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A Path Analysis of Educator Perceptions of Open Educational Resources Using the Technology Acceptance Model

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Article abstract

Open educational resources (OER) are making their way into a variety of educational contexts from formal lesson planning to just in time learning. Educators and training professionals have been recognized as an important audience for these materials. The concepts of self-efficacy and outcome judgment from social cognitive learning theory serve as theoretical constructs to measure educator perceptions of OER. This study uses a path analysis, based on the technology acceptance model, to understand adoption of these resources by this audience with a particular emphasis on self-efficacy. Among the participants, three main groups were identified: K-12 educators, higher education professionals, and those involved in workplace training. A discriminant function analysis found that K-12 educators stood out as finding OER relevant to improving their practice. Recommendations are made in regards to an emphasis on easy to use designs to improve application self-efficacy of OER and instructional messaging for future K-12 educators.

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Abstract

Open educational resources (OER) are making their way into a variety of educational contexts from formal lesson planning to just in time learning. Educators and training professionals have been recognized as an important audience for these materials. The concepts of *self-efficacy* and *outcome judgment* from social cognitive learning theory serve as theoretical constructs to measure educator perceptions of OER. This study uses a path analysis, based on the technology acceptance model, to understand adoption of these resources by this audience with a particular emphasis on self-efficacy. Among the participants, three main groups were identified: K-12 educators, higher education professionals, and those involved in workplace training. A discriminant function analysis found that K-12 educators stood out as finding OER relevant to improving their practice. Recommendations are made in regards to an emphasis on easy to use designs to improve application self-efficacy of OER and instructional messaging for future K-12 educators.

Keywords: Open educational resources; technology acceptance model

Introduction

The landscape of the Internet and World Wide Web has demonstrated an amazing rate of growth over the past 20 years. Indexed web pages are estimated to be about 8.67 billion as of December 2012 (de Kunder, 2012). That number is likely just a fraction of existing web pages, as nearly a quarter of the actual number is simply not indexed (Barabási, 2002). Amid this landscape, there are countless resources created, maintained, used, and repurposed for education. Open educational resources (OER) may be defined as educational resources that are either in the public domain or have been made freely available through their license. OER available via the Internet are making their way into the lesson plans of thousands of educators in both face to face and distance learning environments. Many resources are specifically designed for inclusion in educational settings, while other resources are re-purposed by educators to meet a specific need. This study examines educator perceptions of OER that impact their adoption and use. The participants in this study came from higher education, K-12 schools, and workplace training. Understanding how this group of users perceive the usefulness of these types of items has two potential benefits: First, creators of OER will be able to design their materials to meet the perceived needs of educators, and, second, practices for inclusion of OER in lesson planning and curriculum development may be identified which can guide teacher education and professional development instructional messages. As more educators seek out digital resources for their classes, it is useful to understand the relationships between these individuals and the resources that they seek out to support the use and re-use of OER among educators otherwise unaffiliated with the OER movement.

The open movement is guided by a determination to share resources in order to support generativity or creative intellectual growth in a generational context and with worldwide reach. Generativity in this context refers to the transformative nature of creating knowledge into the future by sharing, educating, and interacting with the next generation. Proponents from the movement have called for a shift in educational policy and practice to encourage adoption and creation of OER (Read, 2008). Many international, national, and state-level organizations have promoted or funded OER initiatives, for example, the Hewlett Foundation's Strategic Plan to Increase Access to High-Quality Educational Content (Atkins, Brown, & Hammond, 2007) and UNESCO's Paris OER Declaration (2012). New trends in publishing and copyright have been formulated to support this growth, particularly Creative Commons licensing. Creative Commons licensing allows creators to copyright their work in a manner appropriate to how they wish to share their work. While some may wish to reserve all rights, others may adjust the license to fit their intent to make their work more open to reuse, repurposing, and remixing.

State and national governments, as well as international organizations, have determined a benefit to supporting the creation, development, and maintenance of these resources. Examples of legislation and policy promoting the development and adoption of OER are

becoming more common (Creative Commons, 2013). It appears that modularized course content and full courses are a focus in higher education, while open textbooks are a focus in K-12 education (Florida Distance Learning Consortium, 2013). Two major forces are driving these policies and investments. First, it is believed that there will be a cost savings and, second, it is believed that providing open access to these resources empowers people all over the globe by making quality educational resources more available. While the cost savings and the dissemination of knowledge are perhaps considered as obvious goods, these resources must be useful to the audience they are directed towards if they are to be used at all.

