

Wissensbasierte online- (Zusammen-) Arbeit in Lehre und Forschung

Knowledge-based online (collaborative) work in teaching and research

Student Readiness for Online Learning – A case study in rural Bolivia

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Abstract

The present paper describes the research of the students' online learning readiness in a rural university in Bolivia. In particular, it examines through a quantitative research the influences of some variables on the students' attitudes toward online learning. These variables were established based on theoretical fundamentals and selected and confirmed through a qualitative research based in semi-structured interviews with lecturers and directors of the university's rural centers.

This study also provides a way to predict the membership of a student in two groups: "Those who would participate in an online course" and "those who would not participate in an online course" depending on the influencing variables (technology access, technology skills, self-directed learning and online interaction). This analysis also reveals the most important factors to be considered by the university before introducing online courses.

The results have shown that the perceived Internet access strongly affected the participation or the lack of participation of students in an online course. Moreover, the student's attitude toward online learning is influenced mainly by the perception of the quality of his Internet access, by the perception about his capability to interact online (with other students, lecturers and content) and by the individual's perception about his own computer skills.

This study also provides a simple model to analyze the students' online learning readiness based on their self-assessment.

1 Introduction

The rapid growth of information and communication technologies has started a transformation in the learning and teaching processes in universities around the world. Accessibility anytime and anywhere is an advantage that makes online learning an attractive solution to the problem of limited educational access for students in rural areas, who would otherwise have to travel or relocate great distances to attend face-to-face classes.

However, online learning has failed in many universities because of one or more actors in the educational process have not been ready for online learning [1]. The introduction of online courses in the universities is in most of cases a decision of the administration, whether for advertising purposes or for making the university more competitive than others in the region. Most universities introduce online courses without any prior study of Online Learning Readiness. This leads to the failure of the online courses in terms of students dropping out, low participation rates and a decrease in learning quality, which brings more losses than profits for the institutions [2].

Although a study of readiness is necessary in all dimensions of the university, the study of student readiness is a central task, which should always be carried out. The present paper presents the methodology and results of the study of the online learning readiness of the students in the rural university centers of the University Mayor de San Andrés.

The study pursued the following objectives:

- To determinate the current computer and internet skills of students in the rural centers measured through their self-assessment.
- To identify influencing factors for the online learning readiness in the rural centers.
- To identify differences between regions and careers in students' perception about their online learning readiness.

2 Theoretical Framework

E-Learning-Readiness is a term that is usually confused with Online Learning Readiness. In this research, Online Learning is understood as a form of E-Learning, [3] which refers to learning by using a computer and a network connection such as Internet or Intranet [4]. Student online learning readiness refers to the preparedness of the students to participate in an Online Course.

The investigation of online learning readiness in the literature is very related with some other theories like acceptance, effectiveness and especially success factors of online learning [5]. Some authors have separated types of readiness in dimensions. One of these refers to the student online learning readiness. Following are some examples of the researched potential influencing factors in this dimension: “*Self-directed learning*”, “*motivation for learning*”, “*computer/internet self-efficacy*”, “*learner control*”, “*online communication self-efficacy*” [6], “*general beliefs about distance education*”, “*confidence in prerequisite skills*”, “*self-direction*” “*desire for interaction*” [7], “*technical skills*”, “*computer self-efficacy*”, “*learner preferences*”, “*attitudes towards computers*” [8].

In the literature, there are few studies about Online Learning Readiness in rural universities. One of them was carried out at a university in the rural area of Finland. The investigation was oriented to the study of students’ beliefs about E-Learning and its possibilities. The results showed that the majority of the students had neutral beliefs about E-Learning and there was also a lack of knowledge about possibilities of online learning [9].

In the same vein, with regard to the students’ readiness for online learning, some authors identified some critical influencing factors such as: “*self-directed learning*” and “*learner control*” [6], “*network literacy*” [10] “*self-efficacy*” and “*attitudes toward the Internet*”, “*perceived structure*” [11], “*gender*” and “*ethnicity*” [12].

