Validation of the attitudinal scale of open educational practices in university teachers

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Abstract

The relevance of Open Educational Resources (OER) in the Latin American university context requires an instrument that measures the conceptual, procedural, and attitudinal aspects that teachers consider having in their open educational practices. The purpose of this research is to describe the process of design and validation of the Attitudinal Scale of Open Educational Practices (ASOEP) Scale. Consequently, the methodological approach corresponds to a descriptive, transectional, instrumental design that has three components: scale design, evaluation by expert judgment and validation with the pilot application. The pilot test was applied to a random sample with 123 teachers at a university in Colombia. The results from the validation of the content had the participation of five international experts who were classified according to coefficient K in the range between (*k*: .80 and *k*: 1.00). From the pilot application, the ASOEP Scale presented a general reliability of (α: .943).

Keywords: Open Educational Practices, Open Educational Resources, Open Education, University teaching, Attitudinal scale

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Introduction

Access to information in the different fields of knowledge is becoming a reality for a wider audience. Universities, governments, and non-profit organisations around the world have promoted the opening, access, and distribution of educational content for the benefit of society. The idea that knowledge is a common good and that technology, especially the internet, provides an opportunity for everyone to share, use and reuse knowledge (Ramírez Montoya & García Peñalvo, 2016), is what the educational movement Open has proposed.

This movement is driven by the creation and use of open educational resources (OER) and their integration into the different educational practices that teachers, academics and educational institutions are developing to generate a transformation in the quality of teaching and learning of millions of students. However, little has been studied about the capacities, abilities, or competencies of Latin American university professors regarding the development, creation, mixing or reuse of OER in their teaching practices. Therefore, the objective of this article is to design and validate an instrument that measures the conceptual, procedural, and attitudinal aspects that teachers consider when regarding their open educational practices.

Theoretical framework

Currently, various international scientific researchers are focusing their attention on topics related to open access, OER, massive open and online courses (MOOCs), digital repositories and open educational practices. All of them, especially OER and open educational practices, are attracting special interest from educational institutions, ministries of education and academics. Their different conceptual approaches and the perspectives of the researchers are set out below.

Open educational resources

On 2002, UNESCO coined the term open educational resource (Cronin, 2017; Geser, 2007; Stracke, Downes, Conole, Burgos & Nascimbeni, 2019), defining it as 'the open provision of educational resources, enabled by the technologies of the information and communication, for consultation, use and adaptation of a community of users for non-commercial purposes' (UNESCO, 2002). Since then, the concept has been gaining strength in higher education institutions and international organisations such as UNESCO and OECD, due to the fact that the costs of tuition fees and textbooks have increased year after year, limiting access to information for most students in higher-level institutions. Consequently, there has been a dramatic increase in the use of OER in recent years (Hilton, 2019).

Different conceptual approaches have been raised in the last two decades about OER. For example, the OECD defines them as 'those teaching, learning, and research materials that use appropriate tools, such as open licenses, for allowing their free use, continuous improvement, and reuse by others for educational purposes' (Orr, Rimini & Van Damme, 2015, p. 17). In turn, Atkins, Brown, and Hammond (2007) define them as teaching–learning and research resources that have been published under an intellectual property license, which allows their free use and reuse by others.

For this research, OER will be understood as all those materials in physical or digital format (text, images, audio and video) and digital tools (software, website, blogs, etc.) intended for teaching, learning, training or research. These materials exhibit an open license that gives credit and

recognition to the authors and allows users to adapt them (use, reuse, or mix) and consult them on different platforms or digital repositories without restrictions or royalty payments.

In addition, different ministries of education such those in India (Perryman & Seal, 2016), China (Tlili, Huang, Chang, Nascimbeni & Burgos, 2019) or Brazil (Ferreira & Lemgruber, 2019), have supported the adoption, creation and use of OERs in their educational systems through educational projects, initiatives or policies. Also, different educational institutions or universities such as the University of Southern Queensland (Australia) have included institutional policies for the development and use of OER in their educational community (Udas, Partridge & Stagg, 2016).