While all these positive forces encourage the creation and acceptance of these resources, other factors hinder wide spread adoption of OER. Although there is some financial support for the creation and maintenance of OER collections, funding is limited. Further, balancing open resources and paid resources is a major concern for any educational institution (Read, 2008). Copyright and concerns for acceptance of content published outside of recognized venues has deterred many from pursuing publication in an emerging model (Schonfeld & Houseright, 2010). Finally, systematic use of OER has not been integrated in to the curriculum for teaching professionals and many of the best-known repositories may be unknown by the majority of educational practitioners. Understanding how educators currently in the practice regard the usefulness of these resources in their own work is an area which can inform both design of OER and their access points as well as provide insight into instructional messaging targeted at OER integration.

Despite these constraints, the growth of OER is likely similar to information available digitally in general. Recently, the interest in massively open online courses (MOOCs) has flooded the blogosphere and online learning conferences alike (Mangan, 2012; Liyanagunawardena, Adams, & Williams, 2013). As more educators turn to the Web for classroom resources, understanding why they adopt these resources will serve as a point in understanding what educators need and how they can or do implement these digital artifacts into their practice. This research focuses on attitudes about adopting these resources that is consistent with models of diffusion of innovations (Rogers, 1995) and the theory of reasoned action (Moore & Benbasat, 1996) as exemplified in the technology acceptance model (Davis, 1989).

Theoretical Foundation

A useful theoretical framework for understanding how educators adopt OER can be constructed based on the works of Albert Bandura and Fred Davis. Bandura provides a theoretical framework and Davis provides a model. The tome *Social Learning Theory* (Bandura, 1977) explores ideas about how efficacy expectations and outcome expectations inform both behavior and outcomes in the chapter on antecedent determinants. Bandura presents a model regarding these concepts that is illustrated in Figure 1. *Efficacy expectations* may encourage or discourage an individual in attempting

a new behavior. Typically, people are more likely to adopt something that they believe they will be able to accomplish. *Outcome expectations* gauge how an individual perceives the new behavior will impact outcomes, thus recognizing if there is any value or detriment in adopting the new behavior.

Figure 1. The difference between efficacy expectations and outcome expectations (Bandura, 1977).

Built upon the concepts of efficacy and outcome expectations, the technology acceptance model (TAM) developed by Fred Davis has been a widely used model to explore technology adoption in a variety of contexts since its development. The model seeks to explain the process of how individuals accept and use new technologies. Figure 2 illustrates an early conception of the model, which has subsequently been modified and adapted in many studies (Adams, Nelson, & Todd, 1992; Lau & Woods, 2009; Yi & Hwang, 2002). The TAM postulates that external factors, often system design characteristics, contribute to an individual's perceptions of *how easy to use* and *how useful* a new technology is considered. These perceptions in turn inform the *intention to use* the technology, and finally determine the *actual usage* (variables in italics). In this study general computer system self-efficacy is tested as an external factor. All other variables of the TAM are included in the instrument and analysis. The TAM's wide use is not without its critics, however with so many replications, the model and its associated instruments have been extensively validated.

Of particular interest in this study is self-efficacy as a determining factor in TAM (Legris, Ingham, & Collerette, 2003). This focus on self-efficacy is built upon the idea that self-beliefs affect motivation and cognition (Bandura, 1989). Self-efficacy examines attitudes toward the ability to do a given task (in this instance, to find and integrate an OER). This personal belief is closely related to the construct of perceived ease of use. Similarly, outcome expectations or judgments as identified by Bandura (1982) align well with perceived usefulness in determining if adopting the technology has value.

