Editorial policies

Open Praxis is a peer-reviewed open access scholarly journal focusing on research and innovation in open, distance and flexible education. It is published by the International Council for Open and Distance Education—ICDE.

The aim of Open Praxis is to provide a forum for global collaboration and discussion of issues in the practice of distance and e-learning.

Open Praxis welcomes contributions which demonstrate creative and innovative research, and which highlight challenges, lessons and achievements in the practice of distance and e-learning from all over the world.

Open Praxis provides immediate open access to content on the principle that making research freely available to the public supports a greater global exchange of knowledge.

Open Praxis is a quarterly journal published in January–March, April–June, July–September and October–December.

Research articles and innovative practice articles are subject to double-blind peer review by a minimum of two Reviewers.

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Open Praxis does not necessarily agree with opinions and judgements maintained by authors.
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This editorial in the first *Open Praxis* issue in 2020 presents a brief report on the *Open Praxis* development since its relaunching in 2013, with a special focus on volume 11, published in 2019, similar to the brief reports published in past years (Gil-Jaurena, 2015, 2016, 2017, 2018, 2019). Table 1 includes different journal statistics, such as number of submissions, number of published papers; acceptance rates; number of authors and number of reviewers.

A record of 101 authors (excluding the editor) contributed to *Open Praxis* volume 11 with their research, innovative practice, special papers or book reviews, compiling a total of 33 published items. The average author per paper has increased to almost 3 (table 1). Considering the international scope of the journal, contributions are geographically and institutionally balanced, coming from 22 different countries: 2 North American countries (USA and Canada), one South American (Uruguay), 8 European countries (Ireland, United Kingdom, Portugal, Spain, France, Netherlands, Italy and Slovenia), 5 African (Cameroon, Ghana, Kenya, Tanzania and South Africa), 4 Asian countries (Turkey, Pakistan, Thailand and Korea) and 2 in Oceania (Australia and New Zealand). The 59 reviewers also reflect a gender, geographical and institutional balance, as shown in the list available in the *Open Praxis* website (https://openpraxis.org/index.php/OpenPraxis/about/displayMembership/10).

### Table 1: Journal statistics per year

<table>
<thead>
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<td>34</td>
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<td>Special papers*</td>
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<td>11</td>
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<td>6</td>
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<td>1</td>
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<tr>
<td><strong>Total submissions</strong></td>
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<td><strong>52</strong></td>
<td><strong>57</strong></td>
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<td><strong>65</strong></td>
<td><strong>54</strong></td>
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<td>Rejected before peer-review</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>15 (+ 4 book reviews)</td>
<td>17 (+ 3 book reviews)</td>
<td>10 (+ 3 book reviews)</td>
<td>16 (+ 2 book reviews)</td>
</tr>
</tbody>
</table>

(Continued)
Table 1: (Continued) Journal statistics per year

<table>
<thead>
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<td>32</td>
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<td>32</td>
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<td>Days to review</td>
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<td>56</td>
<td>63</td>
<td>56</td>
<td>61</td>
<td>57</td>
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<tr>
<td>Days to publication</td>
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<td>118</td>
<td>117</td>
<td>158</td>
<td>169</td>
<td>163</td>
<td>167</td>
</tr>
<tr>
<td><strong>Acceptance rate</strong></td>
<td><strong>60,70%</strong></td>
<td><strong>59,61%</strong></td>
<td><strong>50,88%</strong></td>
<td><strong>45,28%</strong></td>
<td><strong>53,33%</strong></td>
<td><strong>54%</strong></td>
<td><strong>54%</strong></td>
</tr>
<tr>
<td>Number of authors</td>
<td>65</td>
<td>81</td>
<td>71</td>
<td>65</td>
<td>80</td>
<td>70</td>
<td>105</td>
</tr>
<tr>
<td>Average authors per paper</td>
<td>1,71</td>
<td>2,31</td>
<td>2,15</td>
<td>1,91</td>
<td>2,11</td>
<td>1,94</td>
<td>2,84</td>
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<tr>
<td>Number of reviewers</td>
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<td>61</td>
<td>59</td>
<td>66</td>
<td>58</td>
<td>59</td>
</tr>
</tbody>
</table>


The Open Praxis website has received visits from all over the world (figure 1), being the following the top ten countries (in descending order) in 2019: United States (41,88% of the users), India (6,98%), United Kingdom (6,14%), Canada (4,57%), Philippines (2,43%), Australia (2,15%), Turkey (2,07%), Spain (1,95%), Germany (1,65%) and South Africa (1,53%). The United States of America is showing an increasing number of visits to the Open Praxis website in recent years: from almost 16% in the first 5 years, until January 2018 (Gil-Jaurena, 2018) to almost 42% in 2019 (fig. 1).

![Figure 1: Location of visitors to Open Praxis website (January-December 2019)](image)

Source: Google Analytics

Open Praxis, vol. 12 issue 1, January–March 2020, pp. 1–5
Regarding scientific impact, citations to *Open Praxis* in academic publications (journals, conference proceedings, books, etc.) have progressively increased since the relaunching of the journal in 2013 (figure 2). The current *Open Praxis* h-index is 30 (source: Google Scholar, March 2020).

![Figure 2: Citations to Open Praxis per year. 2008-2020](source: Google Scholar)

After this brief report on the Open Praxis figures and progress, what follows is an introduction to the first *Open Praxis* issue in volume 12, which includes nine research papers, one innovative practice paper and one book review.

In the first article (*Open Education Faculty and Distance Education Students’ Dropout Reasons: the Case of a Turkish State University*), Münevver Gündüz and Selçuk Karaman, from Turkey, deal with a relevant topic in distance education: dropout. They develop and interview-based study and identify School and Programme-related factors, Social Environment-related factors, and Personal Trait-related factors that influence students’ dropout in the distance education program at Ataturk University.

In the second paper (*Opening Futures for Nigerian Education – Integrating Educational Technologies with Indigenous Knowledge and Practices*) Biliamin Adekunle Adeyeye and Jon Mason, from Nigeria and Australia, introduce the African Indigenous Knowledge Systems in the critical reflection about openness and technologies in education. Their historical, cultural and values-based approach explores the opportunity to merge indigenous knowledge and technology in pursuit of sustainable development.

Sidra Noreen and Muhammad Abid Malik, from Pakistan (*Digital Technologies for Learning at Allama Iqbal Open University (AIOU): Investigating Needs and Challenges*), present a survey-based study focused on the students’ needs of digital technologies, which shows a positive attitude towards them. They have also interviewed some staff in charge of these technologies, in order to identify the challenges, including aspects such as ICT costs or faculty attitudes. The paper provides and overview of the case at AIOU and some hints for action.

An international team conformed by Liat Biberman-Shalev, Gemma Tur and Ilona Buchem from Israel, Spain and Germany (*Culture, Identity and Learning: A Mediation Model in the Context of Blogging in Teacher Education*) presents a comparative study that, using both a psychological and a socio-anthropological perspective, explores identity ownership in a group of students. The context has been a virtual learning environment –the use of blogging– and identity has been the mediation
variable, being learning the dependent variable and culture the independent one. The authors highlight the educational implications of the results.

Antonia Makina, from South Africa (Developing a framework for managing the quality use of podcasts in open distance and e-learning environments), building upon research about the use of podcasts in higher education and concerned with doing a quality use of this resource, has designed a framework aligned Bloom’s Digital Taxonomy. The paper reports on the process of developing the framework, and offers it as a practical educational tool.

The last four research papers, all from the USA, report on different studies about the use of open educational resources (OER) in higher education.

Juliana Magro and Sara V. Tabaei (Results from a Psychology OER pilot program: faculty and student perceptions, cost savings, and academic outcomes), present the results of a survey and focus-group based study focused on different dimensions about the use of open textbooks in a collaborative pilot program that involved the library and a Psychology Department.

Feng-Ru Sheu and Judy Grissett (Quality and Cost Matter: Students’ Perceptions of Open versus Non-Open Texts through a Single-Blind Review), also in the field of Psychology, focus on students’ perceptions about textbooks and present a mixed methods experimental research that puts the students in the situation of evaluating course texts.

Lucinda Rush Wittkower and Leo S Lo (Undergraduate Student Perspectives on Textbook Costs and Implications for Academic Success) present a survey-based study focused, as well, on students’ views about textbooks, particularly in the relevance of their cost in students’ performance. The survey is included as an appendix.

On the other hand, Troy Martin and Royce Kimmons (Faculty Members’ Lived Experiences with Choosing Open Educational Resources) focus on faculty and analyse their perspectives through a phenomenological interview-based study interests in four topics in relation to OER: knowledge and motivations, content selection, technical issues, and sustainability.

This set of four papers contributes to the literature about OER and open textbooks in higher education.

The innovative practice paper, by Pedro Antonio Tamayo, Ana Herrero, Javier Martín, Carolina Navarro and José Manuel Tránchez, from Spain (Design of a chatbot as a distance learning assistant) present their experience with a virtual assistant they have used in an Economy distance education course. They report on the motivations for using a chatbot, the process they followed in the design and implementation of the conversational robot, and the assessment of the experience.


We hope these articles will invite to discussion, reflection and innovation in open and distance education.

Special thanks from Open Praxis to the authors and reviewers who have contributed to this issue.

References


Abstract
This study aimed to investigate open education faculty and distance education students' dropout reasons. By implementing the use of a case study as a qualitative research method, this study investigated why students dropped out for their distance education programs. The study group was composed of 25 students who had dropped out of distance education and open education faculty programmes. The study group was formed by using a stratified random sampling method. The research included a data collection tool based on a semi-structured interview form that was generated on the basis of interviews with experts and an evaluation of theories, models, and studies concerning dropout. The data from the interviews were analyzed through content analysis and involved distinguishing between codes, categories, and themes. This study found the following main factors as responsible for students dropping out of these programmes: students’ difficulty in paying the tuition fees, their maladjustment to the form of education offered on the Internet, their need for printed books, and technical problems encountered in examinations. Students’ lack of personal career objectives and their worries about failure were also among the most important factors that increased the possibility of dropping out. Additional reasons for dropping out included issues related to environmental circumstances and conditions as well as individual responsibilities. In conclusion, it was found that programmes and other environmental factors were influential in instances of dropout.

Keywords: dropout, distance education, open education faculty, higher education

Introduction
Currently, the widespread use of the Internet and online tools in educational environments has increased the prevalence of online education. In particular, adults prefer online distance education because they value their time and place importance on independent learning activities (Lim, 2001). It is evident that distance education provides students with the advantage of lifelong learning. In the most general definition, distance education is defined as planned teaching and learning activities through communication channels within an institutional organization regardless of time and place (Moore & Kearsley, 2011). Open education is very similar to distance education and supports lifelong learning independent of time and space. However, there are difficulties as well as the advantages of both open and distance education. These difficulties can cause problems for students in online open and distance learning programs, some of which compel them to drop out (Park & Choi, 2009). Because of these high drop-out rates, it is particularly important to ensure that the student is kept in the system (De Paepe, Zhu & DePryck, 2018). Educators target high attendance and low drop-out rates as indicators of the success of the program. Therefore, there is a need to focus on school dropout factors in online distance education.

Dropout in Open and Distance Education
Although there are various definitions of what it means to drop out, it is generally understood to be a complete departure from school for individual or social reasons (Garrison, 1987). Although dropout
can take place at every level of education, dropout in online distance education has attracted more attention because of the different educational structure that it provides.

The dropout rate in open and distance education is an important indicator in revealing the problems of the education system (Graeff-Martins et al., 2006; Willging & Johnson, 2009). However, many countries are increasing their efforts to prevent drop-out rates within their schools (Christenson & Thurlow, 2004). Because of the increase in the number of online programs, high dropout rates comprise a serious issue that needs to be solved to ensure the vitality of online learning among adults (Park & Choi, 2009).

Studies focusing on the reasons for adult dropout in online learning show that adult students’ decision to leave distance education are affected by many factors: academic locus of control (Lee, Choi & Kim, 2013), face-to-face interaction request (Willging & Johnson, 2009; Lee & Choi; 2011; Drouin, 2008), family responsibilities (Thistoll & Yates, 2016), family and workplace support (Park & Choi, 2009), academic failure (Holder, 2007; Choi & Park, 2018; Paechter, Maier & Macher, 2010), business life (Lee & Choi, 2011), time conflicts (Lim, 2016), monetary problems (Yukselturk & Inan, 2006), academic encouragement (Heyman, 2010), and lack of motivation (Thistoll & Yates, 2016).

