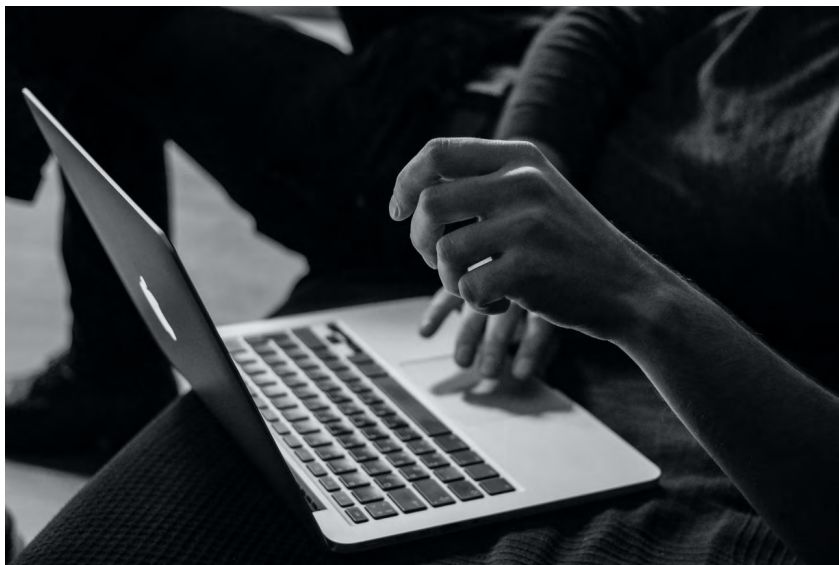


Meta-syntheses of OER Transition in Online Higher Education

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ABSTRACT

This article is a meta-analysis of research on the use of Open Educational Resources (OER) in educational communities. OER's are free educational resources that are openly available on the internet for faculty or student use (as cited in Annand, 2015). According to Senack & Donahue (2016) the cost of textbooks can cause an undue burden on students and hinder their educational experience. OER's are given consideration and in use in some educational environments as a means of lowering textbooks costs for students. This article further addresses research regarding student and faculty response to the use of OER's in the higher education milieu. Research demonstrates a divide among students, i.e. some students that appreciate the open availability of OER's, but others who prefer printed materials for their educational experience (Brandle et. Al, 2019). The research also speaks to faculty perception regarding the adoption of OER's. Faculty seek institutional support through provision in their schedules for time and investment needed to ful-

ly implement OER's (Annad, 2015). The authors provide research that indicates the importance of faculty being educated on the use of these resources and given consideration in the application of their use. The article finally reports the results of the use of OER's in educational communities.

Keywords: OER, textbook costs, student, faculty

Meta-síntesis de la transición a los REA en la educación superior en línea

RESUMEN

Este artículo es un metaanálisis de la investigación sobre el uso de Recursos Educativos Abiertos (REA) en comunidades educativas. Los REA son recursos educativos gratuitos que están disponibles abiertamente en Internet para uso de profesores o estudiantes (como se cita en Annand, 2015). Según Senack & Donahue (2016) el costo de los libros de texto puede causar una carga indebida a los estudiantes y obstaculizar su experiencia educativa. Los REA se tienen en cuenta y se utilizan en algunos entornos educativos como un medio para reducir los costos de los libros de texto para los estudiantes. Este artículo aborda además la investigación sobre la respuesta de estudiantes y profesores al uso de REA en el entorno de la educación superior. La investigación demuestra una división entre los estudiantes, es decir, algunos estudiantes aprecian la disponibilidad abierta de REA, pero otros prefieren materiales impresos para su experiencia educativa (Brandle et. Al, 2019). La investigación también habla de la percepción de los profesores con respecto a la adopción de REA. Los profesores buscan apoyo institucional a través de la provisión en sus programas de tiempo e inversión necesarios para implementar completamente los REA (Annad, 2015). Los autores proporcionan investigaciones que indican la importancia de que los profesores sean educados sobre el uso de estos recursos y se les dé consideración en la aplicación de su uso. El artículo finalmente informa los resultados del uso de REA en comunidades educativas.