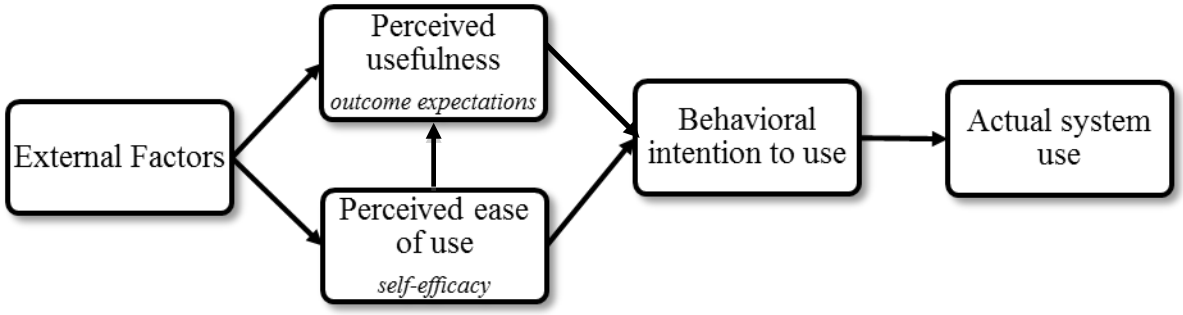

Figure 2. The technology acceptance model (Davis, 1989) with corresponding elements from Bandura (1989) in italics.

OER Defined

The TAM may provide an appropriate lens in understanding the adoption of this technology, which are defined here as web-based educational resources that are freely available via the Internet. The phrase can be further broken down into the three key words of OER, first, the *open* aspect of the resources, which allows for free use. The term *educational* separates these resources from other materials that are freely available on the Internet with an educational purpose which may come from the creator or the user of the resource. The OER phrase broadens dramatically in using the word *resource*, which in this context not only refers to content but a wide variety of tools to support access to the content as well as even more tools that support inquiry.

Use of OER

In the past, reuse and repurposing of digital educational resources, primarily in the form of learning objects has been viewed as onerous due to licensing and the traditional copyrights (Wiley, 2008). Now that many resources are freely available through new licensing strategies (e.g., Creative Commons), the opportunity for use is much more open. Several organizations (Connexions, DiscoverEd, MERLOT, etc.) work to aggregate these resources for improved discovery and re-use and past research has emphasized the organization of this information. With this ever widening access, attention now turns to how these materials are adopted or used. OER use can fall broadly into two categories: formal and informal learning. In formal use, a resource is typically being used as a medium for formal study or it will inform formal study. For example, a three-dimensional model of a heart may be used to teach the parts of a heart in an online anatomy class. That same model may help an instructor review to prepare for a lecture on the parts of the heart. Informal use of OER can be applied to typical online behaviors of goal-directed browsing and searching for particular pieces of information. In this regard, the focus of this study is on formal learning endeavors.

Users of OER

More than half of the sample of OER users was comprised of educators in a 2006 survey conducted by the Organisation for Economic Co-operation and Development (Hylén, 2006). They found that motivation to use these resources came from the practitioners and not from administrative guidance. "When presented with a list of proposed goals or benefits with using OER in their own teaching, the most commonly reported motive was to gain access to the best possible resources and to have more flexible materials" (Hylén, 2006, p. 54). While other studies have noted the diversity of individuals visiting different resources and repositories (Ally, Cleveland-Innes, & Boskic, 2006; Schmidt-Jones, 2012), the professional educator's perception of OER is important to study as they are a prominent user of the resource.

Methodological Rationale

In order to study the perception of usability and usefulness of OER among educators, the technology acceptance model was adopted to provide a framework for analysis. A path analysis approach paired well to test model fitness and examine correlation between variables because the TAM is very much a path model (Wright, 1921). Path analysis is appropriate for testing model fitness and in other circumstances where common sense or existent findings point to probable relationships (Cook & Campbell, 1979). Path analysis is an extension of multiple regression, which identifies effects between variables in a proposed model (Ritzhaupt, Dawson, & Cavanaugh, 2012). The model used in this study focuses on examining direct effects between an *exogenous variable* (application self-efficacy) and four *endogenous variables* (perceived ease of use, perceived usefulness, and actual system use). In path analysis, direct and indirect effects can be tested; a direct effect has no intermediate variables while indirect effects can be observed through one or more additional variables. Exogenous variables are not influenced by other variables in the model, so application self-efficacy is the only variable without observed influences. The endogenous variables, in contrast, all have effects between them that are observed in the analysis. The strength of the effects was measured with the standardized regression coefficient (β). This β weight allowed for an interpretation of the strength of the effects between the variables. While the interpretation does not imply causality, it does have the power to predict relationships.