In the literature, there are various studies about the reasons that students leave school in online distance education applications. Research that aims to examine the implications of leaving school in Turkey, however, is extremely limited. For this reason, there is a need for studies investigating the reasons for the dropout factors in distance education programs in Turkey. Yukselturk, Ozekes and Turel (2014) attempted to estimate the level of dropout in online programs through data mining. Their results demonstrated that self-efficacy of online technologies, readiness to learn online, and previous online experience were the most important factors in predicting school dropout. Bozkurt and Akbulut (2019) examined the cultural context and school dropout behaviors with a mixed-method approach that used the social network analysis and bi-directional comparisons (culture and dropout). Yukselturk and Inan (2006) examined the factors affecting the dropout of students in an online certificate program. The results of this study showed that the most important factors affecting school dropout included not having enough time to study, personal problems, and economic program. This study found that students from higher cultural contexts had a greater tendency to leave school than students from lower cultural contexts. Because open and distance education is provided through online platforms, the responsibility of learning falls largely upon the learner; thus, the cost is high at the beginning of these differences. These differences make it difficult for open and distance education students to adapt themselves to the open and distance education system. Therefore, this increases the likelihood that they will not complete their education.

This study presents important factors related to school dropout in open and distance education in Turkey such as cultural, political, and socio-economic differences. By determining the factors that cause the distance education students to drop out, schools can considerably contribute to the development of education policies concerning online education. As a result, they can then create preventive programs.

This study aims to reveal why open education faculty and distance education students drop out of their programmes. In line with this general purpose, it seeks answers to the following questions:

- What are the school and programme-related factors causing open education and distance education students to drop out?
- What are the social environment-related factors causing open education and distance education students to drop out?
- What are the factors related to personality-traits that cause open education and distance education students to drop out?
Method

Research Model

This study employs the case study model, a qualitative research method. A case study is an approach in which a researcher analyzes one or more restricted cases in depth and describes the cases and the themes dependent on the cases (Creswell, 2007). Because of this, case study was preferred for this research, which analyzes the reasons for dropping out.

Study Group

The study group was composed of 25 students who dropped out of open education faculty and distance education programmes of Ataturk University. The study group was set up by using a stratified random sampling method. Each programme (department) constituted a stratum. For the approximately 1,000 students who had dropped out of a programme, we first prepared a list of names and contact information as well as the departments from which the students had dropped out. Using this list, a greater number of students from the stratum (programme) having many students and smaller number of students from the stratum (programme) having few students was included in the sample in proportion with the number of students dropping out of the programmes.

Participants included in the study group were distributed according to age, gender, marital status, and the length of time they remained in the programmes (Table 1).

<table>
<thead>
<tr>
<th>Age</th>
<th>Number of participants</th>
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<td>20-30</td>
<td>15</td>
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<tr>
<td>30-40</td>
<td>5</td>
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<tr>
<td>40-50</td>
<td>5</td>
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<table>
<thead>
<tr>
<th>Gender</th>
<th>Number of participants</th>
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<tr>
<td>Male</td>
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<tr>
<td>Female</td>
<td>12</td>
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<tr>
<th>Marital status</th>
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<tr>
<td>Single</td>
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<tr>
<th>Length of time they stayed in the programme</th>
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<tr>
<td>2- 4 months</td>
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<td>4-6 months</td>
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<td>6-8 months</td>
<td>7</td>
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<tr>
<td>8-10 months</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
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</tbody>
</table>
As is evident from Table 1, 60% of the participants are in the 20-30 age range, 52% are male, 48% are female, and 60% are single. It also apparent that a greater number of participants remained in the programmes between 6 and 8 months than for other time frames.

The distribution of the study group according to the programmes is shown in Table 2.

### Table 2: Distribution of the Study Group according to the Programmes

<table>
<thead>
<tr>
<th>Units</th>
<th>Type of Programmes</th>
<th>Number of participants</th>
<th>Participants</th>
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<td>P1, P2, P3, P5, P6, P7</td>
</tr>
<tr>
<td>Open Education Faculty</td>
<td>Undergraduate programme</td>
<td>5</td>
<td>P11, P16, P17, P21, P23</td>
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<td>Centre for Distance Education</td>
<td>Undergraduate completion</td>
<td>4</td>
<td>P18, P19, P20, P22</td>
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<tr>
<td>Open Education Faculty</td>
<td>Associate degree</td>
<td>4</td>
<td>P4, P8, P15, P24</td>
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<td>Associate degree</td>
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<td>P13, P25</td>
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<td>Undergraduate programme</td>
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<td>P12, P14</td>
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<td>P10</td>
</tr>
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<td>Open Education Faculty</td>
<td>Undergraduate programme</td>
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<td>P9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td><strong>25</strong></td>
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Ataturk University started to recruit students through distance education in 2009 with the Distance Nursing Undergraduate Completion Program. Afterwards, they accepted students to the undergraduate completion (Theology, Midwifery, Perfusion) and non-thesis master’s degree programs in different fields (Business Administration, Occupational Health and Safety, Education Management, Marketing). The faculty members conduct their courses in virtual classrooms and share reading texts and video course records with the students. Course content in the Centre for Distance Education is broadcast by a learning management system for 14 weeks. Courses are taught live online by relevant instructors throughout the semester. In addition, exams are conducted over the Internet. Finally, graduates of distance education programs are entitled to receive the diploma of the faculties with which they are affiliated.

Ataturk University Open Education Faculty was established in 2010. The programs within the Open Education Faculty consist of associate, undergraduate, and undergraduate completion levels. The Associate degree programs include: Open Education Faculty; Emergency and Disaster Management, Justice, Banking and Insurance, Information Management, Computer Programming, Office Management and Executive Assistance, Call Center Services, Child Development, Foreign Trade, Real Estate and Real Estate Management, Photography and Cameraman, Public Relations and Publicity, Theology, Occupational Health and Safety, Business Management, Laboratory and Veterinary Health, Logistics, Private Security and Protection, Radio and Television Programming, Advertising, Health Institutions Management, Civil Air Transportation Management, Social Services, Medical Documentation and Secretarial, Tourism and Hotel Management, Tourism and Travel Services, New Media and Journalism, and Local Governments. The undergraduate programs include: Public Relations and Publicity, Business, Public Administration, Advertising, Health Management, Social Work, and Sociology. The undergraduate completion programs include: Emergency and Disaster Management, Occupational Health and Safety, Health Management, and Social Work. Course content for courses in Open Education Faculty is broadcast by a learning management system for
14 weeks each semester in the form of units. Lesson videos are integrated into the course content and presented to students. Students who graduate from a program conducted within the Open Education Faculty are entitled to receive the Open Education Faculty diploma.

Although the distance education center and Open Education Faculty are similar in terms of their operational structure, they have some administrative differences. The distance education center conducts each program jointly with the faculties to which it is affiliated. Therefore, a person who has graduated from any distance education program is entitled to receive a diploma from the faculty (e.g., nursing undergraduate completion program student). However, the Open Education Faculty has an autonomous structure. By purchasing services from faculty members of different faculties, they form the content of the courses within their own structure. Therefore, a person who has graduated from an open education program receives a diploma from the Open Education Faculty.

The Tool and Process of Data Collection

The data were collected on the basis of interviews, a qualitative research method. Specifically, we employed a semi-structured interview form. Table 3 provides the interview questions used in this study. In preparing the interview questions, we considered issues such as relevance to the purpose of the study, suitability of the questions for participants, and intelligibility of the questions. To construct the form, we examined theories, models, and studies about dropping out. Additionally, we consulted six experts from relevant domains. The first draft of the interview form was used to complete a pilot application on the phone with five participants. The final interview form was composed based upon expert opinion.

Table 3: Interview Questions

<table>
<thead>
<tr>
<th>Why did you leave your department?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>What do you think are the other reasons that led you to leave your department?</strong></td>
</tr>
<tr>
<td>2. <strong>Was there any situation about the school and the program that caused you to drop out? Can you share with us?</strong></td>
</tr>
<tr>
<td>3. <strong>Was there any situation about the social environment that caused you to drop out of school? Can you share with us?</strong></td>
</tr>
<tr>
<td>4. <strong>Was there anything different about yourself that made you drop out of school? Can you share with us?</strong></td>
</tr>
<tr>
<td>5. <strong>Is there any other reason you'd like to share with us?</strong></td>
</tr>
</tbody>
</table>

Data Analysis

The data were analyzed through content analysis. In line with the purpose of the study, the data were divided into conceptually meaningful codes, and thus a list of codes was prepared. The codes were analyzed and brought together, and then the codes with common features were categorized and placed into the theme groups determined in the literature. In qualitative studies, it is important to describe the criteria of persuasiveness, transmissibility, consistency, and approvability as well as precautions for these criteria (Cresswell, 2007). Therefore, two experts examined the analysis of the data and their opinions were included within this study. Additionally, participants volunteered to be included within this research. To achieve transmissibility, we included a justification of the method used in the study as well as an explanation of the properties of the study group, the way the study group was selected, and the processes of collecting and analyzing the data. For consistency, all the interviews were recorded and the experts were asked to check them. For approvability, all
the raw data and codes were stored; in this way, they can be examined when it is necessary. Two researchers jointly analyzed the study data. The results of the analysis were checked by two field experts outside the authors.

**Findings**

In accordance with the purpose of the study, we distinguished between various factors that have an effect on dropout rates: school and programme-related factors, social environment-related factors, and personal traits-related factors. The frequencies and percentages for the themes are shown in Table 4.

<table>
<thead>
<tr>
<th>Factors</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>School and Programme-related</td>
<td>86</td>
<td>66.15</td>
</tr>
<tr>
<td>Social environment-related</td>
<td>29</td>
<td>22.30</td>
</tr>
<tr>
<td>Personal traits-related</td>
<td>15</td>
<td>11.53</td>
</tr>
<tr>
<td>Total</td>
<td>130</td>
<td>100</td>
</tr>
</tbody>
</table>

As shown in Table 4, it is clear that the factors causing students to drop out of school are primarily school and programme-related factors (66.14%). This is followed by social-environment-related factors (22.30%), and finally personal traits-related factors (11.53%). The reason for having a larger number of frequencies (130) than the number of participants was the fact that more than one reason was stated by each participant for dropping out.

**School and Programme-related Factors**

The school and programme-related reasons for dropping out of school are divided into three groups of factors. These are related to type of education, course content, and test environment and conditions. The frequencies and percentages for school and programme-related factors for dropping out of school in open education and distance education are shown in Table 5.

<table>
<thead>
<tr>
<th>Factors</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factors stemming from the type of education</td>
<td>41</td>
<td>47.67</td>
</tr>
<tr>
<td>Factors stemming from course content</td>
<td>23</td>
<td>26.74</td>
</tr>
<tr>
<td>Factors stemming from test environment and conditions</td>
<td>22</td>
<td>25.58</td>
</tr>
<tr>
<td>Total</td>
<td>86</td>
<td>100</td>
</tr>
</tbody>
</table>

According to Table 5, the highest rate of factors relate to the type of education (47.67%), whereas the lowest rate of factors are those stemming from test environment and conditions (25.58%). The factors and sub-factors stemming from school and programme-related factors cause students to drop out of open education and distance education.
Factors Stemming from the Type of Education

The highest rate of the school and programme-related factors stems from the type and structure of education (47.67%). The factors emerging in this category are tuition fees, face-to-face lesson support, institutional support, level of interaction, and dependency on technical infrastructure. Table 6 shows the frequencies and percentages for these factors.

<table>
<thead>
<tr>
<th>Factors</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition fees</td>
<td>15</td>
<td>36.58</td>
</tr>
<tr>
<td>Face-to-face lesson support</td>
<td>12</td>
<td>29.26</td>
</tr>
<tr>
<td>Expectation for institutional support</td>
<td>8</td>
<td>19.51</td>
</tr>
<tr>
<td>Levels of interaction</td>
<td>3</td>
<td>7.31</td>
</tr>
<tr>
<td>Dependency on technical infrastructure</td>
<td>3</td>
<td>7.31</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>41</td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

As Table 6 makes clear, tuition fees account for the highest factor causing students to drop out of open education faculty and of distance education (36.58%). The lowest rates are in levels of interaction and in dependency on technical infrastructure (7.31%). Face-to-face lesson support in distance education (29.26%) and providing institutional support in distance education (19.51%) are also factors that have high rates.