On the other hand, Tezer & Özcan (2015) develops an approach to the concept of attitudes supported in turn by different authors (Daskalogianni and Simpson, 2000; Ma and Xu, 2004; Ilie, Transilvania and Truţa, 2012) highlighting that it corresponds to the set of reaction trends positive or negative behavior that individuals have at the behavioral level in front of a particular object. Additionally the association is identified which they have the attitudes with aspects such as the academic performance, the perception and evaluation of the atmosphere and the scholastic coexistence, as well as the valuation that does so much the students as the educational ones on the methodology, the evaluation system, the beliefs that has on different factors associated with the educative act and the practical experiences that they have been derived from the education-learning models.

The evaluation of attitudes is relevant and pertinent to the extent that it allows analyzing the affective, cognitive and conceptual components associated with what students and teachers think, feel and do in the different scenarios of face-to-face and virtual interaction in the context academic (Pinto-Santos, Villanueva-Valadez and Cortés-Peña, 2019; Pinto-Santos, Perez and Darder, 2020).

Therefore, from the frame of the educative investigations also the opportunity is emphasized to design models and proposals multidimensionally to value the open educative approaches in superior education, which must be supported in empirical studies that contribute in the analysis of the educational capacities that have the front to the areas opened, contained design opened, education and open evaluation (Nascimbeni, Burgos, Campbell and Tabacco, 2018).Thus, it has been considered that educational resources have the potential to improve the quality of learning materials and teaching practice and influence student outcomes (Arinto, Hodgkinson-Williams, King, Cartmill & Willmers, 2017). However, in recent years, the focus of OER has shifted from focusing on access to open educational materials towards the application and use of new and innovative educational practices with OER.

Open educational practices

In this regard, the definition of open educational practices (OEP) still does not have a consensus among researchers, and several meanings have been proposed. For some authors, it is a multidimensional construct with vague limits (Koseoglu & Bozkurt, 2018) and an emerging field that does not have a clear definition (Cronin & MacLaren, 2018; Weller, Jordan, DeVries & Rolfe, 2018). Some conceptual approaches focus especially on the use and creation of OER, while others propose a more holistic definition.

For example, some definitions of open educational practices that focus on the use and development of OER are those formulated by de Beetham, Falconer, McGill, and Littlejohn (2012), through the International Council for Open and Distance Education. They define OER as those practices that support the production, use and reuse of quality 'OER. For its part, the Open Educational Quality Initiative (OPAL) defines open educational practices as a 'range of practices around the creation, use and management of 'OER with the intention of improving the quality and innovate education' (OPAL, 2011, p. 4). Likewise, authors such as Wolfenden and Adinolfi (2019) understand them as a wide range of individual and collective practices inherent in the conceptualisation, creation, adaptation, selection and dissemination of OER.

On the other hand, there are other definitions that go beyond the use and creation of OER. For example, according to Ehlers (2011), open educational practices are those that support the reuse and production of OER through institutional policies, the promotion of innovative pedagogical models and the empowerment of students as co-producers of OER in their lifelong learning paths. For his part, Cronin (2017) defines them as collaborative practices that include the creation, use and reuse of OER, as well as pedagogical practices that use participatory technologies and social networks for interaction, peer learning, knowledge creation and empowerment of students.

Based on the theoretical and empirical references that have been incorporated, this study focuses on the design and validation of an instrument to evaluate the open educational practices of teachers in the creation and use of OER, as formulated below in the methodological section.

Method

The methodological approach of the present study responds to the analytical empirical paradigm from the quantitative research framework through a non-experimental descriptive transectional design (Hernández, Fernández, & Baptista, 2014). In this sense, this research is of a psychometric instrumental cut, oriented to the design and pilot validation of the Attitudinal Scale of Open Educational Practices (ASOEP) from the postulates proposed by León and Montero (2003), Montero and León (2007), Carretero-Dios and Pérez (2007), and Delgado-Rico, Carretero-Dios and Ruch (2012).