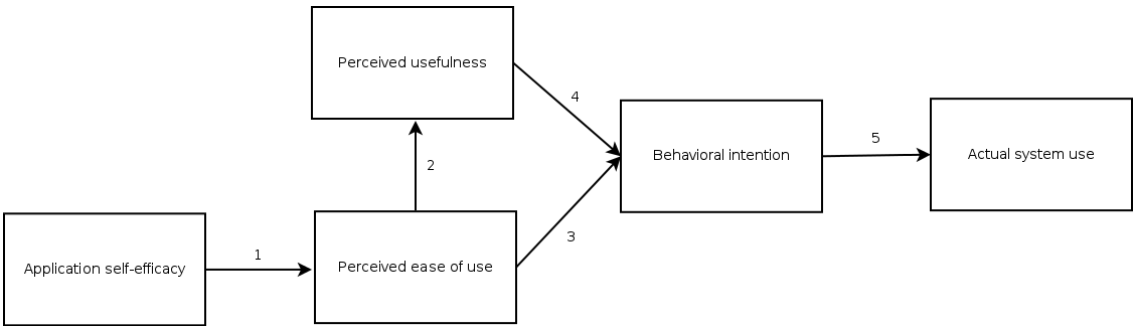

Figure 3. The technology acceptance model with application self-efficacy variable. (Developed from Davis & Venkatesh, 1996 and Yi & Hwang, 2003)

Based on the predictions of the TAM, the first five research questions correspond with the arrows in Figure 3:

1. Does application self-efficacy have an effect on perceived ease of use? It was predicted that application self-efficacy would positively effect perceived ease of use of OER because overall computer skill should translate to improved efficacy with a new application.

2. Does ease of use have a positive effect on perceived usefulness? This relationship was predicted to have a strong effect as indicated by the TAM since as a technology becomes more difficult to use, its perceived utility will decrease (Davis, 1989).

3. Does ease of use have a positive effect on behavioral intention to use? It was predicted that the technical quality would have a moderate effect on the intention to adopt OER (Lau & Woods, 2009).

4. Does perceived usefulness have a positive effect on behavioral intention to use? Finding OER to be useful, particularly for improving educational practice or outcomes, was expected to have a strong effect on intention to use.

5. Does behavioral intention to use have a positive effect on actual use? It was important to consider the effect between what people intend to do and what they may actually do. This thought process bridges the gap between what an individual thinks of a technology and whether they actually adopt it. It was predicted that intention would have a moderate effect on actual use.

A final research question put forward asks if there are group differences related to the educational setting where the participant works in perceptions of OER. The goal was to

determine if there were group differences among the educators represented in the sample (participants came from K-12, higher education, and workplace training environments). Discriminant analysis was selected to examine which variables held the most predictive power for group membership. Discriminant analysis determines dimensions that groups may differ significantly on and also can illustrate directionality if significant variates are identified (Field, 2005). Determining group differences could help to inform instructional messages regarding OER to meet the needs of particular audiences of educators.

Methodology

Participants

A purposive sampling approach was used to collect data from a group of educators and professionals who were identified as aware of and possibly using OER in their teaching practice. Participants were solicited from educational technology listservs and working groups at the national and institutional level (e.g., International Society for Technology in Education Special Interest Group for Game and Simulation Technologies, University of North Carolina Charlotte Learning and Development group in Human Resources, etc.). From 224 responses, 128 were fully complete for analysis. A sample size of 128 responses was sufficient to meet an eight to one ratio (responses per parameter) but a sample as low as 90 would have been stable enough for analysis (Suhr, 2008). The respondents were primarily female (66% female to 34% male). The majority were over 40 years of age (40% aged over 51, 29% aged 41 to 50, 24% aged 31 to 40, and 7% aged 18 to 30). The majority of the participants had graduate degrees (32% doctoral and other terminal degrees, 56% master's, and 12% bachelor's). Professional in higher education (48%), K-12 (29%), and workplace training (23%) were all well represented.

Participants were contacted via listserv postings and email containing a request to participate in the study with an explanation of the purpose of the research and a definition of OER. After approximately two weeks from an initial contact, a second request to complete the survey was sent to participants.