However, among 5107 studies about E-Learning-Readiness, most of them were carried out in developed countries like the USA, Canada and Australia [13], in literature there are very few studies done in developing countries and fewer still that have been done in rural areas.

3 Research Methodology

The research was based on a triangulation method using qualitative and quantitative research methods and multiple data sources.

With the help of the theoretical fundaments, a reference model was built. A qualitative research was carried out with the lecturers and the directors of the rural university centers, in order to identify the factors that were important to investigate. With these results, the reference model was readjusted. The qualitative research also helped us to confirm and explain the results of the whole investigation.

After the readjustment of the reference model a quantitative method was used to analyze the perceptions of the students about their online learning readiness and the identification of factors, that influence their attitudes toward online learning and their decision of whether they would participate in an online course or not. For this purpose, an instrument was designed, improved, and validated.

Besides giving demographical data, this instrument obtained information about the perception of students within the variables we wanted to study. For this, we used subscales based on a self-assessment with 5- Point Likert Scale (Strongly disagree 1, Disagree 2, Neutral 3, In Agreement 4, Strongly agree 5). Each subscale contained the questions of other validated instruments as follow:

- Access to computer (TAC), Access to Internet (TAI); items based on the instrument of Watkins et al. [14].
- Technological computer skills (TSC) is a self-assessment of computer literacy of the student; items based on the instrument of Mercado [15].
- Technological Internet skills (TSCI) is a self-assessment of the Internet literacy of the student; items based on Dray et al. [16].
- Self-directed learning (SE) is a self-assessment of the capabilities of a student to plan, organize and direct his own learning process; items based on the instrument of Williams [17].
- Online Interaction (OI) is a self-assessment of the capabilities of a student to interact with other students, lecturers and share content over Internet; items based on the instrument of Watkins et al. [14].
- Attitude toward the adoption of online learning (ATE) is a self-assessment about the beliefs of the student referring to online courses; items based on the instrument of technology acceptance model used by Park [18]

The instrument also takes into account the demographic variables of age, region and career, because in the qualitative study the lecturers and the directors mentioned them repeatedly as potential influencing factors.

4 Hypotheses

As described, with the chosen variables and considering the theoretical background, a conceptual model has been developed (see Figure 1).

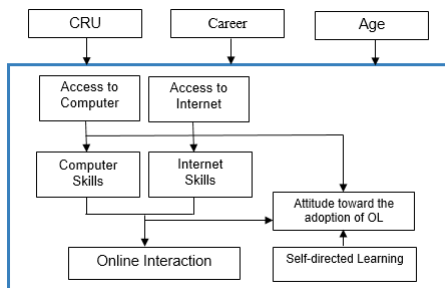


Figure 1: Conceptual model for the research of the student online learning readiness

Based on this model, we established the following hypotheses to investigate which are the variables that influence the attitude toward online learning:

- H1a: Computer access (TAC) has a positive effect on the technological computer skills (TSC)
- H1b: Internet access (TAI) has a positive effect on technological Internet skills (TSCI)
- H2: Technological computer Skills (TSC) have a positive effect on the technological Internet skills (TSCI)
- H3: Technological Internet Skills (TSCI) have a positive effect on online interaction (OI)
- H4a: Technological computer skills (TSC) have a positive effect on the attitude toward the adoption of online learning (ATE)
- H4b: Technological Internet skills (TSCI) have a positive effect on the attitude toward the adoption of online learning (ATE)
- H5: Online interaction (OI) has a positive effect on the attitude toward the adoption of online learning (ATE)
- H6: Self-directed (SE) learning has a positive effect on the attitude toward the adoption of online (ATE)

The study was carried out in three rural centers of the principal university of La Paz (CRU). The size of the sample was determined based on the analysis methods and the total student population in the rural area. 125 students filled out the survey. Thirteen people were interviewed (directors and docents).