**Tuition fees.** It was found that the perception about tuition fees as the cause of dropping out derives from worrying about failure, not being able to graduate within the normal duration of education, and having to repeat a semester or year. In addition to this, there is a belief that the programme will not contribute to the student in the short term; therefore, students may feel that online education is not worth what it costs. In particular, there is a belief that distance education should be less expensive. It was found that this belief stemmed from the thought that factors that conventionally contribute to the cost of education were not present in online courses. For example, there were no physical textbooks or face-to-face lessons. A participant expressed their concerns in this manner:

“I paid 1,250 Turkish Liras at a time; it was difficult for me to pay it. I thought about how I would afford it, so I had to drop out.” (P11)

**Face-to-face lesson support.** It was found that the need for face-to-face teaching by the instructor of a course in a real classroom environment was influential in decisions to drop out of school. Additionally, some of the participants stated that they did not see themselves as a part of education because face-to-face teaching was not used. One participant viewed it in this way:

“I wouldn’t think of drop out if the lessons were held in a classroom setting.” (P19)

**Expectations for institutional support.** Students who take classes in distance education for the first time and cannot overcome the problem of adjustment expect academic and technical support.
Failure to meet these expectations for support is another cause for dropping out. One participant described it in this way:

“We did not know anything. We wanted to ask something. It was difficult to reach the university on the phone. I had to quit because I did not have answers to my questions rapidly.” (P24)

Levels of interaction. Having interaction with teachers and other students is perceived as being included in a social environment in distance education. However, inadequate levels of interaction plays a role in students’ decision to drop out of school. A participant explained:

“Eye contact, a crowded classroom is very important to me. Such a thing was not available. As soon as I learnt that the lessons would be on the internet, on the computer, I said to the teacher I would give up. I wanted to attend formal education and to be a student again. I did not want to study at home. For this reason, I quitted.” (P12)

Dependency on technical infrastructure. Distance education requires a certain level of technical equipment and must meet certain conditions. Failure to meet the need for the technical infrastructure required for both participation in live online lessons and the ability to view the lessons also influenced decisions to drop out. One participant spoke to the significance of these aspects:

“There is no internet when electricity is a failure. We can’t enter online classes. In my opinion, lessons are recorded on the computer but it is not a good thing to study on the internet.” (P24)

Thus, it is clear that teaching lessons on the Internet, perceptions about the price of education, and the need for face-to-face lesson support were remarkable factors on students’ decision to drop out of school. Additionally, expectations for institutional support, the importance of the levels of interaction in online education, and the necessity of technical infrastructure were also identified as reasons for dropping out of open education and distance education programs. It is important to note that being accustomed to traditional, face-to-face instruction makes it difficult to adapt to the structure of online education.

Factors Stemming from Course Content

Factors related to course content were also identified as causes for school dropout. Emerging factors in this category include: the need for printed books, access to supplementary resources, the perception that course content was intensive, and presentation periods. The frequencies and percentages for the factors are shown in Table 7.

<table>
<thead>
<tr>
<th>Factors</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need for printed books</td>
<td>14</td>
<td>60.86</td>
</tr>
<tr>
<td>Need for supplementary materials</td>
<td>4</td>
<td>17.39</td>
</tr>
<tr>
<td>Belief that course content is intensive</td>
<td>3</td>
<td>13.04</td>
</tr>
<tr>
<td>Presentation periods of course content</td>
<td>2</td>
<td>8.69</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>23</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 7: Course Content-related Factors
Accordingly, it was found that the need for a printed book containing the course content had the highest rate (60.86%). This was followed by the desire for supporting the course content with supplementary materials (17.39%), the belief that course content was intensive (13.04%), and the presentation periods of course content (8.69%). The factors related to course content are described below in the order of percentages with support from participants’ views.

**Need for Printed Course books.** The analyses demonstrated that the need for printed course books was a reason for school dropouts. The participants said that they had studied the subjects in printed course books in their earlier school life and that this made it more difficult to read course content on the computer. They stated that they needed a course book due to its portability and accessibility.

The participants associated their need for a printed book with their previous study habits. They said that it would be more efficient and more motivating for them to study with a printed book by using meta-cognitive study skills (especially note-taking, underlining, etc.) and that they obtained the printouts for course content for this reason. They also said that this would require additional effort and cost. A participant expressed the following view:

“It is essential that we have a book, because we are used to having a book. We want to underline sentences while reading, we want to take notes and to highlight the important parts. We remember better in this way. I had difficulty and I could not continue.” (P17)

**Need for Supplementary Materials.** The need for supporting course content with supplementary materials was found to be a cause for school dropouts. Accordingly, two main reasons influenced the expectations for supplementary materials. Because of their previous study habits, a printed book would meet psychological needs. Additionally, students wanted to have a resource that was practical and concise, thus enabling them to study in a shorter time and achieve greater success on exams. Yet, it was also apparent that the students believed that course materials should include topics from different perspectives in addition to being exam-oriented. The participants pointed out that they needed additional resources to facilitate the process of studying and that lecture notes became a great burden to them in the absence of supplementary materials.

**Belief that course content is intensive.** When studying a lesson, it is necessary to have course content that facilitates comprehension and contains concise knowledge. This need stems from the desire to better understand a course, to more effectively prepare for an exam, to preserve the integrity of a subject, and to achieve greater success on an exam. However, the perception that course content is intensive in terms of quality and quantity is also influential in decisions to leave school. A participant described it in this way:

“Subjects should have been brief in distance education. We should have understood easily. We had 600 page lecture notes. It was difficult.” (P8).

**Presentation Periods of Course Content.** The analyses showed that broadcasting course content weekly made it difficult to set up connections between subjects and that it negatively affected the process of studying. The thought of failure to use study time effectively and efficiently also influenced decisions to drop out of school. A participant explained it as follows:

“We should have the whole book instead of having weekly booklets. It would be more advantageous to study a book from the beginning to the end instead of studying separately every week.” (P2).
Providing printed material of course content, supporting students with supplementary materials, achieving a certain quality of course content, and sharing content in an accessible manner all had an effect on open education and distance education students' decisions to drop out.

Factors Stemming from Test Environment and Conditions

The analyses showed that test environments and conditions could also be influential in students’ decision to drop out of open education and distance education. In particular, students’ perceptions about online tests and associated technical problems were influential in their decision to give up education. Reaching the test centre in centrally administered examinations and perceptions that test questions were difficult also emerged as causes for school dropouts. Frequencies and percentages for factors stemming from test environment and conditions are shown in Table 8.

<table>
<thead>
<tr>
<th>Factors</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical problems</td>
<td>8</td>
<td>36.36</td>
</tr>
<tr>
<td>Perceptions about the test administered on the internet</td>
<td>6</td>
<td>27.27</td>
</tr>
<tr>
<td>Reaching the test centres</td>
<td>4</td>
<td>18.18</td>
</tr>
<tr>
<td>Perceptions that test questions are difficult</td>
<td>4</td>
<td>18.18</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>22</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

According to Table 8, technical problems stemming from test environment and conditions accounted for the highest influence (36.36%) in students’ decisions to drop out of open education and distance education. This factor was followed by perceptions about the test administered on the Internet in open education and in distance education (27.27%), reaching the test centres (18.18%), and perceptions about the test questions (18.18%).

Technical Problems. Technical problems encountered in tests administered on the Internet can occasionally cause stress and tension. This was of particular concern for students who took an exam on the Internet for the first time and worried about failure. These were both influential factors in their decisions to drop out of school. According to one participant:

“I had difficulty taking exams online. We could not open the web site during the day. I did not want to deal with. That’s why I dropped out.” (P20)

Perceptions about the test administered on the Internet. The analyses showed that the level of safety in online examinations should be more prominent. Participants stressed that the examination was not fair and that the scores they received were not an indicator of success. Thus, they stated that these factors were influential in their decisions to drop out. One participant described it in the following manner:

“I studied hard for the exams and I passed, but some students cheated in the exams. This is unfair which disturbed me. So I dropped out.” (P21)

Remoteness to the test center. Students living in cities other than exam centers travel to the cities where the final and make-up exams are administered. In addition to the stress and anxiety
associated with taking exams, the process of traveling to exam centers influenced students’ decisions to drop out. One participant explained the effects of this factor:

“Test center was not available in the place where I lived. I had nobody to look after my child. I had to drop out because it was difficult for me to go.” (P24)

**Perceptions that test questions are difficult.** Students emphasized that the test questions were irrelevant to course content, that the questions required knowledge, and that they contained long and difficult texts. The analyses demonstrated that taking exams for more than one course at a time resulted in ineffective use of time, having difficulty in understanding and answering questions, increased worry about failure, and loss of self-confidence. A participant viewed it as the following:

“The lessons were based on memorization and questions were asked in detail. That’s why I dropped out.” (P11)

Technical problems encountered in addition to perceptions about the tests may be influential in students’ decisions to drop out of school. Moreover, students felt that taking exams in another city forced them to sacrifice responsibilities at work and at home. Additionally, the perception of difficult test questions was also influential.

**Social Environment-related Factors**

According to the data, 22.3% of the factors causing school dropout in open education and in distance education were social environment-related factors. We analyzed social environment-related factors under two main categories: environmental circumstances and conditions and occupational and household responsibilities. The frequencies and percentages for the factors are shown in Table 9.

<table>
<thead>
<tr>
<th>Factors</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental circumstances and conditions</td>
<td>19</td>
<td>65.51</td>
</tr>
<tr>
<td>Individual responsibilities</td>
<td>10</td>
<td>34.48</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>29</td>
<td>100</td>
</tr>
</tbody>
</table>

Environmental circumstances and conditions accounted for a 65.51% dropout rate while the rate of those who dropped out of school because they did not think they could cope with increasing environmental responsibilities was 34.48%. Below, we consider participants’ view of the factors and sub-factors related to the social environment that influence dropout rates in open education and in distance education.

**Factors Stemming from Environmental Circumstances and Conditions**

Factors stemming from environmental circumstances and conditions emerge as causes for school dropout rates in open education and distance education. Technical inadequacies and the effects of supportive social environments are considered important in distance education; thus, the absence of those circumstances and conditions can lead to decisions to dropping out of school. The frequencies and percentages for the factors were calculated from frequencies (19) and percentages
(65.51%) of factors stemming from environmental circumstances and conditions. These factors are shown in Table 10.

<table>
<thead>
<tr>
<th>Factors</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical inadequacies</td>
<td>7</td>
<td>36.84</td>
</tr>
<tr>
<td>Supportive environments</td>
<td>7</td>
<td>36.84</td>
</tr>
<tr>
<td>Need for financial support</td>
<td>5</td>
<td>26.31</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>29</td>
<td>100</td>
</tr>
</tbody>
</table>

According to Table 10, 36.84% of dropouts decided to leave school due to inconvenient technical conditions whereas 36.84% decided to leave because their expectations for physical and psychological support had not been met. Additionally, 26.31% dropped out of open education and distance education since they did not have financial support. Below, we describe dropout factors stemming from environmental circumstances and conditions and include support from participants’ views.

**Technical inadequacies.** The analyses demonstrated that the participants had the perception that regular Internet access should be available in order to follow lessons taught on the Internet. In particular, students in rural areas with no computer and limited access to the Internet had to move to a place where they could reach the content broadcast and the activities on the Internet. Therefore, these difficulties were also influential in decisions to leave school. According to one participant:

“I needed the internet. Because of my job, I couldn’t find the internet everywhere. That’s why I dropped out.” (P5)

**Supportive environments.** It was clear that students expected support from their family and friends in terms of psychological relief and appropriate environments for studying, especially because self-study is important in open and distance education. The participants stated that they needed help from friends who attended the same department in the subjects that they did not understand. When they had difficulties and could not find such support, they dropped out. As one participant put it:

“I needed help to study my lessons. It was easy for other friends. They helped each other. I am a nurse in a school. I have nobody in my immediate environment since I study alone in the school. When I had difficulty I phoned and said that I would quit my education.” (P18)

**Need for financial support.** Lack of financial options can also cause students to drop out. If students do not work and if their education costs are met by a relative, they might decide to drop out in order to save money. Some of the participants viewed this situation in the following manner:

“My son was doing a course and my daughter was a student at the same time. I had difficulty in financing the costs. That was one of the reasons.” (P18)

“I did not have a job. My family financed my costs in the first semester. They would borrow in the second semester. I had to quit because they would not be able to pay back the loan.” (P21)
Factors Stemming from Individual Responsibilities

Work conditions and household responsibilities can cause dropouts in open education and distance education. This factor emerged because of a failure in time management. The frequencies and percentages associated with individual responsibilities are shown in Table 11.