Palabras clave: REA, costos de libros de texto, estudiantes, profesores

关于网络高等教育中开放教育资源过渡的综合集成法

摘要

本文对教育界开放教育资源（OER）使用的相关研究进行了元分析。OER是供教师和学生使用的、在网络上开放获取的免费教育资源（Annand, 2015）。学者Senack & Donahue（2016）认为，课本费用能对学生产生过度压力，并阻碍其教育体验。OER在一些教育环境中被作为一种降低学生课本费用的方式予以考量和使用。本文进一步研究了高等教育背景下学生和教师对OER使用的响应。研究证明，学生之间存在分歧，即一些学生喜欢OER的开放获取性，另一些偏好使用纸质材料（Brandle et. Al, 2019）。研究还证明了教师对OER采纳的感知。教师寻求机构支持，以获得用于全力执行OER的时间和资金（Annad, 2015）。作者提供的研究表明了“教师就如何使用这些资源接受培训并考量应用OER资源”一事的重要性。文章最后汇报了教育界OER使用的结果。

关键词：开放教育资源，课本费用，学生，教师

The term Open Education Resources was originally utilized by United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2002 (Abramovich & McBride, 2018). UNESCO defined OER as non-commercial educational resources freely available on the Internet useable by teachers for course development and instruction or by students for assignment resources and course material supplementation (as cited in Annand, 2015). Open education resources consist of educational materials existing within the public domain for the sole purpose of being freely used by educators and students to decrease student expenses (Coleman-Prisco, 2016).

The use of open education resources also serves to increase an insti-

tution's competitive advantage by making it more attractive to prospective students, providing a public service, and advancing the institution's reputation (Annand & Jensen, 2017). Well known universities are already committed to the OER movement such as MIT's Open Course Ware Program, which offers open resources for over 1,800 courses, Carnegie Mellon's Open Learning Initiative, and Stanford's Engineering Everywhere courses (Hilton & Wiley, 2010). Experts argue that the academic community has a responsibility to promote the OER philosophy that knowledge should be constructed and circulated freely through the open network in a way that profits a diversified community of users (Alves, Miranda, & Morais, 2014).

Textbook Costs

Student financial debt is currently a significant issue in the United States, with undergraduate students having over 57 million dollars in federal student loans (Coleman-Prisco, 2016). Abdul-Alim (2016) relayed that in 2012, textbooks and supplies cost full time students about \$1,200 per year, and further research indicates that these costs are rising. The College Board Advocacy and Policy Center (2016) found that during the 2015-16 academic year, textbook costs for the U.S. undergraduate exceeded \$1200 and projected a continued upward trend in the coming years. Senack & Donahue (2016) cite that between 2006 to 2016, the cost of textbooks has increased approximately four times the rate of general inflation in the United States. Textbook costs now comprise about 25% of the total cost of a full-time student's higher education, and over \$3 billion of federal student aid in the United States is utilized for textbooks (Senack & Donahue, 2016). These increasing costs create an undue burden on students and negatively impacts their learning experience (Senack & Donahue, 2016).

In a 2015 survey involving approximately 12,000 students in 22 California Community Colleges, students reported traditional textbook costs being a serious source of anxiety (Cochrane & Szabo-Kubitz, 2016). Students further reported that even two traditional textbooks, required for one class, could cost them an entire paycheck (Cochrane & Szabo-Kubitz, 2016). In a similar study, participants shared that

there had been times when they had to choose between buying textbooks or buying food (Martin, Belikov, Hilton, Wiley, and Fischer, 2017). Martin et al. (2017) also received comments from students indicating that if textbook costs decreased, they would be able to work fewer hours and focus more on school. Cochrane and Szabo-Kubitz (2016) found that due to the financial strain created by the high costs of textbooks, 32% of financial aid recipients, who responded to their survey, stated that they could not afford them, and instead attempted to take the class without purchasing those materials.

