

Development and Validation of a Scale to Measure Faculty Attitudes toward Open Educational Resources

By

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Sub-Theme: Research and innovative ODL practices in the following areas -
Development and adoption of OER

1. Introduction

Open educational resources (OER) have emerged as one of the most useful teaching-learning practices in educational arena. It has been used to reduce time to develop courses and facilitate sharing of knowledge. To teachers and students, OER provide access to global content that can be localized without restrictions and create inclusive learning communities (Butcher, 2011). Mostly OER are prepared by teachers for different learners in a specific context. Therefore, place of teachers and their attitude towards open education to provide those conditions that would engage their learners as active participants becomes essential.

However, several research studies reported that learning was tempered by teachers' lack of expertise in OER. Petrides et al (2011) reported that faculty with lower comfort levels in using online technology uses open textbooks in more traditional ways; which hampers independent learning among students. But, with arrival of digital technologies, it has become easier for teachers to share their work not only with their students, but it has also offered opportunity to share their work globally. More specifically, this development encourages them to further develop, practice and model new behaviors with their student. Therefore, there is a need to understand teachers' psychological and behavioral determinants that may influence better use of OER.

On this premise, our study involves understanding why some teachers share educational resources and others do not. In order to investigate this, we examine the OER perception (use and contribution) by teachers in universities as a combined intertwined psychological constructs of teacher's attitude, motivations, their perception of quality and barriers. While the research is in progress, this paper merely describes development of scale of Attitudes toward Open Educational Resources (ATOER) within the framework of a project in the global south to explore the use of OER and evidence of impact of OER. Thus, it discusses various phases of development and validation of scale to assess faculty attitudes toward

OER and present the findings of results of Content Validity Ratio (CVR) for scale development process.

2. Review of Related Literature

Review of literature is divided on the basis of three set of constructs extracted from various studies: Awareness of OER, Sharing of Resources, and Adoption and Use of OER.

Awareness of OER

First set of studies (Mtebe & Raisamo, 2014; Jameela, 2014; Karunanayaka, 2012) have assessed teacher's attitudes through understanding of their 'Awareness' of OER. These studies reveal that many teachers are not even aware of the concept and meaning of OER. Some of the teachers who are aware of the concept are not clear about copyright issues (Karunanayaka, 2012; Jameela, 2014). Nonetheless, there are teachers who have both knowledge and concept of OER and copyrights, yet not able to share or use their resources due to lack of technology skills (Mtebe & Raisamo, 2014).

Sharing of Resources

Second set of studies (Wang, & Noe, 2010, Wild, 2011; Rolfe, 2012; Tuomi, 2013) have identified that the OER movement is primarily based on individual's desire to borrow and 'share resources'. Belief in open education, economic reasons and as a reputation enhancer both for institution and individual emerged as strong communal drivers for sharing resources (Rolfe, 2012). Additionally, there are several motives behind sharing behavior such as altruism, prestige and reciprocity which may motivate teachers to share (Wang, & Noe, 2010). In addition, OER sharing also facilitates self-directed learning (Tuomi, 2013). A sense of belonging, shared purpose, and empowerment are the greatest drivers for sharing resources (Wild, 2011).

Adoption and Use of OER

A third set of studies (Pegler, 2012; Hussain et al, 2013; Borthwick, & Gallagher-Brett, 2014) investigated factors associated with 'Adoption and use of OER' determining teachers' attitude for engaging in OER. Free availability and reusability of OER, their reduced cost and ease of use are major reasons for teachers to adopt and use OER (Borthwick, & Gallagher-Brett, 2014). In addition, technology amicable, teacher's competencies, and their ICT skills also determine grounds for adopting and using OERs (Hussain et al, 2013). For reusing OER, positive environment and appropriate openly licensed resources were found major factors (Pegler, 2012).

3. Rationale of the study

Developing a measurement scale that is valid and reliable is always challenging. Several scholars argue that effective measurement is an underpinning of research (DeVellis, 2003; Netemeyer, et al, 2003). Besides that, reliable and valid measures contribute to the legitimacy and development of a research field (Reynolds, 2010). Also, empirical articles that use rigorous methodological procedures, besides being firmly grounded in theory, receive more citations (Colquitt, & Zapata-Phelan, 2007). Several criteria have been

proposed for assessing psychometric soundness of scales. One of the foremost criteria is content validity.

