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Expert Validation of e-Open for Assessing Open Education Competencies

An instrument designed within the framework of UNESCO recommendations

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ABSTRACT

This article is framed per the UNESCO recommendations to support open educational resources. Open education advocates an inclusive, diverse, and lifelong learning education. In our work, we designed an instrument to assess open education competencies. The study objective is to present the expert validation of the e-Open instrument. The method was validated by 16 Spanish and English speaking experts using a questionnaire to collect data to measure clarity, coherence, and relevance. This survey instrument utilized a Likert scale composed of five constructs (UNESCO recommendations), 14 indicators, and 36 items. Statistical, concordance (Kendall's W), and significance analyses were performed. The results showed that the items are clear (explicit), coherent, and relevant. This instrument may be of value to academicians, researchers, trainers and decision-makers interested in mobilizing open education instances.

CCS CONCEPTS •General and reference~Cross-computing tools and techniques~Evaluation

Additional Keywords and Phrases: Educational Innovation, Higher Education, OER, Open Education, UNESCO OER Recommendations.

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1 Introduction

Open knowledge conceptually integrates philosophical, practical, and operational perspectives for open education. The latter implies democratization of knowledge for accessibility and solidarity, with actions that facilitate social appropriation to enrich learning environments and support educational innovation [1]. A selection of methodologies, tasks, and diverse resources are offered to improve student learning [2].
Since 2002, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) has encouraged open education by promoting initiatives for its growth. It recently issued a series of recommendations and invited member states to support this consolidation and growth. This framework inspired the design of the instrument presented here. Such frameworks that nourish open educational resources and tools of value contribute to open education.

Some noteworthy frameworks include the OpenEd Quality [2], the Open Educators Factory framework [3], the 6E evaluation framework [4], the OpenEdu Framework for higher education institutions [5], and the framework for selecting OER based on fitness-for-purpose [6]. Notable instruments include evaluation scales, such as CD-REA [7]; also, the Likert Open and Distance Education Standards Scale [8], the Likert Sustainability Consciousness Questionnaire [9], and the modified questionnaire for the Unified Theory of Acceptance and Use of Technology model [10]. Other instruments are the OER Usage Survey, Barriers to Developing and Using OER [11], and the OER Mainstreaming Checklist [12]. The instrument presented here contributes a new open education competencies instrument within the new UNESCO 2019 recommendations framework.

1.1 Open education recommendations in the UNESCO 2019 framework

Open education aims to expand access to knowledge to all corners of the world without being limited to differences in geographic, economic, and social aspects, with Internet technology as the primary medium [13]. [14] states that open education is the development of free digitally-enabled learning experiences and materials primarily by and for the benefit and empowerment of underprivileged learners who may be underrepresented in educational systems or marginalized globally. [15] enunciates that open education covers all operational, legal, and visionary dimensions through the analysis, design, realization, and evaluation of learning experiences to facilitate high-quality education that meets the given situation, needs, and objectives

In November 2019, new recommendations were issued to further increase the potential of open education. The United Nations Educational, Scientific and Cultural Organization (UNESCO), at its 40th session in Paris, issued the recommendations approved by the UNESCO General Conference [16]. These recommendations included:
(i) *Capacity building*: Develop the capacities of all critical educational stakeholders in the creation, access, reuse, repurposing, adaptation and redistribution of OER; ensure the use and application of open licenses in line with national copyright legislation and international obligations.
(ii) *Supportive policy development*: Encourage governments, education authorities, and educational institutions to adopt regulatory frameworks that support open licensing of publicly funded, academic and research materials; develop strategies for using and adopting OER for inclusive, high-quality education and lifelong learning for all, supported by relevant OER research.
(iii) *Effective, inclusive, and equitable access to quality OER*: Promote the adoption of strategies and programs with relevant technologies to enable OER to be shared in any medium. There should be open formats and standards to maximize equitable access, co-creation, preservation and searchability, including persons with disabilities and those in vulnerable groups.

(iv) *Foster the creation of sustainability models for OER*: Support and encourage the creation of sustainability models for OER at national, regional, and institutional levels, as well as the planning and pilot testing of new sustainable forms of education and learning.
(v) *Promotion and facilitation of international cooperation*: Support international collaboration among stakeholders to minimize unnecessary duplication of investment in OER development; create a global pool of culturally diverse, locally relevant, accessible, gender-sensitive, multilingual and multi-format educational materials.