Sample

The target population for the effect of the ASOEP pilot validation comprises a total of 1,344 full-time professors from the University of La Guajira in Colombia. Taking this target population as a reference, a random sample made up of (*n:* 123) teachers was designed with a 95% confidence level, and an estimated error of (*em:* 1.2 hours) under the adjustment for the calculation of the mean hours per teacher, which is X:16 hours, with a deviation of (*S*: 7.03) from the variance (S_2: 49.42).

The sample distribution includes 63.4% women and 36.6% men. The ages of the study participants are distributed with the following ranges: 11.4% between 30 and 39 years old, 40.7% between 40 and 49 years old, 36.6% between 50 and 59 years old and 11.4% over 60 years old. It should be noted that 61% of the participants have master's level training, 24.4% have a doctorate, 10.6% have a specialisation, and 4.1% have only an undergraduate degree.

Instrument

The central instrument object of the study corresponds to the Attitudinal Scale of Open Educational Practices (ASOEP), specifically designed for evaluating the conceptual, procedural

and attitudinal aspects that teachers have regarding their perceptions of the creation, management, reuse and use of OER in their teaching–learning processes.

The ASOEP is made up of a total of (20) items that have been conceptually and operationally classified in the following dimensions:

- *D1. Conceptual Domain of OER*: It refers to the general knowledge that teachers have about OER, the types of open access licenses, digital repositories and the advantages of the use of educational technology applied to the creation, use and reuse of OER. There are five items contemplated in this domain.
- *D2. Procedural Management of OER*: It is related to the procedural aspects and digital skills that teachers have regarding the processes of creation, use and reuse of OER. There are ten items considered in this domain.
- *D3. Practices of use of OER:* It corresponds to the dispositions and attitudes of teachers for accessing, creating, reusing, and sharing OER. There are five items classified in this domain.

The scale uses a Likert type format and has six grades of qualification: Total Agreement (6), Moderate Agreement (5), Agreement (4), Disagreement (3), Moderate Disagreement (2), and Total Disagreement (1). Cronbach's alpha reliability level obtained from the pilot validation of the ASOEP is (α: .943).

Process
The process for the design and validation of the ASOEP is based on the stages of the instrumental studies in accordance with that proposed by Carretero-Dios and Pérez (2007) and Delgado-Rico, Carretero-Dios and Ruch (2012). The phases implemented in the study are described below.

1. Identification of the purpose and the central variables of measurement and evaluation: It includes the formulation of the research objectives and the identification of the variables to be considered in the design of the instrument.
2. Systematic, theoretical, and empirical reviews of the variables: A methodological approach based on documentary research was carried out to identify, analyse and classify the theoretical and empirical contributions on open educational practices.
3. Definition of variables, dimensions, and items: It includes the definition of each of the analysis variables, analysis dimensions and the criteria established for the creation of items.
4. Formulation of the test specifications: The organisation of three analysis dimensions, called domains, was determined as follows: D1 is the Conceptual Domain, D2 the Procedural Management of (OER) and D3 the Practices of use of the (OER). Likewise, the type of scale to be carried out was established, and 10 items were proposed to be considered for each domain.
5. Design of the instrument format with its corresponding items: The preliminary version of the scale with 20 items was presented, with five items for the Conceptual Domain, ten items for the Management Domain and five items for the Practices of use of the domain (OER).
6. Evaluation by the Expert Judges Method: The expert competence coefficient technique was used to select the experts who participated in the evaluation process, based on the postulates of Barroso and Cabero (2013). The validation was carried out by an expert following the steps proposed by Escobar-Pérez and Cuervo-Martínez (2008).
7. Adjustments to the ASOEP based on the observations issued by the expert judges: Adjustments were made to the items where two or more experts scored between 1.0

and 3.0, equivalent to not meeting the criterion, low level, and moderate level for the category's sufficiency, clarity, coherence and relevance. Based on the observations, two items of Conceptual Domain, four items of Procedural Domain, and one item of Use Practices Domain were reformulated.