Research in OER field is quite recent. Research related to OER is not common due to lack of awareness, funds to support researches and other contextual dynamics. There is also a dearth of empirical research that follows sound methodological approaches. One Indian study by Venkaiah (2007) examined attitude and perception of distance teachers towards OER using a scale that was not subjected to psychometric validation. Researches on OER have yet to adopt rigour in conduct of empirical studies as in other fields of education. It could be due to its emerging nature or it has been rooted in area of Educational Technology, Information Communication Technology (ICT) and e-learning rather than as an independent field.

The motivation for this research springs from gaps in earlier researches related with OER. Whatever research on attitudes towards OER are available, they do not try to investigate underlying constructs. Content domain specification, and item pool generation are not explained in detail. While much importance has been given to questionnaires and interview schedules, very few used scaling approach to measure attitude. Moreover, relevant research findings were not always been utilized for constructing sound scale to measure faculty attitude towards OER. There is also a lack of research to draw comparative picture of ‘user’ and ‘non-user’ of OER. The ambiguity of ‘contributor’ and ‘non-contributor’ of OER are also visible in many researches.

Building on the methodological inadequacies of previous works, the current research aims to construct a rating scale called Attitudes toward Open Educational Resources (ATOER) that can precisely identify positive and negative pre-dispositions to the concept and practices of OER amongst teachers. Analyses of review provided a basis for developing three major constructs for ATOER scale – awareness, sharing of resources, and adoption and use of OER.

The study will contribute towards the practice of rigorous scale development in researching OER, and describe critical steps in scale development procedure.

4. Methodology

This section outlines the steps of validation of ATOER scale undertaken in this study. The methodologies used were sequentially elaborated below for each step:

(1) Domain Identification and Item Generation

Generation of items is the most important element of establishing sound measures (Hinkin, 1995). In the process of developing ATOER scale, initially 65 statements were pooled from review of literature and classified in to three main themes -- Awareness, Sharing of resources and Adoption and use of OER. Afterwards, to avoid duplication, and have clarity, only 26 statements were selected through sorting process based on rigorous discussions within the internal research team. These 26 statements were subjected to content validity by

research team. A pool of 30 experts was drawn from the research literature and various projects such as WikiEducator and the Research on OER for Development (ROER4D) group.

(2) Content Expert Validation

This study uses Content Validity Ratio (CVR) proposed by Lawshe (1975) to identify valid statements. This followed three stages:

At *first* stage, only 30 experts were selected to express opinion on suitability of the identified 26 statements to measure attitudes toward OER. They were asked to rate the statements in a three point scale (1= Not necessary, 2= Useful, but not essential, and 3= Essential). We used an online survey tool to collect data, and experts were also given a brief about context of the research. CVR was calculated as described by Lawshe (1975) to assess the content validity.

Followed by first stage, CVR was re-calculated combining both '*Essential*' and '*Useful, but not essential*' ratings to give a combine value of CVR_{E+U} at *Second stage*. This is a modified CVR approach (Kawachi, 2014).

At *third* stage, ATOER scale was further revised by adding more clarifying items. Language of scale was further simplified. The revised scale includes 34 items. At this stage, we also separated items of three constructs and sent to the 30 experts, which resulted in four additional responses.

5. Results and Analysis

In order to examine the validity of ATOER scale, Content Validity Ratio (CVR) was calculated at each stage. Findings and analysis of each stage are discussed below:

First Stage: A total of 19 experts out of 30 responded. However, only 15 responses were found to be complete. On the basis of the data, CVR was calculated to be -0.18 which is very less than critical value of 0.49 at $p < 0.05$ level for 15 experts (Table 1). The draft thus shaped was termed Draft-I.

Second Stage: Analysis and discussions on Draft-I draws attention to the speculation that respondents might have ranked the items as '*Useful, but not essential*' instead of '*Essential*' without understanding that items ranked as '*useful*' but not essential will be removed from final scale (Lawshe, 1975). This misperception between '*Useful, but not essential*' and '*Essential*', also resulted in low CVR. Therefore in second stage the CVR is re-calculated combining both '*Essential*' and '*Useful, but not essential*' ratings to give a combine value of CVR_{E+U} (Kawachi, 2014). The CVR_{E+U} of scale is calculated to be 0.62, which is more than critical value of 0.49 at $p < 0.05$ level for 15 experts at 0.05 level. The draft shaped after second stage was termed Draft-II.

Third Stage: Only 4 expert's respondent at this stage. CVR_{E+U} of revised scale was calculated to be 0.68. It could be inferred that instruction of background of study and

details of three constructs might have helped expert to understand the scale. Additionally, CVR_{E+U} is calculated 1.00 for most of the new items (Table 1). The draft shaped after this stage was termed Draft-III.