1.2 Indicators of the e-Open tool based on the framework of the UNESCO recommendations

The UNESCO recommendations were the constructs to focus the e-Open instrument. Based on the UNESCO 2019 constructs, the indicators supported by theoretical frameworks were delineated and became the basis for the instrument design items: (a) Capacity development [17], [18], [19], [20], [21], [22], [23], [24], (b) Development of supportive policies [25], [26], [27], [28], [29], [30], (c) Effective, inclusive and equitable access to quality OER [29], [31], [32], [33], [34], [35], [36], (d) Creation of sustainability models [17], [37], [38], [39], [40], [41], [42] and, (e) Promotion and facilitation of international cooperation [32], [39], [43], [44], [45], [46].

2 METHOD

The validation method ensured that what was intended to be measured was actually measured. Theoretical support was based on the framework of the five UNESCO recommendations and a review of instruments related to open education. We solicited experts to validate an open education competency tool for content and form [47]. The experts tested the criteria of clarity, coherence and relevance [48] through an online questionnaire, where they scored their assessments of instrument items on a scale from 1 to 4 and provided comments. In the subsequent validation phase (the reliability analysis), Kendall's W concordance coefficient was calculated because it allows knowing the degree of association between the results provided by the judges.

2.1 Participants

Experts with extensive experience in open education were invited to participate in the validation process. The group consisted of eight Spanish-speaking and eight English-speaking experts. Figure 1 shows the location and average years of experience of the experts who participated in the instrument validation process by city.

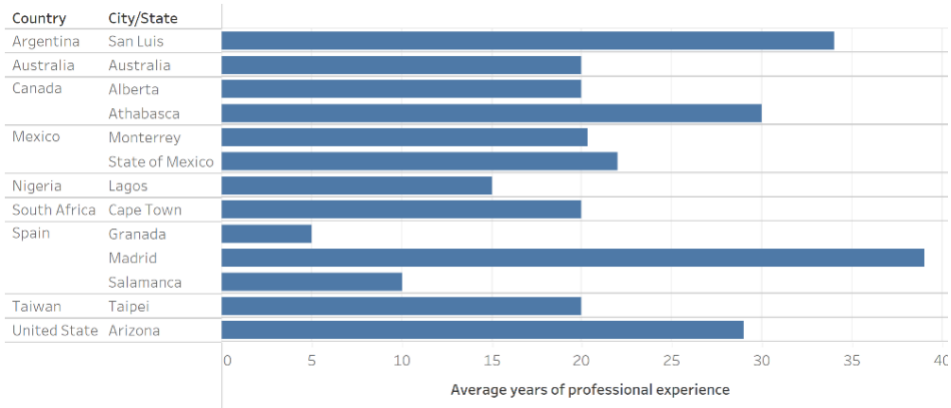

Figure 1: Average number of years of expert experience

2.2 Instrument

The instrument was designed based on a literature review, following the five UNESCO recommendations, 14 indicators, and 36 items. Table 1 shows the distribution of the instrument items.

Table 1. Distribution of items by indicators

Recommendation	Indicator	Items
Capacity building	Creation, reuse, adaptation, and redistribution of OER.	1-3
	Open licensing and copyright.	4-6
	Digital literacy.	7-9
Development of support policies	Policies to promote open education.	10-12
	Privacy and data protection policies.	13-15
	Policies or regulatory frameworks to promote open licenses.	16
Promotion of effective, inclusive, and equitable access.	Programs or technology platforms that share in open access.	17-18
	Development of inclusive OER.	19-20
	ICT and broadband infrastructure.	21-23
Creation of sustainability models	Sustainability models.	24-26
	Sources of financing and sustainability.	27-29
Promotion of international cooperation	Projects with international cooperation.	30-32
	International financing mechanisms.	33
	Peer-to-peer networks (local, regional and global).	34-36

2.3 Procedure

The process to design and validate the tool followed the following phases: literature review, comparison of instruments, design of the instrument based on theoretical support and correlation with the five UNESCO recommendations, selection of experts, consultation of experts with an online questionnaire, data analysis, and presentation of results.