The 2015 National Survey of Student Engagement (NSSE) results indicate that 31% of first year students do not purchase textbooks, citing high cost as the reason (as cited in Abdul-Alim, 2016). Recent research with students shows that the high costs of high costs of textbook on full time college and university students in the United States, has resulted in approximately 65% of students refusing to purchase textbooks assigned to their courses, even though they acknowledge it will negatively impact their grade (Annand & Jensen, 2017). Flatworld (2018) conducted a study with higher education institutions in the 2018 Fall semester, and found that during that time, participants spent \$403 on textbooks. One-third of the students Flatworld (2018) surveyed indicated that textbook prices have impacted their decision on whether to take a course. A trend is also emerging where students who are not able to afford assigned readings, attempt to use outside materials to substitute text-

books (National Association of College Stores, 2018). The National Association of College Stores (2018) found that a growing number of students wait to attend the first week of courses, before deciding if they are going to purchase the class materials or seek free alternative sources. Nearly 20% of their participants subsequently chose to download their materials (NACS, 2018.)

Five publishing firms are reported to control 80% of the textbook market in a virtual oligopoly (Senack & Donahue, 2016). One strategy aimed at financial sustainability, in an increasingly digital market, is for textbook companies to frequently produce unnecessary updates, requiring students to purchase new versions of their texts (Senack & Donahue, 2016). Another tactic involves making it necessary for students to purchase online supplements to their textbooks, which caused over 80% of students in the 2015-2016 academic year to incur unexpected extra costs (Senack & Donahue, 2016). Students are aware of these methods; and in a study by Martin, Belikov, Hilton, Wiley, and Fischer (2017) reported that they are especially detrimental to those in lower socioeconomic statuses.

Benefits and worth of OER

Recent research identifies the benefits of open education resources (OER) including lowering the cost of education to students and making education more equitable for everyone (Park, Plumer, & DeForest, 2018). In a time of rising textbook costs and widespread educational debt,

achieving affordability is an important endeavor (Flatworld, 2018). Ruth and Boyd (2016) report that OER texts are now being utilized in about 20% of US degree-granting institutions. Their research showed that those institutions cited the desire to lower student costs as the main reason for the shift to OER (Ruth & Boyd, 2016). The incorporation has been proven successful by saving students over \$39 million in academic costs in the 2015-16 academic year (Ruth & Boyd, 2016).

The financial savings achieved through a commitment to OER is well-documented. An OER pilot project involving five U.S. higher education institutions used full-time faculty incentives in the form of internal grants to promote adoption of OER and resulted in students saving about \$128 per academic course (Annand & Jensen, 2017). The University of Massachusetts allocated \$60,000 in internal grants to full-time faculty over four years to adopt OER and gained an estimated savings of almost \$1 million in the initial semester after the project (Annand & Jensen, 2017). Kansas State University invested \$96,250 in an OER adoption grant program that resulted in student savings more than \$1.1 million in textbooks cost (Annand & Jensen, 2017). Additionally, Tacoma Community College invested approximately \$240,000 in a OER adoption program which resulted in more than \$1.1 million student textbook cost savings (Annand & Jensen, 2017).

OER in higher education institutions (HEIs) effectively address rising textbook costs for students;

but empirical studies show that OER implementation also provides improved student access to course materials without losing quality (Ozdemir & Hendricks, 2017). The adoption of these resources allows faculty members to design their courses in a way that is tailored to their educational viewpoint, creating a more specialized experience for the student (Ozdemir & Hendricks, 2017). These curriculum advantages have important implications on improving student success and increasing student retention (Park, Plumer, & DeForest, 2018). The motivation for higher education institutions to adopt OER certainly include a savings for their students; however, they can also hope to achieve a positive impact on student learning, and lowered attrition rates (Ozdemir & Hendricks, 2017). Despite these benefits, higher education institutions are reluctant to adopt OER because of concerns about their relative value compared to traditional course materials (Park, et al, 2018).

Student perceptions

A study was conducted with two universities over the 2013-2014 academic year to ascertain which OER features were most valued by college students, how much college students understood what OER were, and how well college students knew how to use OER (Alves, Miranda, & Morais, 2014). Alves et al. (2014) found that college students surveyed lacked knowledge of OER and only a moderate ability to utilize what they did know, but reported that the most valued aspects

of OER were the free access and open availability. In a later study conducted in 2018, students reported the “ease of access” and mobility of their digital materials as the second greatest benefit of OER, behind financial savings (Brandle et al., 2019, p. 93). The comparison of these studies would suggest that as technology enhances the accessibility of these resources, student perceptions of their use in courses will continue to improve.

