. Before performing EFA, measurement appropriateness for the 18 survey items was evaluated through use of descriptive statistics. The 18 items were factor analyzed by SPSS using maximum likelihood factor analysis with obliminal rotation. Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.89 and the Bartlett's Test of Sphericity was significant ($p<.001$). As a result, 9 of 18 items were removed. Item analyses were conducted on the remaining 9 items fit a two factor; computer literacy and computer based self confidence . Table 2 shows factor loadings items for exploratory factor analysis of the items for measuring readiness for online learning.

Table 2. Loadings Items

Items	Computer Literacy	Computer based self-confidence	
1.	.84		
2.	.86		
3.	.80		
4.	.76		
6.		.74	
7.		.69	
8.		.73	
9.		.68	
13.		.65	

Confirmatory factor analysis (CFA) was used AMOS version 17 to confirm the factors within a new sample, followed by a reliability analysis to determine internal and external validity of scale items. The conventional chi-square test, comparative fit index (CFI), and root mean square error approximation (RMSEA) values were used to evaluate model fit. A non-significant (P >0.05) χ^2 is desirable and suggests the model adequately represents the data. The CFI can range from 0 to 1.0 and estimates the proportion of the sample variances and covariance explained by the model. CFI values > 0.95 and RMSEA values < 0.08 are considered to represent 'good' correspondence between observed. Standardized path coefficients (factor loadings), factor correlations and second order loadings were examined to evaluate the relationship between each indicator with its associated factor. The table 3 shows the model fit measurement statistic.

Table3. Model Fit Measurement Statistic

	CMIN/DF	GFI	CFI	RMSEA
Good fit index	<3.00	0.95	0.95	<0.08
Model	2.29	.96	.97	.066

The scale was divided into two dimensions: computer literacy and computer based self efficacy. The model testing results the measurement model exhibits good fit. As shown in **Fig.1**, each item has a substantial loading between .49 and .81 on two factors, and each loading was statistically significant. The mean t-test score were compared through paired sample t-tests in up/down groups in order to assess the time variance of the ROLS and its subscale. Significant differences were found between the groups estimated as up %27($\overline{X}$ = 37.46, SS = 3.39) and down % 27 ($\overline{X}$ = 22.17, SS = 4.44). Significant differences indicated that ROLS was suggesting very strong scale.
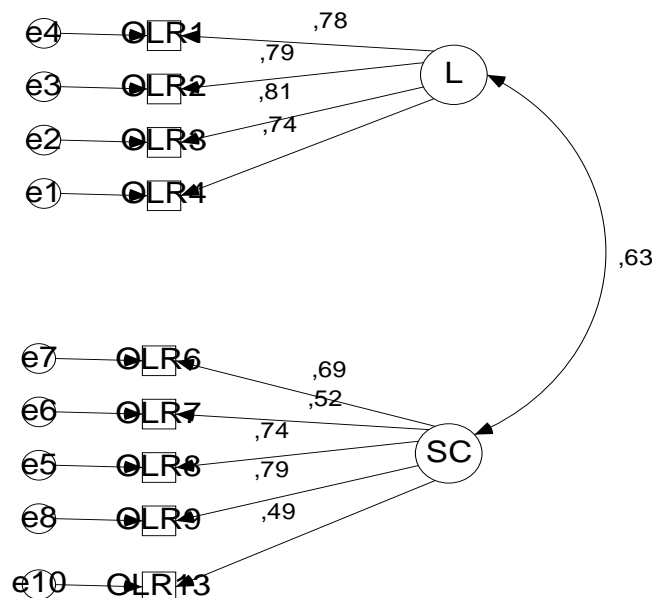
Factor correlations with respective factor, and with each of the factor were demonstrated significant relationship (r=.86-.87, p<.001). Significant positive correlations were found between subscale item score and total subscale scores. Significant positive correlation were found between CL and CBC (r=.49, p<.001); CL and ROLS (r=.49, p<.001); CBC and ROLS (r=.87, (p<.001).Table 4 shows factor correlations with respective factor, and with each of the

factor. Reliability analysis for the internal consistency was tested using Cronbach's alpha for each competency in SPSS. The Cronbach's Alpha reliability coefficient was .85 for the complete scale (9 items), .86 for CL (4 items), .78 for CSC (5 items dimensions. As a result, strong evidence of consistency in students' response to the ROLS items was observed. The total item correlation illustrated in table 5.