Instrument

A web-based survey, using Qualtrics™ software, was utilized to collect data from the sample of educators. All items were adapted from prior research on similar self-efficacy and use and usefulness constructs with a variety of applications (Davis, 1989; Lau & Woods, 2009). The survey questions developed were derived from Lau and Woods (2009). Five self-efficacy items were adapted to identify personal differences in self-beliefs about Internet use, search strategies, and typical computer usage. Items that

measured TAM constructs constituted the rest of the survey and used the same phrasing as Lau and Woods (2009) with a change in the technology under study (from *learning objects* to *OER*). A typical question reads, "Using OER increases my teaching productivity." Respondents were then able to rate their perception of the statement on a scale going from "Strongly Agree" to "Strongly Disagree." Prior analysis used to develop the instrument proved to have high reliability, discriminant validity, and nomological validity through an extensive longitudinal study and principal factor analysis with high alpha reliabilities (Compeau, Higgins, & Huff, 1999; Murphy, Coover, & Owen, 1989). The survey was tested for reliability and content validity through a think-aloud protocol that used three experts in the field of educational technology. Items were revised as needed based on these analyses prior to the study. Internal consistency has met a threshold of $\alpha \geq 0.8$ for items regarding self-efficacy, perceived ease of use, and perceived usefulness.

Limitations and Delimitations

The technology acceptance model has been identified as having extremely limited biases in the instrument by Davis, the creator of TAM, and Venkatesh (1996). In the past, the TAM approach has grouped questions based upon what area of the construct they examine. Carry-over effects from this type of contextual organization have been observed in other psychometric research. Davis and Venkatesh (1996) found that the organization of questions into a grouped pattern did not affect the validity of the instrument and further noted that when the questions were mixed, respondents became frustrated with the lack of organization in the survey. The questions in the survey used in the present study have been appropriately formulated to maintain the order representative of reliable TAM instruments. In all other areas of internal validity, the TAM instrument has been observed as reliable and valid (Adams, Nelson, & Todd, 1992; Hendrickson, Massey, & Cronan, 1993; Segars & Grover, 1993) and has been widely used in research concerning acceptance and use of technology.

Path analysis assumes linear relationships between variables, interval data, and the data is free from measurement error (Suhr, 2008). While path analysis can test for two or more causal hypotheses it does not identify the direction of the causality. Describing the direction of causality will be an interpretation of the data but not a finding.

The stability of the path analysis may be impacted significantly by the number of complete survey responses. With 15 parameters to measure, an ideal response would come from at least 150 individuals; however a more realistic goal that maintains the integrity of the analysis was 90. While the 128 responses met the minimum requirements for analysis, it was not optimal.

Data Analysis

Data were normalized by recoding the Likert scale items to percentage scores (e.g., strongly agree to strongly disagree became 1.00 to .29) in order to make the items comparable across constructs (Hasson & Arnetz, 2005). Creating composite scores for each construct of interest followed the normalization procedure. The Kolmogorov-Smirnov and Shapiro-Wilk tests confirmed normal distribution for self-efficacy, ease of use, usefulness, behavioral intention to use, and actual use. Outliers and way outliers existed, but were retained since they did not impact model fitness. Analysis of the correlation matrix (Table 1) demonstrated no questionable relationships among the variables. The β weights were then calculated by conducting a series of multiple regression analysis. Model fitness was tested using AMOS™, where the model was reconstructed (it is represented in Figure 5 and includes the β weights).

In addition to the path analysis, a discriminant analysis was conducted to explore dimensions of group differences between higher education, K-12, and workplace training professionals. Standardized canonical discriminant function coefficients (Table 2) were used to provide analysis of group separation.

Table 1

Correlation Matrix

	Self-efficacy	Ease of use	Usefulness	Intention	Actual use
Self-efficacy	1.000	.458	. 423	.352	.273
Ease of use	.458	1.000	.790	.700	.556
Usefulness	.423	.790	1.000	.724	.574
Intention	.352	.700	.724	1.000	.554
Actual use	.273	.556	.574	.554	1.000

Results

The unit of analysis for TAM hypotheses was the individual; in this instance the participating educators were the individuals. Path analysis was used to test the fitness of TAM, effect between self-efficacy and perceived ease of use, and effects between all other constructs of interest. Path analysis is appropriate for testing model fitness and in other circumstances where common sense or existent findings point to probable relationships (Cook & Campbell, 1979). Chi-square test of model fit was 16.119, $p = .007$. Indices of model fit confirmed this with goodness of fit index at .954, normed fit index at .950, and comparative fit index at .965. The comparative fit index may be the most important index in this analysis as it is valid for smaller samples where .9 or higher indicates a good fit. Once model fit had been confirmed, effects between each construct

were examined; the associated weights for each effect are found in Figure 4, where significant weights are identified in bold.