<table>
<thead>
<tr>
<th>Factors</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working conditions</td>
<td>5</td>
<td>50.00</td>
</tr>
<tr>
<td>Household responsibilities</td>
<td>5</td>
<td>50.00</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>100</td>
</tr>
</tbody>
</table>

According to Table 11, in relation to individual responsibilities, responsibilities related to working conditions and household responsibilities are influential in students’ dropout decisions in open education and distance education. These factors are described below and supported by participants’ views.

**Working conditions.** Factors stemming from working conditions were found to be influential in students’ decisions to leave school. Stress at work, harsh working conditions, physical and psychological fatigue, and worries about not being able to meet course requirements due to excessive responsibilities are influential in school dropout decisions. A participant explained it in this way:

“I had heavy burden in my job due to my position. Sometimes, I did not go home for a week. I did not have time to study. Therefore, I dropped out.” (P5)

**Household responsibilities.** They were also found to be influential in school dropout decisions. Some of the participants emphasized that they had too many responsibilities in their family. They said that they had difficulty in meeting the requirements for education along with their household responsibilities. They also said that they did not have balance between their responsibilities and they decided to drop out for this reason. In particular, married women with children stated that they did not have opportunities or time to study while they were looking after their children and fulfilling their responsibilities. The participants said that their responsibilities outside school (housekeeping, looking after children, etc.) and extreme tiredness resulted in a lack of desire to study. A participant expressed the following view:

“The most important reason was not being able to study. I am a married woman. I have two children. For this reason I did not have opportunity to study regularly. I decided to quit.” (P11).

Worries caused by technical inadequacies which are not thought to be resolved in a short time are influential in school dropout decisions in open education and distance education. Additionally, students who could not study on their own in online education expected psychological and academic support from their environment. The analyses revealed that individuals who relied upon others financially also ended their education.
Personal Trait-related Factors

Some of the factors causing students to drop out of school in open education and in distance education can stem from students’ personal traits. Accordingly, the following factors were identified as significant factors that relate to personal traits: success at a course, unfamiliarity with online lessons, career expectations, and computer skills. The frequencies and percentages of personal trait-related factors are shown in Table 12.

Table 12: Personal Trait-related Factors

<table>
<thead>
<tr>
<th>Factors</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success at a course</td>
<td>5</td>
<td>33.33</td>
</tr>
<tr>
<td>Unfamiliarity with online education</td>
<td>4</td>
<td>26.66</td>
</tr>
<tr>
<td>Career expectations</td>
<td>3</td>
<td>20.00</td>
</tr>
<tr>
<td>Computer skills</td>
<td>3</td>
<td>20.00</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>100</td>
</tr>
</tbody>
</table>

As is clear from Table 11, the leading factors causing school dropouts in open education and in distance education are success at a course (33.33%) and unfamiliarity with online education (26.66%). These are followed by low career expectations and inadequate computer skills (20%).

Factors stemming from individuals’ personal traits causing school dropouts are described below and supported with participants’ views as well as frequencies and percentages

Success at a course. Success at a course is an important factor in influencing continuity of education. The analyses demonstrated that low success at courses, failing a course, and repeating a semester caused loss of self-confidence and motivation. These factors even caused perceptions that failure could not be compensated. Such experiences are also influential in students’ decisions to drop out of distance education. According to one participant’s view:

“I had a very low score on the test. After that, I was depressed. I never wanted to study anymore. That’s why I dropped out.” (P9)

Unfamiliarity with online education. The analyses performed in this study demonstrated that the prevalence of traditional educational methods caused negative perceptions about education through the Internet. It became apparent that adaptation problems emerged particularly within individuals who were receiving an online education for the first time and did not have adequate knowledge and background about the process. It was found that this situation resulted in stress and failure, thus affecting decisions to drop out. As one participant explained:

“I couldn’t feel that I was a students because I have not had online courses before. People are always asking questions such as ‘what will I do?’ or ‘how will it happen?’. They don’t know what to do since they experience such thing for the first time.” (P16)

Career expectations. The analyses conducted indicated that many of the problems encountered in distance education caused inconveniences for individuals that were influential in decisions to drop out of school. A participant described this in the following manner:

“I didn’t need to attend classes because I have a profession. That’s why I dropped out.” (P3)
Computer skills. It was evident that computer skills and levels of literacy were important in online education. The loss of self-confidence related to a lack of such skills was influential in school dropout decisions. A participant explained the effect of this particular factor:

"I even didn’t know how to use a computer fully. I had a tablet computer for the first time. I had difficulty. There were also other things but this was the main reason for me." (P21)

The in-depth analyses performed showed that students’ low career expectations and academic failure in the process of education resulted in both loss of motivation and tension. Students who had taken courses in distance education believed that the academic failure they experienced would be continuous; therefore, they lost their self-confidence. Additionally, having low levels of computer skills was also influential in students’ decisions to drop out. The frequencies and percentages of factors causing students’ to drop out of school in open education and in distance education are shown in Table 13.

Table 13: Reasons for Dropping out of School in Open and Distance Education

<table>
<thead>
<tr>
<th>Factors</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition fees</td>
<td>15</td>
<td>11.54</td>
</tr>
<tr>
<td>Face-to-face lesson support</td>
<td>12</td>
<td>9.23</td>
</tr>
<tr>
<td>Expectations for institutional support</td>
<td>8</td>
<td>6.15</td>
</tr>
<tr>
<td>Levels of interaction</td>
<td>3</td>
<td>2.31</td>
</tr>
<tr>
<td>Dependency on technical infrastructure</td>
<td>3</td>
<td>2.31</td>
</tr>
<tr>
<td>Need for printed course books</td>
<td>14</td>
<td>10.77</td>
</tr>
<tr>
<td>Need for supplementary materials</td>
<td>4</td>
<td>3.08</td>
</tr>
<tr>
<td>Belief that course content is intensive</td>
<td>3</td>
<td>2.31</td>
</tr>
<tr>
<td>Presentation periods of course content</td>
<td>2</td>
<td>1.54</td>
</tr>
<tr>
<td>Technical problems</td>
<td>8</td>
<td>6.15</td>
</tr>
<tr>
<td>Perceptions about the test administered on the Internet</td>
<td>6</td>
<td>4.62</td>
</tr>
<tr>
<td>Reaching the test centers</td>
<td>4</td>
<td>3.08</td>
</tr>
<tr>
<td>Perceptions that test questions are difficult</td>
<td>4</td>
<td>3.08</td>
</tr>
<tr>
<td>Technical inadequacies</td>
<td>7</td>
<td>5.38</td>
</tr>
<tr>
<td>Supportive environments</td>
<td>7</td>
<td>5.38</td>
</tr>
<tr>
<td>Need for financial support</td>
<td>5</td>
<td>3.85</td>
</tr>
<tr>
<td>Working conditions</td>
<td>5</td>
<td>3.85</td>
</tr>
<tr>
<td>Household responsibilities</td>
<td>5</td>
<td>3.85</td>
</tr>
<tr>
<td>Success at a course</td>
<td>5</td>
<td>3.85</td>
</tr>
<tr>
<td>Unfamiliarity with online education</td>
<td>4</td>
<td>3.08</td>
</tr>
<tr>
<td>Career expectations</td>
<td>3</td>
<td>2.31</td>
</tr>
<tr>
<td>Computer skills</td>
<td>3</td>
<td>2.31</td>
</tr>
<tr>
<td>Total</td>
<td>130</td>
<td>100</td>
</tr>
</tbody>
</table>
Accordingly, factors stemming from school and programme to personal traits and the environment all have an influence on school dropout decisions.

**Discussion and Conclusions**

This study has attempted to reveal factors stemming from school and programmes, ranging from the environment to students' personal traits, that influenced students' decisions to drop out of school in open education and distance education. Yet, the conclusions obtained in this study and in other studies in the literature have shown that no single factor in isolation is sufficient for understanding school dropout reasons. Thus, the effects of more than one factor on dropout decisions in distance education could be analyzed in different studies. This study had certain limitations; the group consisted of 25 participants and data collection was restricted to one university. Prospective studies could work with a larger sample. The findings for the factors that influenced students' decisions to drop out of open education and distance education are shown in Figure 1.

![Figure 1: Factors influential in open education and distance education students' decisions to drop out of school.](image)

According to the results of this study, there is a concern that advanced payment of the program fees will be more difficult for the personal budget and that the payments will continue in the case of extending the school. The existence of payment anxiety in students shows that students believe that they cannot complete their education in distance education. However, it is stated that there is an imbalance between the perceived quality of education and wages in distance education; thus, this indicates a low level of readiness for distance education.

There are perceptions and expectations in distance education that lessons will be supported by face-to-face teaching in a real classroom environment. In particular, the expectation of educator-student interaction is prominent. This can be explained with the fact that distance education students wish to have the feelings of being a student and being committed to school. Drouin (2008) also stresses that students' insufficient interactions with teachers and with other students can cause
students to feel isolated. This causes them to move away from the lesson-based environment and to drop out of school. It is evident that expectations for systematic institutional support are important because the institution and students are physically separated.

Printed course materials are needed in distance education. The need stems from easy access and portability while studying and from students’ desire to sustain their study habits (such as note-taking, underlining and other habits). This situation is associated with students’ wish to learn more easily in a shorter time. Thistoll and Yates (2016), on the other hand, analyzed the effects of course content broadcast in distance education, teachers and teaching materials, and interaction design on satisfaction. Ultimately, they revealed the positive effects of the teaching design model on motivation.

This study also obtained significant findings on students’ reasons for dropping out of open education and distance education due to environmental factors. Another important result obtained was that students need emotional and financial support from their families, friends, employers, and colleagues. They also need a convenient study environment. These findings were similar to the ones obtained in other studies (Castles, 2004; Holder, 2007; Ivankova & Stick, 2007; Morris Finnegan, & Wu, 2005; Osborn, 2001; Park & Choi, 2009; Thistoll & Yates, 2016). This situation results from the direct effect of distance education on self-study by providing education independent from time and place. Park and Choi (2009) stress that several students decide to drop out because the social environment cannot provide sufficient support. Other factors influencing students’ decisions to drop out include: students’ or their families’ low levels of income (Hupfeld, 2010), lacking family support for students’ education (Beekhoven & Dekkers, 2005), and students’ obligations to take on adult roles, such as a parent or employee (Hupfeld, 2010).

Household responsibilities comprise another environmental factor that is influential in school dropout decisions. Students with intensive labor environments and with work responsibilities have the tendency to quit their education since they cannot meet the course requirements. In particular, family responsibilities (Thistoll & Yates, 2016), family and workplace support (Park & Choi, 2009), work experience (Lee & Choi, 2011), time conflicts (Lim, 2016), and monetary problems (Yukselturk & Inan, 2006) all have an effect on decisions about leaving school. This situation can be associated with an increase in students’ levels of stress and fatigue because they have to work; this can further contribute to a decline in their motivation and, as a result, cause them to be distracted from their education. Castles (2004) and Müller (2008) also emphasize that the ability to balance multiple responsibilities is an important factor in school dropout decisions.

When students who are registered in distance education courses for the first time fail one or several courses, they believe that the failure will continue in the future; thus, they experience a lack of self-confidence. Cheung and Kan (2002), Dupin-Bryant (2004), and Osborn (2001) also suggested that the number of previous successful experiences in distance education courses was an important factor in determining school dropout decisions. This situation can be explained with the fact that the students taking courses in distance education for the first time have difficulty in adapting to a new method of education. Levy (2007) also concludes that students with less experience have a greater tendency to drop out than those who have more experience. Individuals who have not previously taken a course in distance education have high levels of anxiety when they face a method of teaching that is unfamiliar to them. This might be associated with the fact that students are more inclined to participate in education that is conducted in traditional methods, especially when they have not yet adjusted to distance education. Students often drop out because of their beliefs that completing the programme will not benefit them and that their achievements will actually be lower than their expectation. Students with no academic or professional career expectations tend to drop out of school when they encounter situations that they perceive as having a negative effect on their lives.