Table 4. Factor correlations with respective factor, and with each of the factor

	Computer literacy	Computer based self confidence
Computer literacy	-	
Computer based self confidence	.49**	-
Readiness for online learning	.86**	.87**

Table 5. Total Item Correlation

Items	R
M1	.602
M2	.576
M3	.667
M4	.647
M6	.586
M7	.400
M8	.591
M9	.663
M13	.381

3. Results

3.1. Research Questions

3.1.1. Research Question 1

Research question 1 concerns university students' readiness for online learning. In this study, students' mean scores in two dimensions are all higher than the theoretical mean of 3, ranging from 3.60 to 4.37 on a 5-point scale. This finding means that the current study's sample of university students has the highest readiness in the dimension of computer literacy ($\bar{X}$=13.85; SS=3.81), followed by computer based self efficacy ($\bar{X}$=16.80; SS=3.93) and means score of ROLS ($\bar{X}$= 30.65; SS=6.68).

Table 6. Mean Scores of Students

	N	Min.	Max.	$\bar{X}$	SS	Skewness	Kurtossis
Computer Literacy	297	4.00	20.00	13.85	3.81	-.578	-.040
Self Confidence	297	5.00	25.00	16.80	3.93	-.543	-.014
Online readiness	297	11.00	45.00	30.65	6.68	-.513	.024

3.1.2. Research Question 2

To test for gender differences in the ROLS constructs, T-test conducted that revealed no significant difference between female and male students (t $_{(295)}$ = -.11, p = .91).

Table 7. T-test Results According to Gender Differences

		N	X̄	SS	SH	*T*	*Sd*	*p*
Computer literacy	Female	246	13.78	3.79	.24	-.67	295	.50
	Male	51	14.18	3.91	.55			
Computer based self confidence	Female	246	13.78	3.79	.24	-.67	295	.50
	Male	51	14.17	3.91	.54			
Readiness for online learning	Female	246	30.63	6.78	.43	-.11	295	.91
	Male	51	30.74	6.22	.87			

3.1.3. Research Question 3

Does educational faculty of students make any difference in their readiness for online learning, as the third research question asks? The results of this study show no significant differences (t $_{(295)}$ = -.67, p = .15). This finding means that university students are those who study at educational faculties had similar levels in all readiness dimensions: computer literacy and computer based self confidence.

Table 8. T–test results according to faculty differences

		N	X̄	SS	SH	*T*	*Sd*	*P*
Computer literacy	Education faculty	198	13.63	3.67	.26	-1.45	295	.15
	Other	99	14.30	4.05	.41			
Computer based self confidence	Education faculty	198	16.84	3.75	.27	.25	295	.80
	Other	99	16.72	4.28	.43			
Readiness for online learning	Education faculty	198	30.47	6.31	.45	-.67	295	.50
	Other	99	31.02	7.38	.74			

3.1.4. Research Question 4

To test for age differences in the ROLS constructs, T-test conducted that revealed no significant difference between age groups (t $_{(295)}$ = -.1.26, p = .21).

Table 9. T-test results according to age differences

	Age
Literacy	.15**
Self Confidence	.09
Online learning	.14*

3.1.5. Research Question 5

In order to investigate, difference among students' score of two dimension on ROLS and perceptions of their self-confidence while using computer one-way ANOVA conducted. Significant differences were found between students 'self perception while using computer and their means score of the ROLS ($F_{(2,294)}$=70.111;p< 001; $F_{(2,294)}$=7.896;p< 001; $F_{(2,294)}$=38.458;p< 001;). A post hoc test further revealed that the means score of students' online learning readiness and computer literacy was significantly (p<.001) greater than students are those who assigned to themselves as bad computer user. Additionally, the means score of students' computer-based self confidence was significantly greater (p<.001) than students are those who assigned to themselves as bad computer users.

