

Adoption of Open Educational Resources: An Analysis of Student's Perceptions

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Abstract. Open Educational Resources (OER) have transformed teaching practices in higher education. This study aimed to analyze means and standard deviations of adopting available educational resources by research and academic degree discipline. The second stage examines the relationship between the dimensions of adopting open educational resources (perceived usefulness, perceived ease of use, attitude, subjective norms, and behavioral control). A total of 358 students from five public and private universities were considered, whereas 90 of them (25.1%) were male, 266 (74.3%) were female, and 1(.3%) preferred not to identify with any of the gender options. Ages ranged from 18 to 35 years ($M= 21.0$ and $SD = 3.0$). The results show that participants from disciplines related to health sciences have higher adoption of open educational resources. They observed that students with postgraduate training presented the highest means in all dimensions associated with OER. Correlations between the factors of adopting OER were statistically significant and cheerful; the correlation value is considered moderate. In conclusion, more studies are need to be done considering the factors that can influence the adoption of OER.

Keywords: Open Education Resources, Academic discipline, Students, Academic degree, Higher Education, Educational Innovation, Future of Education.

1 Introduction

The development of digital technologies and the ease of access to them by society have increased the possibilities of their application in various sectors, such as education. Educational innovation, primarily due to the inclusion of digital technologies and the Internet, gave way to various changes; an example is the development of the Open Educational Movement, which was born to reduce the gap in access to information between communities; for this, this movement seeks to make information available to all [1,2].

Among the manifestations of the open educational movement are Open Educational Resources (OER), which are defined as materials for teaching, learning, and research in any format [3] an important characteristic is that they are in the public domain or have copyright protection clauses that have been published under an open license so that people can access them for reuse, adaptation, and redistribution [4].

The OER concept arises to support educational transformation by providing digitized resources that can be shared through different media, such as the Internet [5]. Therefore, it is essential to differentiate an OER from any educational resource; basically, the distinction lies in the type of licensing they have, which allows their reuse, adaptation, and use without requesting prior authorization from the author of the educational material [6].

The use of OER in higher education has brought significant benefits for users, for example, a reduction in costs due to the standardization of its application, more significant opportunities to access diverse educational materials, reduction of class preparation time for professors, and, in general, an improvement in the quality of education [7–9].

Among the aspects in research on the subject it can be named the barriers, incentives, and factors that influence the adoption of OER [10–12]. The research focused on teachers shows that they are aware of the benefits of using OER in their educational practice; however, some authors mention that the search, selection, and application is one of their biggest challenges, the lack of knowledge of intellectual property, licensing, copyright, this coupled with the perception they have about their technological self-efficacy [10,13,14] these findings imply that it is necessary to continue training to reduce the factors that hinder the use of OER.

Research reports that students have positive opinions about using OER, motivation, and academic performance improved when OER were included in their practice, and they mention that a positive aspect was the money they could save by finding free-to-use educational materials [11,15].

Therefore, one important aspect to analyze is the factors that motivate the adoption of OER in university students. For this study, the dimensions of perceived usefulness, perceived ease of use, attitude, subjective norms, and behavioral control of the technology acceptance model (TAM) [16] have been considered. To analyze the perceived adoption of OER there were considered students in the academic disciplines of humanities and education, health sciences, business and management, engineering and exact sciences. The second stage analyzes the relationship between the dimensions of adopting OER (perceived usefulness, perceived ease of use, attitude, subjective norms, and behavioral control).

2. Method

2.1 Participants

A total of 358 students from five public and private universities in Mexico were selected on a non-probabilistic basis. A total of 90 participants (25.1%) were male, 266 (74.3%) were female, and 1(0.3%) preferred not to identify with any of the gender options. Ages ranged from 18 to 35 years ($M = 21.0$ and $SD = 3.0$). The students came from humanities, education, health sciences, business and management, engineering, and exact sciences.