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Recommendations

Distance education has high dropout rates, both in Turkey and across the world. As such, this form of education should be re-examined and strategies should be developed to reduce school dropout rates in distance education. Students who have academic adaptation problems in their educational life prior to university and who take courses in distance education for the first time could be monitored more closely. Those students could be offered orientation programmes, technical support, and seminars. Prior to students’ university entrance, databases about students’ academic skills, focus of control and motivation levels, personal traits, and current experiences could be formed. Interactive, interesting, and effective course content to facilitate individual study could be created. In order to raise the levels of interaction in distance education, those students could participate in various components such as chats, discussion boards, special messaging, or face-to-face contact. Students who need printed books could be given resources and support with an additional price at registration. Consultancy services could be offered to determine students’ environmental problems and to help them to solve those problems.

This study has several limitations. The sample of the study is limited to 25 people. With a larger sample size, future research can provide a broader picture of the factors that lead to dropout in online distance education. In addition, theses can be written on this subject. Each of the identified factors can be dealt with separately and solutions can be developed. Objective and direct measures are needed for further speculations.

References


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Opening Futures for Nigerian Education – Integrating Educational Technologies with Indigenous Knowledge and Practices

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Abstract

This paper highlights some key historical perspectives and antecedents of African Indigenous knowledge (AIK) and practices while identifying 'open' futures and opportunities for the application of digital technologies for educational opportunities that build on this cultural base. The role and negative impact of colonialism in the under-development of AIK is examined in this context together with the impact of post-colonial and contemporary corruption in further undermining the value of Indigenous knowledge systems. Two key concepts are identified as a counterpoint to this: the resilience of AIK and 'local wisdom' and the openness underpinning much of the ongoing digital revolution. This natural alignment can help guide the integration of Indigenous-based knowledge and practices and the deployment of open and distance learning in the re-birth of African Indigenous Knowledge Systems (AIKS). Openness is a pivotal concept here for it is integral to both the architecture of the Web and in its ongoing evolution. Given the identified opportunities associated with digital technology, and despite the challenges, it is argued that there is an unequivocal need for AIKS to explore the advantages of open education resources and practices in promoting this rebirth that is also consistent with modern science and technologies in Africa and beyond.

Keywords: AIK, indigenous technology, open distance education, open education resources, open educational practice, Nigeria

Introduction

There is growing awareness and appreciation that Indigenous knowledge systems and education possess a significant and enduring value that could assist the world in sustainable development (Adeyeye, 2019; Ugwu & Diovu, 2016; United Nations, 2015). Such knowledge systems extend beyond the more visible cultural contributions (such as music) already appropriated into diverse genres of world music. The richness of African Indigenous knowledge systems demands deeper consideration in this global narration and evolution towards a new developmental direction.

This paper represents a foundation for ongoing investigation into how open educational systems might be calibrated when informed by African Indigenous Knowledge (AIK) and practices and how AIK systems can use local utilitarian educational values in building homegrown technologies and solutions for Nigerian domestic needs and aspirations in a sustainable way that could guarantee a sustainable future and place the country on the verge of development and change resilience. The foregoing discussion is therefore first centered on historical perspectives with the aim of shedding light on any key questions that emerge. As such, it is part of a broader research agenda that aims to investigate how open distance learning can be leveraged to address higher educational access.
problems in the remote areas of Nigeria as part of world focus in addressing universal access to education for all. The study aims to contribute to the exposition of the values embedded in AIK systems and practices and how this might inform sustainable ways of utilising science and technology.

**Background – AIK and the Colonial Legacy**

African Indigenous knowledge and practices have deep historical roots. Every country within the African continent has distinctively rich and sound country-specific Indigenous practice systems and beliefs that often extend beyond national boundaries. For every community, local traditional knowledge, beliefs and protocols have persisted in the governance and education of their members, passed from one generation to another. These cultural and ecological diversities have been drawn upon by Africans for thousands of years to solve specific developmental and environmental problems (Mohamedbhai, 2013). Such statements are echoed globally, though often expressed in broader time spans when considering the depth and longevity of Indigenous cultures elsewhere (World Bank, 1991; Hill, Cullen-Unsworth, Talbot & McIntyre-Tamwoy, 2011; Terri Janke & Company, 2018).

Africa has been at the forefront of world civilization dating back to the Pharaonic days and the Egyptian civilization era. Many Africans have contributed greatly to global knowledge and world developmental projects. They have been involved in the origination of theories and various philosophical thoughts; these can be found in the works of Indigenous African scholars as presented within the table 1.

<table>
<thead>
<tr>
<th>African Scholars &amp; Luminaries</th>
<th>Works and Influences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imhotep</td>
<td>The African architect of cosmos and father of medicine and designer of the Egyptian pyramid</td>
</tr>
<tr>
<td>Ahmes</td>
<td>The mathematician and author of the first mathematical textbook</td>
</tr>
<tr>
<td>Frantz Fanon</td>
<td>A psychiatrist and philosopher and the author of the <em>Wretched of the Earth</em></td>
</tr>
<tr>
<td>Kwame Nkrumah</td>
<td>The renowned philosopher and articulator of <em>consciencism</em> philosophy and ideology</td>
</tr>
<tr>
<td>Leopold Sédar Senghor</td>
<td>A poet and one of the architects of <em>negritude</em> philosophy</td>
</tr>
<tr>
<td>Ali Mazrui</td>
<td>Professor of Humanities and intellectual giant widely celebrated across the globe</td>
</tr>
<tr>
<td>Obafemi Awolowo</td>
<td>The African nationalist and proprietor of <em>democratic socialism</em></td>
</tr>
<tr>
<td>Mwalimu Julius Kambarage Nyerere</td>
<td>The African socialist and promoter of <em>Ujamaa Philosophy</em></td>
</tr>
<tr>
<td>Wole Soyinka</td>
<td>Novelist and writer and winner of noble prize in literature,</td>
</tr>
</tbody>
</table>

Among many others are Aimé Césaire, John Mbiti, Chinua Achebe, Williams Abraham. These luminaries have their names registered in the field of arts, literature, humanities, pure science and social sciences (Adigbue, 2017; Dudley, 2002; Smith, 2009). From a broad historical perspective, civilization itself has beginnings with Africa and is expressed through the richness of its Indigenous knowledge systems and practices. "We have been engaged in drawing lines upon maps where no white man’s feet have ever trod" (Barth 1966, as cited in Adigbue, 2017, p. 77).
The decline of the rich social and cultural role of Indigenous knowledge of Africa started with the forceful and calculated extinction program of the colonial powers through the instrument of colonialism, most notably from Britain, Belgium, France, Germany and also the United States of America in the recent case of Liberia. This was achieved through forceful division of the continent along boundary lines into different colonies, and the amalgamation of culturally separated communities into single units, primitive exploitation of both human and natural resources, the stolen and instant destruction of African works, arts and artifacts. This systematic extinction was further aided by drivers of globalization and modernity (Adigbuo, 2017; Alinno & Udeze, 2018; Eyong, 2007; Sifuna, 2008).

The colonial agencies established Western institutions and used Christian missionaries to deliberately undermine the African social structures and to replace it with Western civilization (Sifuna, 2008; Adigbuo, 2017). This has grossly affected the proficiency and development of the African Indigenous knowledge systems. The African continent has also suffered more havoc in the hands of pseudo and acclaimed Pan-Africanist leaders of post-colonial and contemporary eras who have corruptly driven the continent into the state of economic and developmental capitulation. Otieno (2013) raises the question as to whether Europe continues to under-develop Africa or if Africa is under-developing itself? He cites Joshua Agbo in his book *How Africans under Developed Africa* as having criticized other authors like Walter Rodney and his likes who have solely viewed the argument of Africa under-development only from the blame side of history. He expostulated that “our future has been placed in our hands long ago…to continually blame Europe as the cause of African underdevelopment is like treating ringworm and leaving leprosy unattended.” This corroborated the popular statement of the Nigerian famous writer and activist Chinua Achebe that ‘The problem with Nigeria is Nigeria’ (Achebe, 1983).

**Background – Values in African Indigenous Diversity**

African Indigenous knowledge is as diversely rich as African cultural diversities and as exquisitely deep as the continent natural resources. Some of this richness can be found in the traditional use of African fables and folktales for the narration of epical stories and African histories and African proverbs are often used for the conveyance of ideological thoughts, truthful statements, wisdom and Indigenous ideas e.g., “When a king has good counselors, his reign is peaceful”. Moreover, a prominent example of early information and communications technology (ICT) are talking drums, which are used to convey coded messages and to make incitements (Gleick, 2011), while African songs are used to eulogize the ancestral heritage of Africa, to lament loss and ease work boredom. From a global perspective, the complexity and layering of rhythms in African music is also now well known. Spielvogel (in Adigbo, 2017, p. 77) highlights that African music was the basic ingredient upon which the American musical style was developed. This has been predicated upon the musical experiences of the Afro-American artists who are progenies of African slaves shipped to America for slavery.

From a perspective of ‘local wisdom’, an increasingly recognised construct that provides a counterpoint to ‘global competence’ (Telaumbanua, 2019) is the craft of Griots and Griotte, aimed at teaching and transferring societal moral values and cultural knowledge. The Griots are the ‘man that knows it all’ (full of knowledge and wisdom), and are employed by families and kings as teachers and advisers, while the Griotte is the female practitioner who sings at special occasions and helps in the preparation of the young girls toward marriage life (World Affairs Council of Houston, n.d).

However, there also exists a diversity of opinion as to the meaning of the terms used for AIK. According to Adigbuo (2017), ‘Africa’ as a concept and as an object of study connotes different meanings to different people. It follows then, that African Indigenous Knowledge (AIK) has
been adopted in various ways and cannot be pinned down to a specific definition. Perhaps less problematic for Makinde and Shorunke (2013), ‘Indigenous knowledge’ (IK), is also known as ‘traditional knowledge’ (TK) ‘traditional environmental knowledge’ (TEK) and ‘local knowledge’ (LK)” (p.3). In this paper, Indigenous knowledge highlights the accumulated knowledge that was born out of countless iteration by people of Indigenous affiliations demonstrating resilience in coping with change (Melchias, as cited in Eyong, 2007, p. 121).

Contemporary African Indigenous education involves the inculcation of traditional societal norms and values in the young generations through a systemic socialization process which involves the training of the mind, the body and the soul (Sifuna, 2008). It emphasizes moral values and societal responsibilities among indigenes, and, as such aligns with worldwide educational agendas associated with 21st-century skills (character and global citizenship) and social, emotional and ethical learning. In 1998, in a statement that gained traction, Mugabe defines Indigenous knowledge as knowledge upheld by people who “shared the same Indigenous particulars” (as cited in Chiwanza, Musingafi & Mupa, 2013, p. 54).

**Challenges for Indigenous Knowledge in Africa: The Nigeria Experience**

African Indigenous knowledge can be understood as the underpinning social capital and an asset the African continent has invested in its people through the struggle for emancipation and self-survival (Adigbuo, 2017). “Many of the barriers of Indigenous knowledge are from the older generation and now find it difficult to communicate their beliefs and practice to the scientifically educated younger generation; once the older generation passes away, the knowledge disappears with them” (Muhamedbhai, 2013). The impact of the continual depletion of the Indigenous form of education in the education curriculum and societal operations among Africans have made the so-called scientifically educated and contemporary African generations to lose touch with the rich values of AIK.

Another identified source of challenge for African Indigenous knowledge and practices is its continual shattering by foreign civilizations and influence through the mechanism of formal western education. Yet, there is a clear contribution that AIK can make to global agendas such as the **UN 2030 Agenda for Sustainable Development** (United Nations, 2015).

Indigenous knowledge has a broad knowledge of *how to live sustainably* [our emphasis]. However, formal education systems have disrupted the practical everyday life aspects of indigenous knowledge and replacing them with abstract knowledge and academic ways of learning. Today, there is a grave risk that much indigenous knowledge is being lost along with its valuable knowledge about ways of living sustainably (UNESCO, as cited in Ugwu & Diuvo, 2016, p. 23).

The argument was also corroborated by Sifuna (2008) that, “the failure to integrate Indigenous learning and Western education was partly a deliberate effort to eradicate African education” (p. 20). Eyong (2007) also highlighted colonialism as one of the challenges facing Indigenous knowledge systems (IKS) in Africa:

- IKS have suffered for decades from several strategies of disinformation embedded in western-centric, colonial and post-colonial education and western religion, science and technology. Today, these systems form a bulk of selective omission of non-European achievements, inventions and technologies in academic works. Often, data on IKS are distorted to confirm the hypothesis of non-Africanist scholars (Eyong, 2007, p. 131).