8. Verification of the target population, estimation of the size and selection of the study sample: The population for the pilot test was defined according to the following criteria: being a higher education institution, having a policy of open access to knowledge, having an institutional repository, being an official institution, and allowing participation in the study.

9. Request for informed consent of the participants and pilot application of the ASOEP: The informed consent format and the Google Forms electronic form were designed with the ASOEP items, and a response period of five days was established after sending the acceptance message by the participants.

10. Statistical and psychometric analysis of the ASOEP: In this phase, the analysis of the results of the pilot test with SPSS was carried out to establish if the scale was adequate for the purpose of the study.

11. Review based on the results of the pilot application: The analysis of each one of the dimensions that make up the scale for the pilot test was carried out.

12. Final adjustments to the ASOEP: It includes making final adjustments and generating conclusions about the design and validation of the scale.

Results

Consistent with the methodological and procedural guidelines formulated for the design and pilot validation of the ASOEP Scale, the main findings obtained both in the content validation process by expert judges and in the pilot test application are presented below.

Validation by Expert Judges

First, the selection process of the expert judges took place, taking as a reference a series of criteria that guaranteed their expertise and suitability in relation to the subject of OER. The information was consolidated into a self-evaluation form that included the expert competence coefficient (K), which was obtained from the sum of the knowledge coefficient (Kc) and the argumentation coefficient (Ka) divided by two. In this way, as determined by the application of the formula to five international experts from Mexico, Chile, and Peru, we obtained a coefficient of competence k between .80 and 1.00, determining that they were suitable to evaluate the scale (Table 1).

Table 1: *Profile of expert competence coefficient (K)*

Expert	Profile	Educational Level	Country	Competence K
1	Professor-researcher	Doctorate	Peru	.80
2	Docent	Master	Chile	.95
3	Professor-researcher	Master	Mexico	1.00
4	Professor-researcher	Doctor	Mexico	.95
5	Director	Doctor	Mexico	1.00

Source: Authors

As a result of the evaluation process of the ASOEP by expert judges, seven items were modified according to the corresponding observations. Specifically, two items of Conceptual Domain, four items of Procedural Domain, and one item of Use Practices Domain were modified. The final

items of the ASOEP are presented below, classified in each of the three conceptually established domains.

Table 2 presents the items of the Conceptual Domain of OER that is aimed at identifying the degree to which teachers demonstrate their level of knowledge in relation to the characteristics, purpose, and technological aspects of OER.

Table 2: *D1: Conceptual Domain on OER*

Item	Descriptor
DC1	1. I distinguish Open Educational Resources (OER) among other educational materials.
DC2	2. I know the purposes of Open Educational Resources.
DC3	3. I know the differences between the six Creative Commons (CC) licenses.
DC4	4. I recognise the types of digital repositories available on the network.
DC5	5. I have extensive knowledge about the educational and technological advantages of OER

Source: Authors

Table 3 presents the items of the Procedural Management of OER, in which the attitudes that teachers have towards aspects such as their perception of digital competence, knowledge of the procedure to design an OER and recognition of intellectual property, platforms and strategies for publishing and sharing OER.

Table 3: *D2: Procedural Management of OER*

Item	Descriptor
DP1	6. I feel that my digital skills are limited for designing OER in my classes.
DP2	7. I have created some open educational resource (book, drawing, outline, video, software, etc.) for my class.
DP3	8. I properly follow the established procedure for the creation of OER.
DP4	9. I receive training from my institution to create OER in my classes.
DP5	10. I acknowledge the intellectual property of the authors of the OER that I use in my classes.
DP6	11. I use Open Educational Resources created by others to explain the topics in my classes.
DP7	12. I previously analyse the characteristics that have the CC licenses to mix or modify REA
DP8	13. I mix or modify OER from other authors to use in my classes.
DP9	14. I share my OER publicly on different platforms or repositories.
DP10	15. I consider that the process of publishing my OER in digital repositories is overly complicated.