2.2 Instrument

Acceptance of Open Educational Resources. The scale was developed for the study is composed of 20 items distributed in five dimensions: (a) perceived usefulness (four items, e.g., "Open educational resources help me to complement the information seen in class"), (b) perceived ease of use (four items, e.g., "I can freely select different open educational resources according to my needs"), (c) attitude (four items, e.g., "I think that studying with open educational resources is pleasant"), subjective norms (four items, e.g., "I can freely select different open educational resources according to my needs"), and subjective norms (four items, e.g., "I can freely select different open educational resources according to my needs"): I can freely select different open

educational resources according to my needs), (c) attitude (four items, for example, I think studying with open educational resources is enjoyable), subjective norms (five items, I use open educational resources because my teacher has explained the benefits to me), and behavioral control (three items, In the future, I will use open educational resources as a way to study). The scale has a Likert-type response format with values ranging from 1, "Strongly disagree," to 5, "Strongly agree." The measurement model manages to explain 67% of the variance. As for the reliability of the model, it presents acceptable values in the dimensions and in the general model (see Table 1).

Table 1. Scale reliability

Factors	Cronbach Alpha	McDonald's Omega
Perceived usefulness	.91	.92
Perceived ease of use	.86	.87
Attitude	.92	.92
Subjective standards	.86	.87
Behavioral control	.93	.94
Global scale	.97	.98

3. Procedure

3.1 Data collection.

Voluntary participation of the participants was requested; the students who agreed to participate were asked to accept an informed consent, and the reliability of the data was guaranteed. Finally, the instrument was applied through a Google forms survey with a response time of approximately 20 minutes.

3.2 Data analysis.

Once the responses were obtained, the data analysis was carried out with the support of SPSS 25 (Social Sciences Statistical Package) and JASPP statistical software. Exploratory factor analysis, reliability analysis, means, standard deviations, and correlations were calculated.

4. Results

4.1 The discipline of study and adoption of OER.

Table 2 reports the means and standard deviations of the study discipline of the participants and the factors related to the adoption of OER. The results show that participants from the study discipline related to health sciences have higher adoption of OER, standing out in dimensions such as perceived usefulness.

Table 2. Means and standard deviations of study discipline and factors related to adopting OER.

	Humanities and Education		Health Sciences		Business and Administration		Exact sciences and engineering	
	M	SD	M	SD	M	SD	M	SD
Perceived usefulness	4.24	.88	4.48	.90	4.20	.89	4.09	1.15
Perceived ease of use	4.07	.83	4.09	.84	4.02	.84	4.00	.82
Attitude	4.14	.90	4.16	.88	4.07	.87	4.11	.67
Subjective standards	3.70	.82	3.84	.85	3.79	.79	4.03	.61
Behavioral control	4.01	.95	4.04	.92	4.01	.87	4.03	.64

The findings imply that students in the health area have greater acceptance of OER; this could be due to the type of subjects and content addressed in university education, which refer to a more significant number of hours of study and the need for students to use different educational resources that meet their study needs. However, an important finding is the lower means reported in the dimension of subjective norms; this could imply that students receive little information from their professors about the importance and benefits of using OER; this could be a subject of analysis to address with the professors about the importance of the use and reuse of OER in their teaching practice.

4.2 Academic grade and adoption of OER

Table 3 shows the means and standard deviations of the academic grade of the participants and the dimensions of the adoption of OER. The overall means of adopting OER are presented in the perceived usefulness, which implies that this is the primary factor that influences the students' use of OER. On the other hand, the lowest means was presented in the subjective norms, which implies that students do not receive information about the benefits of using this type of OER and that their adoption is due to needs. Regarding the academic degree, it was observed that students with postgraduate training presented the highest means in all dimensions related to OER.

Table 3. Means and variances of academic grade and factors of OER's adoption.