The greatest of these challenges, however, was the incursion of the Europeans in the contextual development of the African Indigenous knowledge and practices. A significant challenge here is that
AIK was developed and contextualized by non-Africans and outside the spheres and shores of Africa for Africans (Adigbuo, 2017).

The Nigerian political landscape was not spared of challenges, and arguably the country suffers greater punch of the ordeal being the most populous and most resourceful economy in the continent. The Nigerian government and Nigerian people play a vital role in the emancipation of the African continent from colonialism and that is not without its socio-political and economic consequences. Indigenous knowledge in Nigeria has dwindled just like any other country within the continent and has been predicated on the fact that the knowledge has not been properly codified, documented and well preserved. Of course, this is a universal challenge of Indigenous cultures worldwide that have typically preserved cultural knowledge and practices through non-literate oral and performative lineage. Several efforts and strides have however been made for the re-invention of the knowledge in the area of design fabrication, agriculture, food preparation, trado-medics, environmental conservation and biodiversity. The New Economic Partnership for African Development (NEPAD) (as captured in Makinde & Shorunke, 2013) recognized the fact that Africa has a rich knowledge base and technologies that have played a major role in “biodiversity conservation, sustainable use and prospecting”.

So then, how might these challenges be understood in terms of the application of educational technology in an era of increasing innovation with digital technology? To answer this, we now consider a key feature of contemporary educational technology: openness.

**Openness in the Evolution of Digital Infrastructure**

Both the evolution of the Internet and the World Wide Web can be characterized by the prominence of the connective power of networks on the one hand and the openness of the underlying digital infrastructure on the other. Thus, while not fully implemented because of innovation superseding standardization, the Open Systems Interconnection Reference Model (ISO, 1984) points to the underlying open architecture of the Internet. It is this openness that has been successfully exploited in the propagation of open source solutions, the invention of the web through an open hypertext protocol, and the emergence open access, open educational resources (OER) and practices in the educational sector worldwide (Mason, 2014; Friesen, 2009). It is no accident that UNESCO (2002) first championed OER as a transformative enabler for the developing world to participate in 'knowledge-building societies'. This openness of OER is not just an expression of 'no-cost access' to educational opportunity but an important underlying architecture that aligns with the resilience of AIKS.

**AIK Systems and the Appropriation of Indigenous Technology/Modern Science**

In many parts of the world today, AIK has been adjudged as a visible alternative for the promotion of rural communities’ development (Briggs, 2005). The greatest challenges facing African Indigenous knowledge is the inability of African society to transform the richness in African Indigenous knowledge into a scientific, more sophisticated and technologically advanced expression of knowledge that could help in domesticating its affairs for more economic viability and development.

In order to properly conceptualize ‘Indigenous Technology’ two merged concepts need to be separately conceptualized. The United Nations has for over thirty years devoted efforts in its quest to find a universally accepted definition for the concept of Indigenous people, knowledge and community. The United Nations on several occasions among its Indigenous organization working committees disagreed on what should be a common globally accepted definition for Indigenous people and came to the agreement that no formal definition is possible. In its article 8, the UN states: “Indigenous peoples...
have a collective and individual right to maintain and develop their distinct identities and characteristics, including the right to identify themselves as indigenous and to be recognized as such” (United Nations, 1994). However, more commonly cited is the UN ‘Special Rapporteur of the Sub-Commission on Prevention of Discrimination and Protection of Minorities’, Jose R. Martínez Cobo (1987):

Indigenous communities, peoples and nations are those which, having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing on those territories, or parts of them. They form at present non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions and legal system (Martínez Cobo, 1987).

According to Kim and Berry (as cited in Alinno & Udeze, 2018) Indigenous is being native according to history and scientific analysis. Pollock (as captured in Alinno & Udeze, 2018, p. 158) sees it as the description of people with original inhabitants of a geographical area. For the World Bank (1991), Indigenous peoples “as social groups with a social and cultural identity distinct from the dominant society that makes vulnerability to being disadvantaged by the development process”. Melchias in (Eyong, 2007, p. 121) further caption it as “culturally distinct ethnic groups with a different identity from the national society, draw existence from local resources and are politically non-dominant”. Similarly, though less problematic, technology is basically term signifying the application of knowledge in the creation of solutions to humans’ problems:

Systematic knowledge and action, usually of industrial processes but applicable to any recurrent activity. Technology is closely related to science and engineering. Science deals with humans understanding of the real world about them the inherent properties of space, matter, energy, and their interactions. Engineering is the application of objective knowledge to the creation of plans, designs and means for achieving desired objectives. Technology deals with the tools and techniques for carrying out the plans (McGraw-Hill, 1989)

Momah in (Hamilton-Ekeke & Dorgu, 2015, p. 37) thus describes Indigenous technology “as that which has evolved from the traditional and cultural milieu of a people”. Okafor, as captured in Alinno and Udeze (2018), explain it as arts and sciences that are locally developed in accordance with culture to meet the needs of people.

For the purposes of this paper, we suggest a synthesis where Indigenous knowledge and technology are understood as the inculcation of local wisdom in the educational preparation of individuals and community through a systemic socialization process—which involves the training of the mind, intellect, body and soul for the realization of cultural heritages and exploration of its key values through the dispensation of Indigenous cum modern science technologies in education processes.

Given the contemporary trends and tensions in world global economy and the un-abating competition in technology innovations, developing countries such as Nigeria needs to identify new and sustainable ways of engaging in the fields of science and technology to close the gap of development. The shift in civilization and technological trends coupled with the rising needs of locally defined initiatives has also called for the domestication of African economic operations and developmental plans through various innovations and Indigenous knowledge applications. Essien (as captured in Alinno & Udeze, 2018) argues that “the imperative of identifying Indigenous knowledge to technological progress is crucial for the sustenance and propagation of our country’s cultural heritage as a basis for technological advancement and economic development” (p. 158). However, the creation of indigenous technology is not without its challenges. Some of the challenges as
explained by Hoekman, Maskus and Saggi (as cited in Alinno & Udeze, 2018) is the high cost of investment in technology and the risk of innovations. While Hamilton-Ekeke and Dorgu (2015) admit to the differences in forms and models compared to the Western.

Given the foregoing, it becomes apparent that the domestication of Nigerian affairs has become an issue of emergency. Education technology in the Nigerian school curriculum should occupy a prominent role into the future to equip graduates with technological know-how that will serve the local needs of Indigenous people. Moreover, there exists an important reflexive relationship with Indigenous knowledge in the distinctiveness of local application of educational technology. Of course, Indigenous knowledge technology systems are distinct from modern-day scientific technologies. While the former refers to a form of unique knowledge systems that are peculiar to a given culture, the latter represents a scientific research base generated in institutions of higher learning (Tharakan, 2017). The current economic and developmental stage of Nigeria, particularly on its national bio-resources development agenda, calls for a marriage between the Indigenous Knowledge Systems and the modern scientific systems of technologies. This will, in turn, pave way for innovative pathways that are needed for sustainable developments, economic transformation for global competitiveness, and revitalization of agricultural produce for food security towards the improvement of life for the common people. If this could be achieved the technological narratives of Indigenous technology and its exploration of numerous indigenous knowledge among the Indigenous people will be massive.

Open Distance Learning (ODL) within Re-Expression of AIK

African Indigenous learning can, therefore, be viewed as the core foundation for ‘Education Self-Reliance’ in modern education (Hamilton-Ekeke & Dorgu, 2015). Open distance learning is a form of technologically based education or an off-campus based system of learning enabling flexible, and often self-directed, educational access to those who might have missed the opportunity or have been denied access for various reasons in the on-campus mode of educational delivery in higher institutions. For Greenberg (in Chawinga & Zozie, 2016) contemporary distance learning represents “a planned teaching/learning experience that uses a wide spectrum of technologies to teach learners at a distance” (p. 4). This explains the relevance of technology-enhanced teaching/learning which ODL represents in the re-expression of AIK particularly in Nigeria. According to UNESCO (2002), the term “open and distance learning reflects both the fact that all or most of the teaching is conducted by someone removed in time and space from the learner, and that the mission aims to include greater dimensions of openness and flexibility, whether in terms of access, curriculum, or other elements of structure” (p. 8).

The transference of IK has always been a direct form of reciprocated skills which are handed down through generations. ODL will aid in the expansion and transformation of Indigenous knowledge through technological means to support its proper documentation, management and dissemination, which will be devoid of time and space.

Open distance learning is increasingly growing owing to its affordances that allow learners to learn without the need for direct and physical contact with the school and its flexible focus regarding the needs of individual learners. ODL has the attributes that inform the application of educational technology in educational processes that could spring up the discovery of new knowledge and ideas needed by the world to surmount the pressure of human insatiable needs through the exploration of Indigenous knowledge and value systems. Indigenous knowledge with less sophisticated technological use has been explored in the trado-medical field and has been instrumental to cure series of deadly
ailments and diseases also in the field of agricultural sciences Indigenous agronomy has been very successful in Nigeria. The knowledge has been applied in fields such as environmental conservation, management of disasters, management of natural resources and many more areas. The infusion of Indigenous technology and ODL as a developmental tool-pack for local educational transformation will not only aid in the re-invention process of the lost value of AIK among its peers but will also serve as an instrument of realization of new technological discoveries for the world benefits.

Adding Indigenous Values to Open Education Resources (OER)

THE UNESCO 2002 forum on the impact of Open Courseware for Higher Education in Developing Countries birthed the term OER (Friesen, 2009). The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2012) defines open educational resources (OER) as “teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions” (p. 1).

In guidelines on the use of OER for the promotion of educational access rights for everyone, UNESCO urges states in their capacity and authority to ensure: the fostering of OER awareness, development of strategies and policies for the reinforcement of OER, promotion of the use of open licensing framework, development of quality learning materials, fostering of strategic alliances for OER, encouragement of research on OER, adoption of appropriate standards to ensure sharing and retrieving of OER among others.

Following this, it suffices to say that if African nations are serious about preserving and nurturing African Indigenous knowledge to be repositioned and re-invented then OER becomes an option and avenue to be exploited for such repositioning to take place. Access to OER for the promotion and reinvention of AIK is a very pertinent issue that requires holistic dedicated policy efforts to drive it. The Internet provides enormous scope for ongoing development and dissemination of Indigenous educational resources created by Africans for Africans. Building on this perspective, Mason (2014), argues that the “open agenda is a natural place to reposition development of inquiry-based learning into the future — thereby broadening the agenda beyond issues of access, licensing, enrolment, and technical interoperability to also embrace processes of inquiry” (p. 108).

The need for Indigenous knowledge re-creation is crucial in the creation of Indigenous technology that will serve the local people. Nigerian Indigenous knowledge systems have impacted and informed the application of education technology in so many ways. For example, it has provided useful information for farmers about agricultural resilience on how to absorb their agricultural produce and recover from all sorts of shocks that could either have a severe impact or slowly erode farmers’ ability from farming. Education technology has helped in sharing information on resilience to equip crops and farmers with information and technology to protect their crops and livestock from diseases. Other similar instances are, ‘Gegemu’ (Jimsonweed), if soaked, the water can be used as repellants for livestock, ticks and other stuff? ‘Ewe-lyeye’ (Spondias mombin) is being used for natural weight loss without chemicals. ‘Dongoyaro’ (Neem seed/oil) is now a universally accepted bio-pesticide for over 200 insects. Its cake is used for prevention of nematodes in the soil. Blood of certain animals such as dogs and lizards are used to protect vegetable from all kinds of insects and diseases. This local knowledge had been with the Indigenous people for ages. Modern science and technology are just beginning to talk about genetically modified organism (GMO) plants, one of such are the blood of mentioned animals, and it’s called Transgenic GMO. If such knowledge can be well codified, documented, managed and made accessible through the medium of OER the world we benefit more than enough from AIK and the knowledge will survive extinction and help build a sustainable future.
Conclusion

Indigenous knowledge and practices are increasingly a consideration for world growth and sustainable development agendas. The world is tilting towards embracing Indigenous values and domestication of affairs to meet up with the needs of the local people and the recognition of cultural values and orientations. OER is considered to be a major asset and avenue towards the revival and development of the Nigerian-African Indigenous knowledge systems. If Nigerian/African leaders could foster efforts in ensuring the establishment of Indigenous-based technologies and promote broader-based open distance learning, this will help in the repositioning of the social-infrastructural and economical values of its people.