Table 10. One-way ANOVA results

f , $\overline{x}$ ve ss					ANOVA results					
Score	Groups	N	$\overline{x}$	ss	Var. K.	KT	Sd	KO	F	p
Literacy	Poor	54	9.89	3.48	G.among	1385.845	2	692.923	70.112	.000
	Good	192	14.11	3.02	G.in	2905.636	294	9.883		
	Very good	51	17.06	3.21	Total	4291.481	296			
	Total	297	13.85	3.81						
Self Confidence	Poor	54	15.35	3.93	G.among	233.153	2	116.576	7.896	.000
	Good	192	16.80	3.87	G.in	4340.726	294	14.764		
	very good	51	18.33	3.64	Total	4573.879	296			
	Total	297	16.80	3.93						
Online readiness	Poor	54	25.24	6.48	G.among	2740.060	2	1370.030	38.458	.000
	Good	192	30.91	5.82	G.in	10473.522	294	35.624		
	Very good	51	35.39	5.96	Total	13213.582	296			
	Total	297	30.65	6.68						

4. Discussion

Online learning is affecting the educational environment and has been labeled as a tool that can enhance effective and efficient teaching and learning. However, while it is increasingly used in many educational institutions observations have been shown that online learning readiness focus on the computer-based literacy in performing tasks, including perceived ability to computer –based self efficacy. The study findings provide evidence that university students has the highest readiness in the dimension of computer literacy, followed by computer based self efficacy. From the results, university students might be relatively confident while performing tasks in online learning therefore they gain more benefit from technology enhanced effective instructions using a particular technology to deliver these instructions.

There is ongoing debate about whether student learning influenced more by conventional instruction or audiovisual and computer media, research showed that audiovisual and computer media as technology vehicles promote more learning benefit than conventional instruction. However, the findings of this study revealed that revealed that students' levels of readiness were high in computer literacy and computer based self-confidence thus they select the most appropriate technologies in terms of their purpose of learning. In addition, they can be equipped with tools and methods to become a changing agent in their own context as the schools' transit to online learning. Students need to build their capacity in technological knowledge through online learning. The study has demonstrated that students' technological knowledge about using computer can lead to them effectively integrate and use technologies through online education.

From the study results, it can be stated that university students might relatively confident while using computer. The study has revealed that the means score of students' online learning readiness was significantly greater than students are those who assigned to themselves as bad computer user and thus, the students have already been equipped with tools to become a changing agent in their own context. On the other hand, woman usually seems to not fit be equipped with technology tools however the study results have showed that gender no made statistical difference between female and male. Moreover, educational faculty students are perhaps more accustomed to online education but, all students demonstrated an equal degree of readiness.

5. Conclusion, Recommendations

This study has verified the readiness for online learning on university students. Considering that online learning further development and validation of readiness for online learning scale can adopt a more multidimensional interpretation of ROLS factors. Meanwhile, the study results are beneficial to better understand the ever-increasing use of online learning environment where students identify potential barriers to their achievement managing of their preparedness through online learning. Therefore, the realization of the barriers and their relationship between the variables to some extent is likely possible. The study finding means that the current study's sample of university students has the highest readiness in the dimension of computer based literacy and computer based self confidence. This study furthermore analyzed readiness for online learning according to university students' faculty that university students are those who study at educational faculties had similar levels in all readiness dimensions: computer literacy and computer based self confidence. Furthermore, the study has been shown that male and female students had similar levels in all readiness dimensions: they exhibited equal attitudes on readiness for online learning. It can be suggested future studies on the relationship between the readiness of self-directed learning and course topics in the online learning context. The development of the ROLS for instructors to consider their readiness for online learning regarding online courses and instructional design that help them to gain knowledge for a better online, technology-based delivery of instruction. Meanwhile, technology-oriented instruction with its focuses on forming learning materials can be designed properly to engage the learner and promote learning by instructors.

It can be suggested future studies on the relationship between the readiness of self-directed learning and course topics in the online learning context. The development of the ROLS for instructors to consider their readiness for online learning regarding online courses and instructional design that help them to gain knowledge for a better online, technology-based delivery of instruction. Meanwhile, technology-oriented instruction with its focuses on forming learning materials can be designed properly to engage the learner and promote

learning by instructors. Because this study aims to develop an instrument the ROLS for all university students, this study did not probe into the learner-readiness differences relative to the courses. However, in order to examine the usefulness of the ROLS for all academic disciplines, students from diverse courses may be involved in future research. Moreover, because of its exploratory nature, this study did not check ROLS criterion-related validity; that is; we did not collect students' data on the ROLS and other similar scales concurrently. Future research may focus on the correlation of ROLS and other similar scales for more concurrent evidence of validity. In addition, future research may address the test-retest reliability of the ROLS.

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