Source: Authors

Table 4 presents the items corresponding to the Practices of OER Use. They are aimed at assessing the degree to which teachers effectively use their educational resources for the development of their classes as well as the perceptual and motivational aspects associated with the digital interaction that OER promote with students and fellow teachers.

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Table 4:*D3: Practices of OER Use*

Item	Descriptor
DU1	16. Sharing my open educational resources gives me benefits and recognition in my activity as a teacher
DU2	17. I like to share my OER with the general audience.
DU3	18. I am pleased to receive feedback on what my colleagues think about my OER.
DU4	19. The OER used in my classes have boosted my students' interest in learning.
DU5	20. I promote the creation, use and reuse of open educational resources among my colleagues.

Source: Authors

Pilot validation of the ASOEP Scale

The Attitudinal Scale of Open Educational Practices (ASOEP), after recoding the items DP1, DP10, and DU3 had a Cronbach's alpha reliability of (α: 0.943). Next, Table 5 presents the consolidated analysis of inter-scale correlations between the general ASOEP Scale and the three subscales (D1, D2 and D3) and the estimated reliability coefficients. In all cases, the correlations were directly proportional and statistically significant at 99%, which provides evidence of the internal consistency between the dimensions and the general scale. Additionally, in the last column of Table 5, the reliability coefficients are presented, which at a general level are higher (α: 0.943). For the three dimensions, the reliability coefficients are higher than (α: 0.80).

Table 5: *ASOEP: Estimation of Correlation Coefficients ® and Cronbach's Alpha Coefficient (α)*

		ASOEP Scale	D1: Conceptual Domain over OER	D2: Procedural Management of OER	Cronbach's Alfa Reliability Coefficients
ASOEP Scale					0.943
D1: Conceptual Domain over OER	Pearson 's correlation	.890**			0.882
	Sig. (bilateral)	.000			
	N	123			
D2: Procedural Management of OER	Pearson 's correlation	.889**	.695**		0.816
	Sig. (bilateral)	.000	.000		
	N	123	123		
D3: Practices of OER Use	Pearson 's correlation	.879**	.620**	.728**	0.839
	Sig. (bilateral)	.000	.000	,000	
	N	123	123	123	

**. The correlation is significant at the 0.01 level (bilateral).
Source: Authors

For effect to deepen with the criteria of the statistical and psychometric analysis of Scale EAPEA, a factorial analysis with the method of main components was developed, presenting/displaying a statistically significant adjustment from the analysis of Coefficient KMO and Test of Bartlett (KMO: 0,89; pv. 000) as it is demonstrated next in Table 6.

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Table 6: Factorial Analysis of the KMO Coefficient and Bartlett Test: EAPEA Scale

KMO and Bartlett Test		
Kaiser-Meyer-Olkin Measure of Sample Adequacy		.890
Bartlett's test of sphericity	Approx. Chi-square	1827.245
	df	190
	Sig.	.000

Source: Authors

From the factorial configuration, a tendency of factorially pure unidimensional load was identified since for the first component a value of (EV appears: 9,77) that is significantly superior to components 2 and 3 with values of (EV: 1,99 and 1.26). The level of total explained variance of 71%. Additionally, all the items of the EAPEA Scale presented significant loads greater than (0.30) in the first component.