African cultural heritage is poised for renewal and educational technology through OER and ODL look to be natural instruments to assist in this. Arguably, Nigeria will not be a completely independent and economically stable nation until it is capable of developing its own independent technological based systems that combine both Indigenous and scientific values; Indigenous knowledge has contributed immensely to the development of technology in the world depending on the level playing ground accorded to its custodians and opportunities created for its explorations.

Based on the findings of this paper the next steps will be to investigate how open distance learning can be further leveraged in designing learning environments for rural contexts as part of an attempt in bridging higher educational access gaps in remote Nigeria.

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Digital Technologies for Learning at Allama Iqbal Open University (AIOU): Investigating Needs and Challenges

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Abstract
The present study investigated the need of digital technologies for the distance learners of AIOU (Allama Iqbal Open University), and the challenges in its implementation. Within mixed-method approach, an explanatory sequential design was employed to conduct this study. Quantitative data was collected through questionnaires from 963 students to find out the needs for digital technologies. Later 3 administrators and 1 library in-charge were interviewed to find out the challenges in its implementation. Quantitative data was analyzed using descriptive statistics. For qualitative data analysis, inductive analysis was done. Most of the students said that digital technologies were needed for increasing accessibility and flexibility of learning. The challenges for its implementation were in the requirement of diverse online learning resources, access, cost and lack of expertise. The paper recommended that there should be provision of portable devices to students with Wi-Fi, and guidance about its use. Annual need-assessment system was also suggested.

Keywords: digital technologies, digital learning, online learning, e-content

Introduction
Digital technologies promote a digital learning environment to facilitate the distance learners. These technologies enable digital learning. Digital learning means using digital technologies effectively and efficiently to help in the learning process. A digital learning in any educational institution includes all those learning technologies which can support learning of the students (Moore & Kearsley, 2004; Roy & Farmer, 2013). A digital learner is the one who uses digital learning techniques to improve one’s knowledge. This world has become a global learning platform with collective information (Meyer, Thomas & Schroeder, 2011; Steeles, Jones & Goodyear, 2012), and digital technologies help greatly in this regards. Digital mode of learning at distance universities is now developing into a full-fledged learning system which facilitates its users around the world by providing them with many opportunities such as easy and immediate access to digital contents, online assessment and quicker feedback from relevant instructors or tutors (Rosenblit, 2009). All of these facilities are required by distance learners as they are now part of a universal classroom.

The progress in ICT has made the geographical distances between teachers and learners irrelevant especially in distance learning. Digital technologies such as online websites enable distance learners to find more relevant learning materials for their learning, assignments and exam preparations. They also help distance learners in finding and incorporating more relevant and important ideas and points...
for their research work. The focus is shifting from teachers and printed textbooks to recorded lectures and digital contents (Salmon, 2000; Bates 2005; Sankhsri, 2006). Moreover social media platforms such as Skype and WhatsApp give distance learners opportunities to discuss in groups, take help from teachers online, and learn and incorporate those materials that are most relevant to their subjects (Trivedi, 2010). Use of technologies in workshops makes learning more meaningful, interactive and interesting as compared to teacher-centred, traditional workshops. They also extensively facilitate the virtual delivery of educational programs not only within the same country, but also internationally. Students do not have to travel to other countries to get education from their universities. They can do it at their doorsteps.

To develop a variety of skills in a student relating to a particular area, one must provide them with diverse learning resources for individual and collective sustainability (Levy & Roberts, 2005; Anbu & Chibambo, 2009; Gerard, 2013). Realizing this, most of the universities, especially distance universities around the world, are trying to incorporate digital technologies in distance learning to support the learning. Various studies have pointed out different challenges in the implementation of digital technologies such as time, access and resources required for proper incorporation of digital technologies for a large number of learners, and maintaining equality and quality in the process (Wagner, Days & Sun, 2004; Litteljohn, 2005; Anderson, 2008; Ronsenblit, 2009).

Luboobi (2007), Kalusopa and Zulu (2009), and Moyle and Wijngaards (2012) also pointed out other challenges of distance universities such as insufficient computer services and other ICT facilities, inadequate number of multimedia labs to enable e-content creation, lack of other necessary infrastructure such as bandwidth, staff retention, and computer illiteracy among students and staff. Inadequate allocation of financial resources also prevents from stepping towards digitalization. It is because essential steps for digitalization such as human resource training, developing and maintaining infrastructure need lots of financial resources.

Allama Iqbal Open University (AIOU) is Pakistan’s first open and distance education university. It is also thinking to digitalize its resources and learning system. Like many other distance universities of the world, it is also facing challenges in this process. Different challenges mentioned by the researchers also appear to confront the University about the digitalization of printed material such as cost, qualified personnel, program layout and required technologies (Pandey, 2001). AIOU is a public sector university, but most of its expenditures are met with the students’ fees which are not high enough to fulfil increasing cost for transferring materials from print to digital media. An efficient and effective digital learning university needs to have strong and well-designed digital learning infrastructure and environment to use digital technologies proficiently in distance learning which is also costly and time consuming. It has increasing number of enrolled students every year, and most of them come from rural areas. Traditionally, those students come with a lack of knowledge about digital devices and computer skills (although this scenario is changing now with more and more people having access to at least smart phones).

Many earlier studies explained that the challenges of digital learning in developed countries are mainly related with information safety of online learning material where they have lots of online learning resources for distance learners; but contrary to that, in developing countries, distance universities are still facing challenges in identifying needs of digital technologies for distance learners and how to fulfil those needs (Laurillard, 2002; Saade, 2003; Elloumi, 2004). Keeping this in view, the present study has been conducted to find out the needs of digital technologies for assignments, workshops and examination from the perspectives of the distance learners, and to explore the challenges that AIOU may face in its implementation.
Research Questions

This paper tried to find out the answers of the following research questions

- To what extent do distance learners at AIOU need digital technologies in their assignments, workshops and examination?
- What challenges is AIOU facing in the provision of digital technologies to distance learners for digital learning?
- How AIOU may overcome those challenges and provide digital technologies to the distance learners effectively?

Research Method

Research Design

Within mixed-method approach, an explanatory sequential method was employed to conduct the study. Survey was carried out for data collection from the students. Quantitative results were then drawn which were used to develop interview guide for qualitative data. Interviews were conducted from the administrators and library in-charge.

Population and Sample

Population of study comprised of 2145 M.A. and M.Ed. students from Faculty of Education who were enrolled in autumn 2015 from Rawalpindi and Islamabad regions. Out of them, 1138 students were selected randomly for the sample by applying computer method formula “=RAND()” in MS Excel. 963 students returned the questionnaires indicating a return rate of 84.6%.

Three administrators and one library in-charge were interviewed. The administrators of those departments were interviewed which would be mainly responsible for the digitalization and provision of digital technologies to the distance learners of AIOU.

Data Collection Tools

A questionnaire consisting of 21 items was developed which was divided into three sections: A, B and C. Section A was about demographic information (gender, age and qualification). Section B comprised of 12 close ended items that were divided evenly into three components of distance learning i.e. assignments, workshops and examination. The scale was ranged from 1 (strongly disagree) to 5 (strongly agree). In section C there were 2 open ended questions for further exploration and suggestions from distance learners.

A semi-structured interview guide was developed with 12 main questions about information regarding digital learning services at AIOU, challenges it could face in the provision of digital learning to its learners, and suggestions to overcome them. Supplementary questions were also asked as needed to probe the situation better.

Validity and Reliability of the Tools

Content validity Index (CVI) was carried out for validation of the tools. For this purpose five experts from educational technology field were invited to categorize each question, according to the objectives of the study in the following way: 1-not relevant, 2- somewhat relevant, 3-quite relevant and 4-highly relevant. The content validity index for questionnaires (14 research items) and interviews (12 main questions) were 0.85 and 0.87 respectively.
The Cronbach’s alpha was applied to check internal consistency of the questionnaire. For this purpose 90 questionnaires were distributed among the students. These questionnaires were not included in final sample. 72 questionnaires were returned. The Cronbach’s alpha for assignments, workshops and examination parts was 0.854, 0.841 and 0.834 respectively.

Data Collection and Analysis Techniques

For quantitative data collection, questionnaires were administered to the students through electronic mail. Out of 1138 e-mails, 963 were responded. Interviews were conducted face-to-face with all interviewees individually. They were audio-recorded. Notes were also taken during interviews.

The quantitative data was analysed using percentages, frequencies and mean score through SPSS (Statistical Package of Social Science). For qualitative data, inductive analysis was used to draw themes and codes from the interviews. Codes were put under themes. Similar themes were merged and collapsed. Finally, the names of the participants were replaced with codes R1, R2, R3 and R4 (respondent 1, respondent 2, respondent 3 and respondent 4) to hide their identity.

Data Findings and Interpretations

Data findings were divided into two main parts: needs for digital technologies as expressed by the students through questionnaires, and challenges in its implementation as expressed by the relevant University members through interviews.

Needs of Digital Technologies at AIOU

The distance learners at the University gave the following responses about the needs of digital technologies for their assignments, workshops and examination through questionnaires. Frequency of respondents’ responses across each question is denoted by ‘f’.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Statements</th>
<th>SDA f(%)</th>
<th>DA f(%)</th>
<th>U f(%)</th>
<th>A f(%)</th>
<th>SA f(%)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>Online submission of assignments through email can give me quick feedback from my instructor.</td>
<td>6 (.6)</td>
<td>13 (1)</td>
<td>42 (4)</td>
<td>383 (39)</td>
<td>539 (55)</td>
<td>4.4</td>
</tr>
<tr>
<td></td>
<td>University suggested websites would give me latest information for my assignment work.</td>
<td>9 (.9)</td>
<td>26 (3)</td>
<td>42 (4)</td>
<td>44 (45)</td>
<td>464 (47)</td>
<td>4.3</td>
</tr>
<tr>
<td></td>
<td>Evaluation of assignments through online tutorial would help me to get quick feedback from my tutor.</td>
<td>7 (.7)</td>
<td>24 (2)</td>
<td>92 (9)</td>
<td>477 (49)</td>
<td>383 (39)</td>
<td>4.2</td>
</tr>
</tbody>
</table>

(Continued)
Table 1: (Continued) Needs of Digital Technologies by the Distance Learners

<table>
<thead>
<tr>
<th>Factors</th>
<th>Statements</th>
<th>SDA f(%)</th>
<th>DA f(%)</th>
<th>U f(%)</th>
<th>A f(%)</th>
<th>SA f(%)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshops</td>
<td>Online lectures through Skype would be easier for me to attend along with my job.</td>
<td>5 (.5)</td>
<td>9 (.9)</td>
<td>22 (2)</td>
<td>583 (59)</td>
<td>364 (37)</td>
<td>4.3</td>
</tr>
<tr>
<td></td>
<td>Wi-Fi facility in the workshop center would facilitate me during my study hours.</td>
<td>17 (1.7)</td>
<td>21 (2)</td>
<td>132 (13)</td>
<td>520 (53)</td>
<td>293 (30)</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>WhatsApp can be easier than face-to-face classroom discussion</td>
<td>13 (1.3)</td>
<td>7 (.7)</td>
<td>22 (2)</td>
<td>420 (43)</td>
<td>521 (53)</td>
<td>4.4</td>
</tr>
<tr>
<td>Examination</td>
<td>Availability of instructional material of Smart phones would be easier than reading heavy textbooks.</td>
<td>4 (.4)</td>
<td>5 (.5)</td>
<td>82 (8)</td>
<td>391 (40)</td>
<td>501 (51)</td>
<td>4.4</td>
</tr>
<tr>
<td></td>
<td>Online quizzes would help me to assess my learning for exams.</td>
<td>11 (1)</td>
<td>16 (2)</td>
<td>107 (11)</td>
<td>560 (57)</td>
<td>289 (29)</td>
<td>4.1</td>
</tr>
<tr>
<td></td>
<td>I prefer online exams to traditional one (with pen and paper)</td>
<td>61 (6)</td>
<td>39 (4)</td>
<td>223 (23)</td>
<td>411 (42)</td>
<td>249 (25)</td>
<td>3.8</td>
</tr>
</tbody>
</table>

SDA Strongly Disagree, DA Disagree, U Undecided, A Agree, SA Strongly Agree

Table 1 shows what the distance learners of AIOU thought about the usefulness of digital technologies. The students were mostly positive about it, and gave high scores to all of them (range 67–96). Apart from “preferring online examination to traditional one” in which 67% of the respondents agreed, in all other questions, 83% to 96% agreed. They thought most positively about online submission of the assignments (94%), University recommended websites (92%), online lectures (96%), WhatsApp/ Social media discussion (96%), and e-contents (91%).