5 Instrument

As said, the used instrument for this research was a compilation of items that were adapted to reach the investigation's goals. The reliability and validity of the data for the research were measured using factor analysis with the help of the Statistical Package for the Social Sciences (SPSS) and SmartPLS. The items that did not pass the tests of validity and reliability were deleted.

Table 2 shows the descriptive statistics of the subscales with the validated items, it can be observed that the students' perceptions regarding the items questioned were mostly positive. Table 2 also shows the indicators for validity and reliability of the instrument. For the measurement of the validity of the construct-level, the internal consistency of the subscales was tested with the Cronbach's alpha ($C\alpha$) and composite reliability CR of Fornell. For all subscales, the $C\alpha$ and CR were greater than 0.6.

Table 2: Descriptive statistics

	M	SD	$C\alpha$	CR	AVE
TSC	3.446	0.6048	0.783	0.873	0.696
TSCI	3.030	0.6019	0.893	0.926	0.757
OI	3.470	0.7990	0.869	0.911	0.718
SE	3.602	0.6723	0.788	0.894	0.808
ATE	3.352	0.7793	0.851	0.899	0.691

For the measurement of the reliability of item-level, a factor analysis was performed. The loading of each indicator was greater than all of its cross-loadings. The convergent validity and discriminant validity were proved through the measurement of the average extracted variance (AVE) (see table 2).

6 Results

The study shows that most of the students have access to a computer. Only 2.4% of the sample have no way to access a computer / laptop / tablet. However, only 33.06% have a computer / laptop for their individual use, the others have to share their computer with other people in their homes or make use of the PC-Pools of the university or a computer in an Internet Café in the area where they live.

Most students access the Internet. However, the most common form of access is through Internet Cafes at 76%. Only 13.2% of students have a connection at home via ADSL or WiMAX and some of them have permanent access to the Internet through mobile Internet via modem or cellphone.

Based on the interviews of the lecturers and a survey with the students, it was found that both the lecturers and the students had a positive assessment of students' computer skills. The positive assessments of the lecturers are based on experiences with papers, projects and homework as well as presentations, which had to be elaborated in digital form. In the self-assessment of students, their computer skills were generally considered satisfactory in all the items. In spite of this, the use of applications for special purposes showed better indicators of students involved in technical careers.

The internet skills were positive but had lower results than computer skills. The positive perceptions of the lecturers were based on the students' activities using the Internet, for example: sending a homework assignment by e-mail or making contributions and discussions via chat and online forums. The self-assessment of the students about their internet skills is between satisfactory and good. The students seem to have problems with troubleshooting in some cases, for example upgrading Java or to installing a flash add-on for watching a video. The use of social networks and forums could be an effective tool for an online learning approach, because the majority of students use Facebook to communicate with their teachers and colleagues outside the university, this way seems to be widely accepted and used.

Differences between regions and careers

The differences between regions and careers were analyzed through tests of contingency tables, comparing the regions and careers on each item. As result, only two items presented significant differences (see table 3). The first refers the most common way of accessing the Internet, in some areas Internet access is only available via mobile modem or cellphone. The second difference was related to the use of applications for special purposes like AutoCAD, GIS, etc. It can be deduced that the students of technical careers feel more confident to use any kind of software.

Table 3: Differences between regions and careers

Variables	χ^2	dF	P
TAI/Region: Most common way of accessing the internet.	10.771	2	0.005
TSC/Career: Use of application for special purposes.	22.113	12	0.036

Influencing factors for the online learning readiness

As stated previously, the studied influencing factors of online learning readiness were first found in literature and selected in a qualitative research between lecturers and directors of the rural centers.

We decided to use structure equation modelling SEM based on partial least squares. The hypothesis testing of the reference model was done with the help of the PLS-SEM's measurement model with SmartPLS. A bootstrapping was carried out with 500 samples and 5% significance level. Therefore, the acceptable T values for determining significant correlations had to be more than 1.96 [19] (see table 4).

The influences of the access to computer and access to Internet on the other variables were measured through analysis of variance ANOVA. Just one item of these variables was considered for the study, which referred to the quality of access.