	Undergraduate		Postgraduate		Continuing education	
	M	SD	M	SD	M	SD
Perceived usefulness	4.20	.95	4.67	.38	4.39	.64
Perceived ease of use	4.02	.88	4.30	.48	4.19	.65
Attitude	4.12	.92	4.41	.88	4.12	.72
Subjective standards	3.76	.86	4.07	.60	3.85	.67
Behavioral control	4.01	.94	4.45	.63	4.00	.78

This finding implies that students with master's or doctoral degrees are more predisposed to adopt OER than undergraduate and continuing education students. Because of graduate students' type of training, they are continuously in contact with free resources such as articles, book chapters, educational videos, and open software for data analysis and reference management. Therefore, the low averages obtained in undergraduate and continuing education are essential to analyze; it reflects the need to intentionally make visible the benefits and advantages of using OER for lifelong learning.

4.3 Relationships between factors of adoption of OER

The analysis of Pearson correlations between the factors of the adoption of OER was statistically significant, whereas the correlation value is considered moderate. These results show the value of the OER's adoption model; however, it is necessary to analyze the relationships between these factors with other variables that may influence the adoption of OER (see Table 4).

Table 4. Pearson correlations between factors of the adoption of OER.

	1	2	3	4	5
1. Perceived usefulness	-				
2. Perceived ease of use	.69**	-			
3. Attitude	.76**	.75**	-		
4. Subjective standards	.61**	.63**	.65**	-	
5. Behavioral control	.65**	.63**	.70**	.72**	-

** $p < .05$

5. Conclusion

The objective of this study was to analyze the means and standard deviations of the dimensions of the adoption of OER by the discipline of study and academic degree and to analyze the relationship between the dimensions of the adoption of OER (perceived usefulness, perceived ease of use, attitude, subjective norms, and behavioral control).

Students from the disciplinary areas seemed to be more willing in the use of OER. The results showed that students from the health area present higher means in the dimensions of the adoption of OER compared to students from areas related to humanities and education, administration, and business, and from exact sciences and engineering. These findings are consistent with what is reported in the literature [17,18] where it was mentioned the study of the positive perceptions of medical students on the use of OER. These findings imply, on the one hand, the positive perceptions that students from different academic disciplines have about using OER; however, it is still necessary to continue developing studies about the factors that affect or encourage the adoption of OER.

In terms of academic degrees, graduate students perceive OER better than students from other academic levels. The results show that master's and doctoral students have a better predisposition to adopt OERs than undergraduate and continuing education students; these findings differ from what is reported in the literature because, according to the evidence, there are no differences in attitudes towards OER in undergraduate and graduate students [17] however, in the literature it is reported that OERs are a resource that promotes research skills in graduate students [15]. These findings imply that it is necessary to continue delving deeper into understanding whether the academic degree is a determining factor for the adoption of OER, and it is also essential to develop studies on school and personal variables related to the dimensions of OER adoption.

Regarding the relationships between the factors on the adoption of OER by students, it is shown that the factors are related in the expected direction, so these findings confirm the robustness of the model of technological appropriation. The results showed a statistically significant relationship between the dimensions: perceived usefulness, perceived ease of use, attitude, subjective norms, and behavioral control. This finding is consistent with what has been reported in the literature on using the TAM model as a perspective to analyze the adoption of OER in students [18,19] Despite the findings, it is essential to continue to analyze other factors related to adopting OER in students.

Also, it is important to mention that these results must be taken with caution due to the limitations of the study. At first, regarding the self-report measurement format, other forms of measurement must be used; secondly, although a representative sample was sought, these data only refer to a geographical area in northern Mexico, so generalizations should be made cautiously. Third, although the analyses provide valuable information, other types of statistical analysis must be considered to establish hypothesis tests and perhaps cause-effect relationships between variables.

Regarding future studies, it is suggested that they continue to address the adoption of OER from the students' perspective, integrating into theoretical models both individual and school variables that could help to understand the acceptance of OER; it is also suggested that the development and validation of measurement instruments with more robust evidence on the adoption of OER from the student's perspective.

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