Table 7 presents the psychometric analysis of the behaviour presented by the items that make up (D1). It can be seen that the average scores are between (x: 2.8 and x: 4.1) under the theoretical range of (1 to 6), with the average score for item 2 being higher, corresponding to item 3 being lower. The deviations range between (s: 1.40 and s: 1.55). All item–subscale correlations are positive and above (r_{xy}: 0.50) and, as can be seen if any of the items is eliminated, the estimated reliability alpha level (α: 0.882) is not exceeded.
Table 7

D1. OER Conceptual Domain: Psychometric Item Analysis

Items	Average	Typical deviation	Corrected item-total correlation	Cronbach's alpha if item is removed
1. I distinguish Open Educational Resources (OER) among other educational materials	3.98	1.507	.770	.844
2. I know the purposes of Open Educational Resources	4.10	1.405	.724	.856
3. I know the differences between the six Creative Commons (CC) licenses	2,80	1.552	.548	.897
4. I recognise the types of digital repositories available on the internet	3.33	1.474	.750	.849
5. I have extensive knowledge about the educational and technological advantages of OER	3.58	1.504	.809	.834

Source: Authors

On Table 8, the psychometric analysis of the behaviour presented by the items that make up (D2) is presented, it can be observed that the average scores are between (x: 2.59 and x: 4.06) under the theoretical range of (1 to 6), the mean score for item 10 being higher and lower for item 14. Deviations range between (s: 1.355 and s: 1.653). The item–subscale correlations are positive, being higher than (r_{xy}: 0.50), with the only exception item (3) which in turn is positive

but has a lower correlation (r_{xy}: 0.366). In the last column, it can be seen that if any one of the items is eliminated, the estimated reliability alpha level (α: 0.816) will not be exceeded.

Table 8: *D2. Procedural Management of OER: Psychometric Analysis of Items*

Items	Average	Typical deviation	Corrected item-total correlation	Cronbach's alpha if item is removed
6. I feel that my digital skills are limited for designing OER in my classes	3.18	1.355	.366	.812
7. I have created an open educational resource (book, drawing, scheme, video, software, etc.) for my class.	3.17	1.653	.618	.785
8. I properly follow the established procedure for the creation of OER	2.99	1.512	.786	.767
9. I receive training from my institution to create OER in my classes	2.86	1.511	.636	.784
10. I acknowledge the intellectual property of the authors of the OER that I use in my classes	4.06	1.600	.564	.792
11. I use Open Educational Resources created by others to explain the topics in my classes	3.88	1.528	.613	.787
12. I previously analyse the characteristics that have the CC licenses to mix or modify REA	2.87	1.588	.794	.765
13. I mix or modify OER from other authors to use them in my classes	2.94	1.516	.669	.781
14. I publicly share my OER on different platforms or repositories	2.59	1.562	.667	.780
15. I consider that the process of publishing my OER in digital repositories is overly complicated	2.82	1.414	.599	.789

Source: Author

On Table 9, the psychometric analysis of the behaviour presented by the items that make up the (D3) is presented. It can be seen that the average scores are between (*x:* 2.87 and *x:* 3.79) under the theoretical range of (1 to 6), the mean score for item 19 being higher and lower for item 18. Deviations range from (*s*: 1,542 to *s*: 1,691). The item– subscale correlations are positive, being higher than (r_{xy}: 0.50), with the only exception item (18), which in turn is positive but has a lower correlation (r_{xy}: 0.335). In the last column, it can be seen that if the item (18) is eliminated, the reliability level can be raised to estimate from (α: 0.839) to (α: 0.882). However, in this case, it is considered pertinent to maintain it since conceptually it is an important feature in practice and does not significantly affect reliability.

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Table 9: *D3. Practices of OER use: Psychometric Analysis of Items*

Items	Average	Typical deviation	Corrected item-total correlation	Cronbach's alpha if item is removed
16. Sharing my open educational resources gives me benefits and recognition in my activity as a teacher	3.72	1.636	.744	.778
17. I like to share my OER to the public	3.33	1.691	.749	.776
18. I am concerned about what my colleagues think about my OER	2.87	1.542	.335	.882
19. The OER used in my classes have boosted my students' interest in learning	3.79	1.575	.704	.790
20. I promote the creation, use and reuse of open educational resources among my colleagues	3.20	1.684	.706	.789

Source: Authors

Table 10 and Figure 1 show the results corresponding to the descriptive analysis of the scores obtained in each of the three subscales and the general ASOEP Scale. From the results, it can be identified that the highest level of average assessment below the theoretical range (1 to 6) corresponded to the D3 subscale. OER Use Practices (X: 3.63), followed by D1. Conceptual Domain of OER (X: 3.55) and finally D2. Procedural Management of OER (X: 3.34), with a general average ASOEP (X: 3.5).