Open Educational Resources (OER) is widely believed to be financially beneficial for students, but students are also concerned with the relative value of their materials (Abramovich & McBride, 2018). In a study by Abramovich and McBride (2018) regarding the replacement of traditional textbooks with OER, results indicated a positive perception of the impact OER had on the class experience, even though traditional course materials still rated higher in financial value. Brandle et al. (2019) surveyed 898 students and half of those participants found zero drawbacks to the use of OER; the other half were primarily apprehensive about the quality of the materials, or relayed personal preferences for printed versus digital resources. Brandle et al. (2019) suggested that OER be optimized for printing and accessible on mobile devices in order to alleviate student concerns.

Faculty perceptions

A recent study of students and faculty reported an overwhelmingly positive response from

students regarding the accessibility, relevancy, and costs savings of OER (Ozdemir & Hendricks, 2017). Faculty shared this positive perception of OER, and reported an improvement in student retention especially in the first few weeks of their courses (Ozdemir & Hendricks, 2017). Faculty members interviewed also indicated that OER material was of a quality equal to or better than traditional textbooks (Ozdemir & Hendricks, 2017). In a study conducted across ten Dutch higher education institutions, the conclusion was drawn that the motivation for instructors and administrators to use OER is directly related to their commitment to provide the best educational environment to students (Schuwer & Janssen, 2018).

However, disconnects do exist between student and faculty perceptions of OER. A study of over 6,000 participants including students and faculty members, determined that 80% of students believed that using OER in their courses would save them money, while only 38% of faculty believed the same thing (Arcos, Farrow, Perryman, Pitt, & Weller, 2014). The results indicated that students were more in favor of using OER as a valid option than faculty in large part due to differing motivations (Arcos et al., 2014). Arcos et al. (2014) reported that instructors' opinions of OER were impacted by the increased time and effort, away from teaching, to develop a course using OER over a prepackaged textbook. Abdul-Alim (2016) supported this assertion in a study citing free cost and accessibility as benefits of OER, while noting that as a drawback, faculty

were required to do extra work to account for the lack of richness of OER in comparison to traditional textbooks.

A recent study of 3,000 faculty member in the United States regarding their perceptions on OER resulted in an understanding to the barriers of OER adoption in higher education (Allen & Seaman, 2016). Study conclusions showed that faculty cited their greatest reluctance to using OER was their perception of the intense time investment needed to identify, review, assess, and build OER materials into their courses (Allen & Seaman, 2016). Secondary concerns involved OER quality, resistance to change, workload issues, and lack of institutional supports (Allen & Seaman, 2016). There are additional faculty concerns about OER regarding lack of control of intellectual property once published, apprehensions about information quality, and anxieties about being replaced as subject experts (Annand, 2015).

As previously stated, the strongest argument in support of OER is the free cost to students, but one of the biggest obstacles to using OER is financial as well. In order for a course to transition to the use of OER, universities must financially invest in the process of faculty review of the proposed OER materials (Annand, 2015). The primary way higher education institutions have consistently achieved successful OER adoption in courses is to engage their faculty in the process through grants and scholarship (Coleman-Prisco, 2016). The results achieved by an institution are an extension of the institution's out-

reach, increased collaboration among faculty, and a positive impact on the global community (Coleman-Prisco, 2016). Benefits appear to be great for institutions that manage to engage faculty into the process and share their intellectual energies (Coleman-Prisco, 2016).

A descriptive case study was conducted with Durban University of Technology (DUT) faculty members in 2011 to gauge perceptions towards OERs, while also measuring their potential to be developers of OER grounded courses (Van der Merwe, 2013). A total of eighty faculty members responded to a standardized questionnaire and survey, which found that despite acknowledgement of OER benefits, faculty did not share the value of educational material openness and identified the need for financial incentives to be a part of the OER adoption process (Van der Merwe, 2013). The study concluded that in order for higher education institutions to retain their relevancy in the evolving educational landscape, in addition to financial investment, they also need to foster a culture of openness among their faculty to the sharing of educational materials and to value OER scholarship (Van der Merwe, 2013).