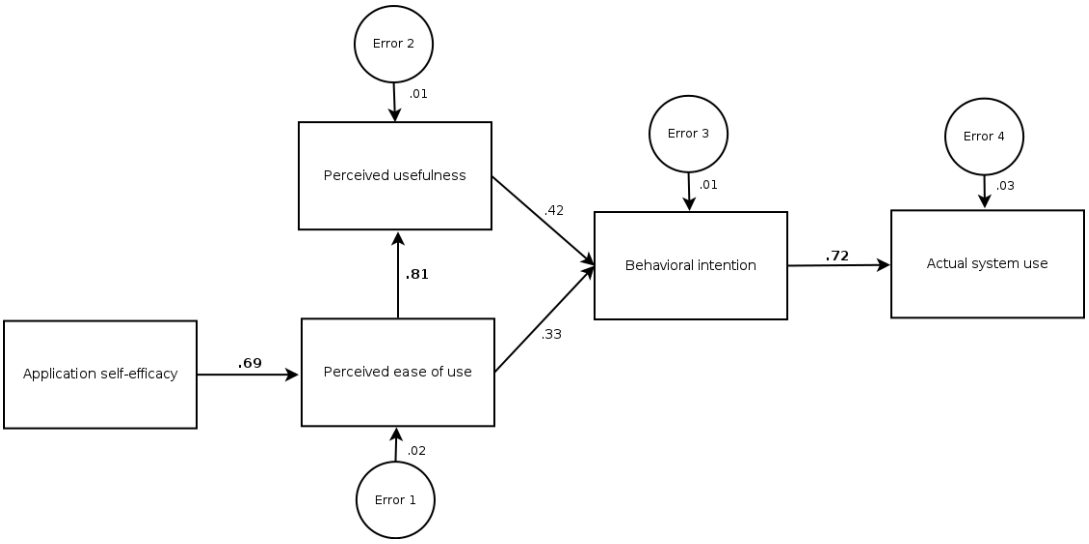

Figure 4. TAM OER Model with β weights.

Discriminant analysis was used to conduct a multivariate analysis of variance test of the hypothesis that groups from K-12, higher education, and workplace training environments would differ significantly on a linear combination of the five variables. The overall Chi-square test was significant (Wilks $\lambda = .156$, df = 5, $p < .001$). Function loadings are detailed in Table 2. The first discriminant function captured 62%of the variance between groups. Perceptions of usefulness provided the largest group separation on the first discriminant function. The second discriminant function, which was heavily influenced by self-efficacy, was also considered for further interpretation as it captured 20.9% of group variance and with the first function captured 82.8% of variance. This decision to include the second function is based on the stepwise procedure set forward by Stevens (2012). Group centroids on functions one and two (Table 3) show differences between group means using the discriminant function coefficients. It can be observed that K-12 educators were distinct from higher education and workplace training participants in regards to their perceptions of usefulness of OER (Function 1). Elementary educators were quite different than all other groups in regards to self-efficacy (Function 2).

Table 2

Standardized Canonical Discriminant Function Coefficients

	Function 1	Function 2	Function 3	Function 4
Self-efficacy	-.181	.959	.511	-.275
Ease of use	.519	-.784	1.190	.765
Usefulness	1.272	.481	-1.057	-.374
Intention	-.997	-.510	.269	-.706
Actual use	-.582	.407	-.365	1.000

Table 3

Functions at Group Centroids

In what type of setting do you teach?	Function 1	Function 2
Elementary school	.485	-.734
Middle or high school	.329	.129
College or university	-.014	-.015
Workplace training	-.145	.217

Discussion

Path Analysis Interpretation

Self-efficacy had a strong effect on perceived ease of use, though the two were not highly correlated. This may mean that there is some disconnect between the perceptions of the technologies asked about in the application self-efficacy portion of the survey (e.g., presentation software, email, etc.) and OER. In other words, even if someone is self confident in their use of online communication tools, this does not have a substantial impact on their level of confidence in finding and using OER. Regardless of the moderate effect, application self-efficacy positively affected attitudes about how easy OER are to use. From this, we can understand that individuals with a higher overall sense of computer application efficacy are more likely to find OER easy to use. This finding confirms the role of self-efficacy in the TAM (Davis, 1989; Lau & Wood, 2009; & Yi & Hwang, 2002) as central to accepting a new technology.