Table 10

Descriptive Analysis of the Subscales and the General ASOEP Scale

		D1: Conceptual Domain over OER	D2: Procedural Management of OER	D3: Practices of OER Use	ASOEP General Scale
N	Valid	123	123	123	123
	Lost	0	0	0	0
Average		3.5545	3.3358	3.6341	3.5081
Median		3.6000	3.3000	3.8000	3.6333
Typical Deviation		1.22750	.83843	1.06931	.92591
Range		5.00	3.80	4.80	4.20
Minimum		1.00	1.80	1.20	1.53
Maximum		6.00	5.60	6.00	5.73
	25	2.4000	2.6000	2.8000	2.8333
Percentile	50	3.6000	3.3000	3.8000	3.6333
	75	4.6000	4.0000	4.4000	4.1667

Source: Authors

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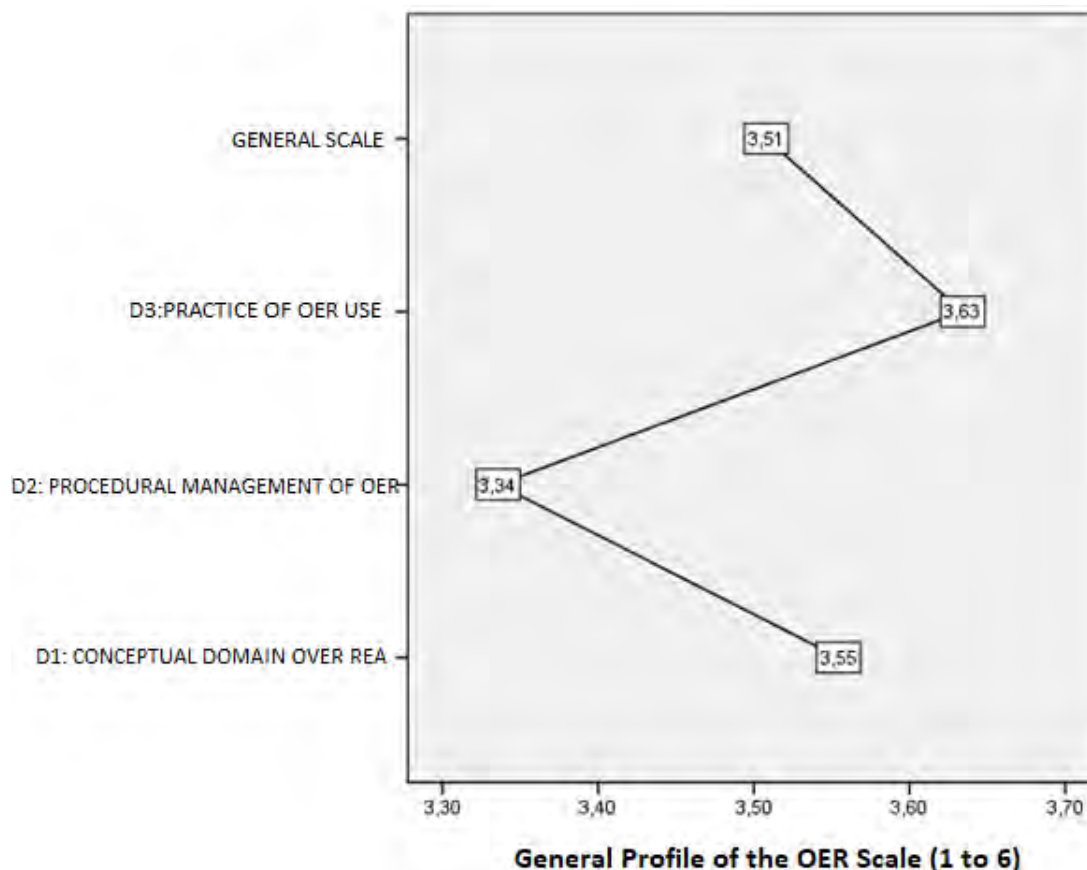
Figure 1. General profile of the ASOEP Scale.