Table 1: Stage-wise Items and CVR

Stage-I	Stage-II	Stage-III	Items	CVR (Draft-I)	CVR_{E+U} (Draft-II)	CVR_{E+U} (Draft-III)	CVR Combined II+III stage (Draft-IV)
1	1	1	I have prior experience of using OER	0.7	1.0	1.00	0.73
2†	2†	2†	All teaching resources available on internet are OER	0.0	0.0	0.00	-
3†	3†	3†	All resources are OER such as video, audio, text and so on	0.0	-0.5	-0.50	-
4	4	4	OER means no need to ask any further permission to use them	0.5	0.5	0.50	0.52
5	5	5	OER means the resource is openly licensed	0.8	1.0	1.00	0.81
		6*	OER means learning resource is freely available to be used by anyone		1.0	1.00	1.00
		7*	OERs are digital or non- digital materials that can be re-used for teaching/learning/ research		1.0	1.00	1.00
6	6	8	I have knowledge of Intellectual Property Right to understand OER	0.5	1.0	1.00	0.62
7	7	9	Sharing of educational resources improves my professional respect	0.8	0.5	0.50	0.70
8	8	10	It gives me pleasure if someone adopt/adapt my educational resources	0.9	1.0	1.00	0.90
9	9	11	Sharing helps me to get feedback	1.0	1.0	1.00	1.00
10	10	12	Sharing enhances my personal and organizational reputation	1.0	0.5	0.50	0.90
11†	11†	13†	I share resources with trustworthy people	0.1	0.0	0.00	-
12	12	14	Sharing of educational resources increases my profile amongst peers and others	0.9	0.5	0.50	0.80
13	13	15	OER increase my network and sphere of influence	0.9	1.0	1.00	0.90
14	14	16	As a teacher, it is my responsibility to share all educational resources created by me	0.9	0.5	0.50	0.80
15	15	17	OER helps me to reach out to more students	1.0	1.0	1.00	1.00
16	16	18	OER improves my chance of recognition at global level	1.0	0.5	0.50	0.90
17	17	19	I believe that sharing educational material as OER will encourage others to do so	1.0	0.5	0.50	0.90
18	18	20**	Sharing of OER amongst colleagues encourages self-reflection	1.0	-0.5	-0.50	-
		21*	Sharing enhances my confidence as I see myself in part of larger community		1.0	1.00	1.00
		22*	When others use my OER, it improves my sense		1.0	1.00	1.00

			of achievement				
		23*	OER helps to disseminate my ideas		1.0	1.00	1.00
		24*	I can use OER easily due to its reusability		1.0	1.00	1.00
		25*	I use OER as they are available at reduced cost		0.5	0.50	0.50
		26*	OERs are easy to use as they are accessible		1.0	1.00	1.00
22	22	27**	Sharing of work could expose my deficiencies	0.1	1.0	1.00	-
24†	24†	28†	I do not want to undergo any peer inspection	0.4	0.5	0.50	-
25†	25†	29†	Educational materials developed for my student will not serve any purpose for others	0.4	0.5	0.50	-
26	26	30	OER promotes collaboration and consortia	0.3	1.0	1.00	1.00
		31*	I am efficient in Information Communication Technology (ICT) skills to adopt and use OER	1.0	1.0	1.00	1.00
		32*	I adopt OER for my teaching as they fulfil academic requirement of my students		1.0	1.00	1.00
		33*	My own competencies and knowledge towards OER helps me to participate or adopt OER		1.0	1.00	1.00
		34**	My work gets visible to others, if I use OER		0.0	0.00	-
Average CVR Value				-0.18	0.62	0.68	0.88

* Items added in Draft-III

** Deleted items based on low CVR

† Deleted items with Negative Statements

Final Validation Stage: A very less number of experts' responded at third stage, therefore at this stage CVR_{E+U} was calculated combining CVR_{E+U} of second and third stage. The average value of CVR_{E+U} was calculated 0.88 which is more than critical value of 0.42 at $p < 0.05$ level for 20 experts. Further, 8 items (item no.2, 3, 13, 20, 27, 28, 29 and 34, from the third stage) were omitted owing to their low CVR_{E+U} value. A final valid scale with 26 items was thus prepared, termed Draft-IV. Henceforth, ATOER scale (Draft-IV) was validated and has been sent for pilot testing to 40 Indian University teachers comprising users, non-users, contributors and non-contributors to OER.