3 RESULTS

For the statistical analysis for each item, the mean, standard deviation, relative deviation, and impact on the scale were calculated, separating them by criterion (Clarity, Coherence, and Relevance). Table 2 shows the items with the lowest and highest mean in the Clarity criterion: Item 25 – "I associate the components of sustainability models with the viability of open education" was the one with the lowest mean (3. 0) and impact on the scale (75%). Items 34 -" I actively collaborate in international open education networks" and 36 – "I value participating in network activities to promote open education" obtained the highest means.

Table 2: Statistical data with maximum and minimum values in the Mean (Clarity)

Item	Mean	Standard deviation	Relative deviation	Scale impact
25	3.0	1.2	38.5%	75.0%
34	4.0	0.0	0.0%	100.0%
36	4.0	0.0	0.0%	100.0%

Regarding the Coherence criterion (Table 3), the lowest mean value was also for item 25. The items with the highest values were again 34 and 36, both with a standard deviation and relative value of 0.

Table 3: Statistical data with maximum and minimum values in the Mean (Coherence)

Item	Mean	Standard deviation	Relative deviation	Scale impact
25	3.2	1.2	36.6%	79.7%
34	4.0	0.0	0.0%	100.0%
36	4.0	0.0	0.0%	100.0%

Regarding the Relevance criterion, Item 21 – "I effectively use broadband applications and/or services" was considered the least relevant by the experts, with a mean of 3.1 and a scale impact of 78.1%, in contrast to items 34 and 36, which were considered the most relevant and had a scale impact of 100% (Table 4)

Table 4: Statistical data with maximum and minimum values in the Mean (Relevance)

Item	Mean	Standard deviation	Relative deviation	Scale impact
21	3.1	1.0	32.8%	78.1%
34	4.0	0.0	0.0%	100.0%
36	4.0	0.0	0.0%	100.0%

The impact on the scale was also calculated for each criterion. The results are shown in Table 5, where the highest level is for Relevance and the lowest for Clarity, while Coherence is at an intermediate value of 90%.

Table 5: Impact on the scale by criterion

Criterion	Mean	Scale impact
Clarity	3.5	88%
Coherence	3.6	90%
Relevance	3.7	92%

Kendall's W was calculated to measure inter-rater agreement, resulting in 0.107, and the asymptotic significance was 0.005.

4 DISCUSSION

It is essential to collaborate actively in networks to promote open education. The items related to networking (34 – "I actively collaborate in international open education networks" and 36 – "I value participating in network activities to promote open education") were the best evaluated in the three aspects considered in this study (Clarity, Coherence, and Relevance). Work that materializes in collaborative networks facilitates the dissemination of knowledge, innovations and updates in education [49]. Working collaboratively for open education is relevant and contributes to UNESCO's recommendations.

The expert validation identified opportunities for improvement in the e-Open instrument items. The lowest mean (3.0 with a relative deviation of 38.5%) was obtained by item 25 – "I associate the components of sustainability models with the viability of open education" in the Clarity criterion (Table 2). The 3.0 score of the Quality criterion implies that it requires a precise modification of the terms used in an item [48]. Thus, as noted, expert validation is a determining process to identify strengths and weaknesses in instrument design.

According to the expert judgment, the items of the e-Open instrument are generally clear, coherent, and relevant. The means of the criteria were: Clarity = 3.5, Coherence = 3.6, and Relevance = 3.7. These scores imply scale impacts of 88%, 90%, and 92%, respectively (Table 5). Clarity means the items are easily understood; coherence implies their logical relationship, and relevance relates to whether they should be included in the

instrument [48]. The e-Open instrument was positively assessed by the experts, indicating that its validity is relevant.

5 CONCLUSIONS

The e-Open instrument aimed to assess open education competencies within the framework of UNESCO's recommendations. Validation by the 16 experts resulted in the assessment of clear, coherent and relevant items. The consistency in the evaluations is remarkable, despite the linguistic differences (Spanish and English).

This paper is limited to a discussion of instrument validation by experts. In the next stage, piloting is contemplated to measure reliability among potential users. The value in additional research lies in analyzing its possible integration into open educational practices that increase open education competencies. Future studies may address the assessment of competencies with qualitative instruments to complement mixed studies.

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