In a survey of faculty at twenty community colleges and universities, who had already begun the institution of OER into their courses, 93.75 percent of participants indicated they felt strongly that OER was well-matched with their educational values, with zero participants disagreeing (Coleman-

Prisco, 2016). 87.5 percent of faculty participants agreed that their students benefited from the use of OER in the higher education classroom and again no participants disagreed (Coleman-Prisco, 2016). Further indicating faculty concern for the experience of their students, 81.25 percent of participants reported that OER allowed them to more fully address the learning needs of their students, with no disagreement (Coleman-Prisco, 2016). The conclusion can be made that once faculty members finish the process of integration, and begin using OER in their higher education class rooms, they view the impact of OER as positive for both themselves and their students (Coleman-Prisco, 2016).

OER adoption

The success of OER integration in academic institutions is closely tied to the faculty culture (Abramovich & McBride, 2018). Research shows that instructors tend to be focused on change, rather than innovation (Coleman-Prisco, 2016). Instructors require support and tested processes before they will endorse an innovation (Coleman-Prisco, 2016). Traditional instructors can be suspicious of innovations, wanting to first see evidence of their success, and isolation can increase this suspicion (Coleman-Prisco, 2016). Coleman-Prisco (2016) concluded that in order to combat this reluctance, innovation should have trialability, be compatible with instructor values, have perceivable advantages, and not be overly complex. Therefore,

it is important that administrators partner with their faculty, so that they can meet these needs and involve them in every step of the OER implementation process (Coleman-Prisco, 2016).

A study of online faculty perceptions of OER adoption was conducted using Roger's Model of Diffusion of Innovations as its framework. This theory differentiates institutional change, involving something becoming different, from innovation as positive progress; and also categorizes stakeholders by their enthusiasm to adopt innovation (Schuwer & Janssen, 2018). Diffusion is then the process by which such innovation flows through institutional social system and impacts its stakeholders (Schuwer & Janssen, 2018). In this study, the innovation was identified as the adoption of OER, and the stakeholders were administrators, support staff, and instructors (Schuwer & Janssen, 2018). Researchers found that accomplishment of innovation relies on collective member buy in to a five-phase progression involving knowledge, persuasion, decision, implementation, and confirmation (Schuwer & Janssen, 2018). During the five-step process there exist variables that can significantly impact the rate of adoption such as members role, the decision process, social dynamics, communication channels, and need for innovation (Schuwer & Janssen, 2018).

Schuwer and Janssen (2018) reported that institutional policies appear to have a more positive impact when they involve educating instructors about OER, providing incentives for

their inclusion, and recognize the scholarship value of said materials. (Schuwer & Janssen, 2018). Instructors should be educated about the value and quality of OER in a way that addresses their individual perspective on its inclusion; and institutions should create an environment of experimentation and innovation with ample support and incentives for educators to embrace OER use (Schuwer & Janssen, 2018). Participating instructors noted that the use of shared educational materials reflected their core values of equitable educational for all students (Schuwer & Janssen, 2018). However, results showed that it is critical for administrators to recognize and honor an instructor's autonomy in choosing to be a part of the OER adoption process, and to be aware of the unique levels of enthusiasm for innovation held by their faculty (Schuwer & Janssen, 2018). Schuwer and Janssen (2018) found that half of an institution's stakeholders will either be late to adopt OER, or resist this innovation all together. They concluded that institutions should identify their most eager innovators to participate in OER integration efforts, so that those stakeholders could inspire investment from their cohorts (Schuwer & Janssen, 2018).

Athabasca University in Canada is an example of an institution fully actualizing the potential of its faculty in the integration of OER. This institution transitioned away from commercial textbooks by utilizing university employed production teams, including full time faculty, to create in house textbooks (Annand & Jensen,

2017). They continued to build on this savings by converting their printed textbooks to digital copies in future editions, which then became offered as OER (Annand & Jensen, 2017). This progression to OER took several years and funding initiatives, but resulted in a total textbook cost savings to students of \$217,500 per year and increased student retention rates (Annand & Jensen, 2017).