Discussion and Conclusions

This study shows the validity and reliability of the ASOEP scale. The use of the technique of competence coefficient K helps to determine the content and argumentation knowledge of the expert in the research topic (Barroso & Cabero, 2013), which allowed the selection of international Latin American experts in the field of open educational practices.

The design and validation of attitude scales applied in the investigation of factors associated with the perception and beliefs that students and teachers have has been a permanent challenge that provides complementary elements to understand the complexity of the relationship established by the central actors of the educational act. In such sense the contributions of Pinto and Cortés (2017) in their study oriented to the boarding of the following question are emphasized: What do university students think about research training?, in which a scale of attitudes was designed and validated to specifically assess the affective, cognitive and behavioral components from the perspective of the students and their positive and negative tendencies against the context of research training.

Likewise, it is considered that it is important to design and use reliable instruments (Cabero-Almenara, Barroso-Osuna, Gutiérrez-Castillo, & Palacios-Rodríguez, 2020) and that the content validity is established in different situations, the validation procedure being done by an expert. This method that allows improving the quality of the instruments through the elimination, adjustment or modification of the items (Escobar-Pérez & Cuervo-Martínez, 2008).

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The high reliability indices of the instrument have been derived from the estimation of correlation coefficients (r) associated with the internal consistency of the scale and the estimation of Cronbach's alpha coefficient (α). These make it possible to determine that the ASOEP is suitable to assess the open educational practices of university teachers in a Latin American context. The scale presents the necessary characteristics for measuring the relevant conceptual, procedural, and attitudinal aspects in the use and creation of 'OER of university professors in Latin American.

The ASOEP scale allows the generation of knowledge about the attitudes teachers have regarding open educational practices, which will be useful for designing institutional policies that promote teacher training in educational technology and become a stimulus to open education, in agreement with Butcher (2015), Cronin (2017), UNESCO (2002: 2015), and Pinto-Santos, Villanueva-Valadez, and Cortés-Peña (2019). Also, this work is a starting point for proposals for new instruments that would make it possible to evaluate the competencies of teachers to create and use OER.

Additionally the necessity has been identified to extend the information available about the policies and institutional practices in superior education for the development of opened educative practices, and the approaches of evaluation of the learning in scenes where OERis used (Murphy, 2013; Paint-Saint, Villanueva-Valadez, and Cortés-Peña, 2019). in this sense, it agrees with Armellini & Nie (2013) that teachers in higher education are willing to participate in the use and reuse of OER and recognize their benefits, and that it is necessary to develop support processes to promote a culture that contributes to open educational practices, focused on digital literacy training, copyright and licensing, identify relevant OER repositories, provide information on OER, integrate OER at the curricular level, promote collaboration and share OER.

However, the main limitation of the research was that the sample for the pilot test corresponds to teachers from a single university in Latin America. It would be interesting and valuable to carry out a study with a larger sample that incorporates teachers from different universities in Latin American to verify the degree to which the items belong to each component and if the dimensions that were conceptually created and validated are still maintained.

For future research, it will be necessary to study the effects of teachers' knowledge of open educational practices on the design of OER. Likewise, the study on training actions that include the use, creation, and reuse of educational resources freely and for free is a current line of research with possibilities of impact on educational innovation processes.

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