Ease of use had a strong effect on perceived usefulness and was highly correlated. This indicates that OER must be considered easy to use or the perceived utility of the resource will be negatively impacted. While content may guide selection, quality in user interface design is essential in the adoption of these resources. This finding is aligned

with the interpretation that learning object design characteristics are as important as the content they transmit; therefore technical quality should always be a consideration (Lau & Woods, 2009). Opportunities to explore well designed and technically elegant OER in educational or training settings can improve perceptions of these resources. Further, demonstrating or embedding the application of OER in teacher education programs may improve the sense that these resources are easy to use among future teachers.

The influence of perceived ease of use and perceived usefulness to behavioral intention to use was not dramatic in either case. It may be important to analyze direct effects from these variables to actual use rather than filtering their influence through the lens of behavioral intention in the future. The concept of usefulness had a greater effect on intention to use OER. This finding is consistent with Lau and Woods' (2009) research on learning objects as well, in that perceived usefulness had a stronger effect on intention to use than perceptions on ease of use. It was anticipated that perceptions of usefulness would have a stronger effect on intention, but usefulness does come up as a major determinant in group membership in the discriminant analysis interpretation which follows.

Behavioral intention had a strong effect on whether an individual reported actual use of OER on a regular basis in their practice. This places emphasis on how an individual arrives at the intention to use these resources. This portion of the model must be observed with some caution when, as in this study, actual use is self-reported. An analysis that includes other means of collecting usage data would improve objectivity in reporting actual use. Computer log data seems like an obvious choice to meet this requirement, but may be hindered by privacy issues. While self-efficacy and outcome judgment contribute to decisions to use a resource, further exploration of how behavioral intention is influenced could provide a more complete picture of why some resources are adopted and others are not. Clements and Pawlowski examine this kind of user intent of OER in terms of types of use and trust, finding that teachers value recommendations of OER when selecting them and that trusting the integrity of an OER supports re-use (2012).

Discriminant Analysis Interpretation

The perception of usefulness of OER accounted as the strongest predictor of group separation on the first discriminant function. In general, individuals coming from K-12 environments found OER more useful than individuals working in higher education or other settings. This may mean that there are simply better resources available for this context or it may mean that there are other causes that result in a better appreciation for OER among K-12 educators. Seeking out free resources may have a relationship to the limited resources found in many school settings with out of date library collections and limited access to paid online databases. This finding connects well with Hylén's (2006)

analysis that revealed finding quality resources to use was a major motivation to seek out OER by educators.

The second discriminant function was based on self-efficacy. Participants coming from elementary school settings had dramatically lower self-efficacy perceptions than all other groups. This could mean that OER may be more readily adopted into the curriculum of educators working with older children and adults. Educators teaching 6-12 grade generally reported higher application self-efficacy than their counterparts in elementary education as well as higher education. Further exploration of how to integrate OER among other computer based technologies for elementary educators in teacher education programs and professional development should be considered in order to improve the use of OER among this group.

Conclusion

The promise of easily accessible quality learning materials making their way to more educators resonates with thousands involved in formal and informal learning. While the particular educational contexts may vary widely, the quality of the design of OER is an essential component in their adoption. Users of these materials need resources that are as easy to use as they are to access. System wide design guidelines may improve the regard individuals have towards OER. This study demonstrates clearly that the perception of how easy OER are to use has a substantial influence on whether the resource is considered useful at all. Among the groups participating in this study, K-12 educators stood out as finding OER useful in their practice. This may demonstrate a need and a desire for continued growth and development of these types of resources for this particular audience. As more districts and states adopt open textbooks that are nimble enough to be remixed, there is an opportunity for educators to custom tailor their texts with OER to meet the needs of their students.

Ease of use is vital in the adoption of OER. Creators of OER will need to keep in mind their audience and usability design as they generate and index their works. If a resource is not easy to use it will not be considered useful and will likely not be used at all even if the content is excellent. Further research determining specific design aspects common to successful OER (those with high rates of use) may help authors create resources with these design criteria in mind, particularly in terms of user interface and universal design considerations.

From the preceding analysis, it appears that K-12 educators have more positive perceptions of the ease of use and usefulness of OER. Exploring group differences further will help to target instructional messages and opportunities among these educators. The findings also suggest that integrating these resources in to teacher education programs will further promote what is already considered a useful resource among this group.

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