Researchers in Tanzania found barriers to OER use in higher education institutions beyond faculty resistance, including lack of student access to an online environment, lack of instructor understanding of how to use OER, and a lack of faculty motivation to create OER grounded courses (Mtebe & Raisamo, 2014). Mtebe and Raisamo (2014) recommended that one way to address these barriers was for institutions to invest in the preliminary work of creating and promoting pro-OER policies, before initiating the conversion process. A case study exploring the incorporation of OER into courses at the University of the South Pacific (USP) reinforced the correlation of extensive preparation and research to the success of OER integration (Koroivulaono, 2014).

USP felt that OER offered them an opportunity to address the disparity of educational availability and economic hardships of their students, so they began exploratory studies to determine how faculty and students would perceive and value the use of OER in class rooms (Koroivulaono, 2014). After gauging stakeholder interest, USP pushed their

practices and pedagogy to grow to new levels by creating a new transformative learning system, employing frequent tests to improve technical aspects of the system (Koroivulaono, 2014). USP proceeded to engage their faculty and students in the integration process, with a series of OER awareness seminars aimed at educating their stakeholders about the benefits of this innovation (Koroivulaono, 2014). Throughout the process, USP continually revised their strategic plan to account for feedback from all stakeholders (Koroivulaono, 2014). The university was able to achieve the goal of increasing educational availability in its region as a result of its methodical approach to OER integration.

Preparation of this scale will result in universities incurring upfront costs. Institutions will need to commission their faculty as subject matter experts to explore, examine, and identify valid OER for coursework, and build those materials into the instructional design of their courses (Annand, 2015). However, these investments will result in educational savings for students, creating a competitive market advantage leading to higher enrollment (Annand, 2015). As higher enrollment alleviates the costs associated with initial OER integration, universities, including on-line institutions, will find that OER use in their courses is financially viable for their students, and also cost effective for the university (Annand, 2015).

Conclusion

OERs are resources that can be used at no cost to educators or students. These resources are determined to reduce the burden of textbook costs for students by minimizing the likelihood that students will bypass purchasing course textbooks resulting in a negative impact their learning (Senack & Donahue, 2016). The research demonstrates that the use of OERs does provide greater access of course materials for students without losing the quality (Osdemir & Hendricks, 2017).

Institutions of higher education and faculty have shown some hesitation in the adoption of OER resources due to concern about the value and quality of these resources (Park et al., 2018). Faculty have been cautious as they seek the institutional investment that provides faculty with time to identify, review, and asses OER resources before building them into courses (Allen & Seaman, 2016). The use of grants and scholarships has been one way that institutions have been able to get faculty to invest their time and talents in the process of adopting OERs (Annand & Jensen, 2017). Van der Merwe (2013) concluded that institutions must financially invest and provide a culture of openness for faculty to share educational materials as well as value the quality of OERs in scholarship. The adoption of OERs is connected to the faculty culture (Abramovich & McBride, 2018). Research concluded

that faculty members who integrate OERs in their classrooms view the impact as positive for themselves and for students (Coleman-Prisco, 2016; Ozdemir & Hendricks, 2017). With the adoption of OERs students do value the financial relief that the use of these resources provide, although Brandle et al. (2019) did identify that some students were apprehensive about the quality of the materials. The bottom line is that institutional adoption of OERs need to be to be guided by faculty culture. The research shows that educating faculty on OERs, providing resourcing to evaluate their use, and continuous feedback from all constituents are factors in the effective integration of OERs in higher education environments (Coleman-Prisco, 2016; Koroivulaono, 2014; Schuwer & Janssen, 2018).

This study recommends that higher education administration fund research into OER adoption, allow for faculty time to adapt OER resources, invite faculty scholarship in OER, and integrate OER into strategic planning. The advantage of OERs for students is particularly clear in terms of relieving financial burden that may inhibit their educational experience. The research demonstrates that investigation of the use of OERs in higher education is worthwhile and can provide quality educational materials for faculty and students. Noticeably, faculty are a critical part of institutions moving forward with the adoption of Open Educational Resources.

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