Results indicate that the items with low CVR_{E+U} may not be most appropriate ones to measure the constructs. Similarly, items with high CVR_{E+U} indicate higher relevance to be included in the scale. Hence, process of validation is essential steps in scale development.

6. Discussion

Research suggests that there are inconsistent guidelines for item development and in analysis process for constructing a scale. In many cases it is not clear what guidelines researchers use to define the constructs to be measured, generate an item pool, revise or remove items from the scale, or examine validity of resultant scale scores. Therefore, it is suggested that it is essential to begin with a clear conceptualization of the target construct. Moreover, content of the initial items pool should be over inclusive and their wording needs careful attention. Next, items should be tested in methodical way for validation. Thus, in turn, this paper contributes to understanding the procedure of validation of scale primarily for attitude scale for OER.

As the current research is in progress, we have not been able to present the reliability of the scale, and a final standardized scale for use in all contexts will emerge at the end of our research.

References

- Borthwick, K., & Gallagher-Brett, A. (2014). Inspiration, ideas, encouragement: teacher development and improved use of technology in language teaching through open educational practice. *Computer Assisted Language Learning*, 27 (2), 163-183.
- Butcher, N. (2011). *A Basic Guide to Open Educational Resources*. In Kanwar, A.S. & Uvalic-Trumbic, S., Ed., p. 142. Vancouver: Commonwealth of Learning.
- Colquitt, J. A., & Zapata-Phelan, C. P. (2007). Trends in theory building and theory testing: A five decade study of the Academy of Management Journal. *Academy of Management Journal*, 50 (6),1281-1303.
- DeVellis, R. F. (2003). *Scale development: theory and applications*. 2nd ed. Thousand Oaks, CA: Sage Publications.
- Hinkin, T.R. (1995). A Review of Scale Development Practices in the Study of Organizations, *Journal of Management*, 21 (5), 967-988
- Hussain, I. (2013). A Study on Attitude of University Academia towards the Use of Open Educational Resources, *Pakistan Journal of commerce and Social Sciences*, 7 (2), 367–380.
- Jameela, T. (2014). Open Educational Resources in Teacher Education: A survey of Instructional Methods used by Faculties of training Colleges. *Excellence International Journal of Education and Research*, 2 (1), 1–12.
- Karunanayaka, S. (2012). Perceptions of teachers and teacher educators on the use of open educational resources in teaching and learning. Annual Academic Session, Open University of Sri Lanka, Retrieved from http://digital.lib.ou.ac.lk/docs/bitstream/701300122/551/1/OU5165_000.pdf
- Kawachi, P. (2014). *The TIPS Quality Assurance Framework for Creating Open Educational Resources: Validation*. Conference paper of 2nd Regional Symposium on OER held at Wawasan Open University from 24-27 June 2014.
- Lawshe, C.H. (1975). A quantitative approach to content validity. *Personal Psychology*, 28, 563-575.
- Mtebe, J. S., & Raisamo, R. (2014). Challenges and Instructors' Intention to Adopt and Use Open Educational Resources in Higher Education in Tanzania. *International Review of Research in Open and Distance Learning*, 15 (1), 249–271.
- Netemeyer, R. G., Bearden, W. O., & Sharma, S. (2003). *Scaling procedures: Issues and applications*. Thousand Oaks, CA: Sage Publications.
- Pegler, C. (2012). Herzberg, hygiene and the motivation to reuse : Towards a three-factor theory to explain motivation to share and use OER. *Journal of Interactive Media in Education*, 1–18.
- Reynolds, C. R. (2010). Measurement and assessment: An editorial view. *Psychological Assessment*, 22 (1), 1-4.

- Rolfe, V. (2007). Open educational resources: staff attitudes and awareness. *Research in Learning Technology*, 20, Retrieved from <http://www.researchinlearningtechnology.net/index.php/rlt/article/view/14395>
- Tuomi, I. (2013). Open Educational Resources and the Transformation of Education. *European Journal of Education*, 48 (1), 1-20,
- Venkaiah, V. (2007). Open Educational Resources in India – A Study of Attitudes and Perceptions of Distance Teachers, Retrieved from http://wikieducator.org/images/d/d7/PID_386.pdf
- Wang, S. and Noe, R. (2010). Knowledge Sharing: A Review and Directions for Future Research. *Human Resource Management Review*, 20, 115–131.
- Wild, J. (2011). OER Engagement Study: Promoting OER, Reuse among Academics, Retrieved from http://www.open.ac.uk/score/files/score/file/OER%20Engagement%20Study%20Joanna%20Wild_full%20research%20report.pdf