Table 4: Hypothesis testing

Hypothese		df	F	p-value	Decision
H1a	TAC→TSC	3	3.319	0.005	Supported
H1b	TAI→TSCI	5	3.323	0.000	Supported

Hypothese		β	T-Value	P-Value	Decision
H2	TSC→TSCI	0.588	7.181	0.000	Supported
H3	TSCI→OI	0.446	4.225	0.000	Supported
H4a	TSC→ATE	0.071	2.40	0.017	Supported
H4b	TSCI→ATE	0.074	0.797	0.426	Rejected
H5	OI→ATE	0.531	6.322	0.000	Supported
H6	SE→ATE	0.056	0.701	0.484	Rejected

We must emphasize that the variable that created most dependencies in the model was the access to Internet.

Participation or no participation in online learning courses

In the students' survey, the students expressed whether they would participate in an online learning course or not. The result of the direct question "Would you participate in an online course?" shows a majority acceptance of 80%.

In this regard, the students were classified in two groups "participants" and "non-participants" based on the analyzed variables. This classification helps us to generate mathematical functions to predict the participation based on the perceptions of a student taking into consideration the measured variables.

Wilk's lambda indicates which variables contribute a significant amount to the functions of prediction to help differentiate the groups [20]. The closer Wilks' lambda is to 0, the more the variable contributes to the discriminant function. Considering

table 5, we can conclude that the access to the Internet (TAI) is the most important factor for the prediction of participation in e-learning courses. Student decisions are more based on their Internet access than on other factors.

Table 5: Discriminant Analysis – Factors' contribution

	Wilks-Lambda	F	df1	df2	Signifikanz
TAC	.938	7.893	1	119	.006
TAI	.622	72.299	1	119	.000
TSC	.804	29.068	1	119	.000
TSCI	.987	1.544	1	119	.216
OI	.690	53.534	1	119	.000
SE	.993	.871	1	119	.353

And the formulas of participation and non-participation are as follow:

$$F_{(\text{no participant})} = -20.620 + 2,826 * \text{TAI} + 0.966 * \text{OS} + 8.750 * \text{TSC}$$

$$F_{(\text{participant})} = -26.741 + 5.047 * \text{TAI} + 3.315 * \text{OS} + 6.638 * \text{TSC}$$

7 Conclusions

Cases of success and failure in the introduction of online learning have shown that for the introduction of an online course, first it is necessary to investigate whether students are ready to learn online or not.

The theory has analyzed several factors that influence student readiness for online learning. However, the studies are usually carried out in developed countries, where the access to computers and the Internet has become prevalent. In developing countries, especially in rural areas, although the possibilities offered by online learning are known, the quality of the access to the Internet could be a big barrier for its introduction [21].

The differences of students' readiness between regions and careers were also researched. There is a significant difference between careers in perceived computer skills. Students in technical careers have more positive perceptions of their computer skills than students from other careers.

Gender, culture, online learning beliefs, computer literacy are proved key influencing variables for the students' online learning readiness in the literature. However, in our case the most influencing factors that determined the participation in an online

learning or not, were first the student's perception about his quality of access to the Internet, then the perception about his capability to interact online and finally the individual's perception about his own computer skills.

When the students perceive that they do not have a sufficient Internet connection although their perception about their skills and their attitude toward online learning are very positive, they would not participate in an online course.

Unfortunately, Internet access in rural Bolivia is still a big barrier for the introduction of online learning because the internet service in Bolivia is the slowest and the most expensive in all South America [22]. However, the study showed that despite these barriers, students and teachers access the Internet, make use of social networks, use digital materials, etc., all of which implies that if internet access is improved, online courses would be successful.

The study of readiness in teaching dimension in such a context is a very interesting topic for further studies. Also, the relationship between student readiness, acceptance and learning outcomes of online courses would be a relevant contribution to the pedagogical theory of online education, that would help the higher institutions as reference for future implementation of online courses.

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