Challenges in the Provision of Digital Technologies at AIOU

Interviews were then conducted from three administrators and one library in-charge to identify the challenges that AIOU is facing in providing digital technologies to the distance learners. Those administrators belonged to the departments which would play a direct role in the provision of digital technologies. Data was analysed and categorized under three main themes and seven sub-themes. Main themes were ICT resources & expertise, access to technology, and attitude towards technology. Sub-themes comprised of digitalization of printed learning material, ICT professionals, quality assurance, high cost of technology, digital divide, affordability of technology and change in mind-set.

First it was analysed which of the categories and themes the respondents talked about. Later, their interviews were analysed more qualitatively through key words and verbatim quotations.

In the table 2, “R” indicates the respondents whereas “f” represents frequency of responses from respondents (how many times that theme was mentioned).
Table 2: Challenges in Providing Digital learning at AIOU

<table>
<thead>
<tr>
<th>Themes</th>
<th>Codes</th>
<th>Respondents</th>
<th>f</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT resources &amp; expertise</td>
<td>Digitalization of printed learning material</td>
<td>R1, R3, R4</td>
<td>3</td>
</tr>
<tr>
<td>ICT professionals</td>
<td>R3, R2, R4, R1</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Quality assurance</td>
<td>R4, R1, R3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Access to technology</td>
<td>High cost of technology</td>
<td>R1, R3, R4, R2</td>
<td>4</td>
</tr>
<tr>
<td>Digital divide</td>
<td>R1, R3, R2, R4</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Affordability of technology</td>
<td>R1, R4, R2</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Attitude towards technology use</td>
<td>Change in mindset</td>
<td>R2, R4, R1</td>
<td>3</td>
</tr>
</tbody>
</table>

**ICT Resources and Expertise**

The participants pointed out that for digital learning, AIOU will have to digitalize its existing printed learning material into digital format as most of instructional materials of the university is in the printed form. Despite acknowledging its demand from the students, R3 pointed out some challenges. He said, “….increasing number of students of this university demand from the university to digitalize its existing learning materials”; the increasing cost has kept the University from doing so.

The expertise in online learning for teachers is also essential for the successful implementation of digital learning (Tarus, Gichoya & Muumbo, 2015). The scarcity of assistance and guidance for instructors and teachers is a major cause in the failure of online education of the distance universities. Without efficient guidance and ability, any type of plan is meaningless and ineffective (Salmon, 2000). R1 said the same thing in these words “University has difficulty in managing and organizing new advancements in teaching learning methods therefore separate departments are required for distribution of online learning material to the learners”. It basically mean that as the teachers are not well equipped with digital technologies skills, the University may need separate supporting departments including very strong IT/ ICT department. With the passage of time, academics and students would develop essential expertise in the use of up-to-date digital tools; but in the beginning, they might need technical assistance. The interviewees reported that most of the pupils of AIOU (at least in the cities) had android and laptops in their hands; however they lacked competency to successfully utilize the digital learning tools. Catherall (2005) said that there was a requirement of technical expertise for distance universities to prepare and operate software and platforms to have at least on-campus expertise. The interviewees also echoed the same opinion. They further added that the task became tougher and more expensive with every passing year as the number of material to be digitalized becomes larger and larger. Additionally, creating e-content takes long time which is a challenge of digital learning and distance institutions. Bates (2005) and Littlejohn (2005) said that converting or developing e-contents and their distribution to a large number of students of the distance universities needed a lot of time and resources. It is a big challenge for distance universities to provide diverse learning resources to a large number of enrolled students to fulfil their demand and expectation of learning (Berge, 2002; John & Williams, 2005). AIOU is also facing the same challenge.

Along with the provision of online learning materials, quality assurance of online learning materials is also necessary. As R4 pointed out,
“Challenges of digital learning are not only limited to the provision of sufficient technical support, it also requires diverse online learning resources and quality assurance of these available online learning resources or material to satisfy learning expectations of distance learners”.

R2 pointed out that when the number was gigantic, and the students were not around; system or platform would become vital. Any flaw in it would create loopholes which could be easily exploited by the students. As a result, the system had to be tested and tried for quality assurance before it could be implemented.

**Access to Technology**

The faster Internet connection is critical for any distance university to continue digital learning. The students should also have access to internet and other relevant tools for it. Cost of internet connection in Pakistan is quite high which makes it very difficult for financially weak students to afford it. R2 said, “In far off areas, not only Internet facility is not good (sometimes, there is no internet), but also the people are too poor to afford it”. High speed of internet is compulsory for any organization which offers online instructions to the students. According to study finding of Chapman and Mahlck (2004), in developing countries access to the Internet is very expensive. Affordability of internet connection is crucial for digital learning implementation. R1 explained that in these words “Computers, internet connections and computer labs are insufficient in the University for the needs of a large number of students who desire to have online learning”. R2 further added “…sometimes online assignments have additional costs”. According to Rumble (2001) and Bates (2005), the major cost is tutoring the courses. This includes hiring of additional teachers to give instructions to more enrolled students through online platforms. Web courses also need considerable maintenance, standard feedback, maintaining record, analyzing exams and assignment results, and also new research and upgrading to keep the system updated and bugs-free all the time. All these add to the cost of the offered program.

Along with all these, another challenge for the University is to provide digital learning to those distance learners who have no access to internet connectivity. The majority of students in distance universities of Pakistan belong to those areas where there is a lack of technical and even infrastructural facilities. That is why many distance universities have a corresponding way of instruction (through snail-mail) as the students lack access to technology (Bates, 2005). Equity and equality becomes a major issue in such circumstances. R4 said,

“For AIOU, it is a challenge to provide digital content to rural and urban area students equally as there is also inequality in technology provision, access and use. Also generally females in several regions of Pakistan use fewer technologies as compared to male pupils”.

R4 pointed out a very important point while talking about the demerits of implementing digital technologies. He said that when the assignments and exams were carried out through computers and Internet, it would not only be a matter of academic competency, but also computer competency. One person with higher level of content knowledge might not be able to score high due to lack of computer competency and typing speed. Another person with less content knowledge might score better because he/she could type faster or had better computer competency. Consequently, the results may be reflective of typing speed and computer competency than academic level. Not only would it kill the spirit of exams (to assess the students in that subject knowledge), but would also create another kind of disparity between those with computer competency and those without it.
Attitude towards Technology Use

Positive attitude is required for effective implementation of digital learning, but most of the teaching faculty of the university remains busy in their work schedule. R2 pointed out that they could not find any extra time to give online instructions to the learners. Additionally, Respondent 1 said, “Digital learning initiatives, especially in Pakistan can be best implementing if instructors are ready to change their mindsets to move from traditional to digital learning”. Khan, Hasan and Clement (2012) also stated that if academics desired to effectively employ these tools in lessons, they had to hold optimistic thoughts towards its utilization.

The respondents also showed apprehension about the attitude of the students, saying that they were mostly looking for “easy way” to pass the exams, and just get the degree. Machines may not have that impact and the “fear factor” on the students as the humans might have.

Findings related to the challenges of digital learning for university are also relevant to the previous findings of Sife, Lwoga and Sanga (2007) that pointed out that challenges of digital learning in developing countries were mostly related to lack of training about the use of ICT tools, resources and expertise for e-content development, high cost of technology required, slow internet speed, lack of technical experts in these institutions, and high level of online services required. Digital learning requires the close cooperation of all departments including instructional or tutorial services, registration, online library, and networking services to provide quality learning system to the students. The findings of the present study are also closely related to the findings of other studies (Tarus et al., 2011; Kajuna, 2009) which found that distance universities in developing countries require a long time frame, large number of resources, well equipped infrastructures and internet connectivity to provide efficient online and digital services to its learners.

Overall, the study came up with three main findings. Firstly, findings related to the needs of digital technologies indicated that with the use of digital technologies, distance learners may be able to have increased flexibility of time and place in their learning and have reliable services from their university.

Secondly, if digital technologies are incorporated into distance learning, distance learners would have much better learning experiences and opportunities that would help them in their academic work as well as in skills development. They would also be able to get cost effective, quick and improved services from the university.

Finally, the study indicated challenges in implementing digital learning. Those challenges are mainly at four levels. Firstly, in the provision of online learning to those students who have no or less access to technology; secondly, finances and technical skills required for the development of digitalized online contents; thirdly to ensure and maintain the quality of these online learning resources, materials and platforms; and finally changing the attitude and mind-set of both teachers and students.

Discussion

Based on the findings of the study, it can be said that digital technologies are significantly needed by the distance learner as indicated by high percentages of their responses in favour of digital technologies. This has also been indicated in the study of Inglis, Ling and Joosten (2003) that the quality of distance learning can be improved by the provision of advance learning facilities to the distance learners. Majority of the distance learners agreed that digital learning supported learning without the limitations of time and space. Digital learning can provide quicker and more reliable services to distance learners. With the help of digital technologies, distance learners can get relevant information, quick feedback from their instructors, group discussion to have collaboration with their
study partners about their assignments, workshops and examination. Previous studies have also explained that digital learning gives pupils the freedom to replicate and include new knowledge into their learning (Malitghong, 2005; Mohantay, 2006; Potter, 2012).

Departments of ICT (Information and Communication Technology), IET (Institute of Educational Technologies) and central library of AIOU are mainly responsible for digitally supporting the distance learners. The challenges for these departments are mainly related to technical and instructional areas. It has also been found by other researchers that there is a requirement of technical expertise for distance universities to prepare and operate software to have on-campus expertise (Wagner et al., 2004; Catherall, 2005; Rosenblit, 2009). The main challenge of digital learning is to have a suitable incorporation of the digital technologies into the instruction at vast level to improve learning chances for everyone. This advantage should not only be for those who have access to technology, but also for technologically backward distance learners. Otherwise, instead of improving the overall standards and quality of education, it would only add to the disparities within the system.

In this scenario, the University may find it difficult to equally distribute e-content information to all rural and urban area students at the same time in the same way. AIOU does not get a lot of grants from the government, but is financially self-sustaining university. Its income with the current fee structure and without any government support may not be able to fulfill high cost of digital transformation from correspondence mode of instruction to the digital and online one. In this situation, the University finds itself at a dilemma. If it increases the fee, it will not be able to meet its fundamental goal of providing quality education to all especially those with low socio-economic status. On the other hand; if it does not digitalize, it may not be able to provide quality education in an efficient and timely way.

Not only is there is a need for appropriate system for the implementation of digital learning, there is also a need to have strong and effective learning environment and a positive mindset that is willing to learn, and willing to adjust according to the changing needs. The platforms, digitalization and technologies alone cannot do the magic until people are willing to be flexible, learn its ins and outs and then work in such a way that is best suited for it. A university that has been working for decades in a certain way, may be able to install new systems overnight, but would find it hard to change the mindset and hardened habits. The best strategy as one respondent pointed out, might be to incorporate digital learning in a systemic but gradual manner so that both the teachers and the students are able to pick it, and cope up with the challenges better.

**Conclusions**

The need of digital technologies is significant for distance learners because they do not want to rely on paper based sources of information only. Distance learners have acknowledged that during the study. They believe that with the use of technology for learning, they can do their learning in a better and more efficient way.

The situation about access and availability of digital devices especially smart phone is changing rapidly in Pakistan in the recent years with increasing number of people having access to smart phones. The number of distance learners who have smart phones or gadgets in their hands is increasing, and they have more awareness about the technologies. There is a need to enable these distance learners to use these gadgets effectively for study purpose on individual as well as collective level. Despite foreseeable challenges and issues, digital learning seems to be the way forward for AIOU and other distance universities.
Recommendations

The paper suggests that the tutors or instructors need support to develop electronic learning materials as well as knowing how to develop the skills for providing digital or online feedback and support to students. This must be tackled at two levels: services of ICT professional from the other institution may be gained initially, and then technical staff and instructors of the University should be provided with audio/video devices from the university, e.g. multimedia, webcam and Wi-Fi devices etc. so that they can learn and use them during their teaching hours and workshop centers.

University may face difficulty in the provision of digital learning to all distance learners as some of them may not have access to those devices or internet connectivity. However portable devices with Wi-Fi can be provided at the time of enrollment to the students with installed software required for the learning. The university can also setup small campuses or study support centers in different areas (or use the existing ones) with the cooperation of IT companies to support the students in digital learning in those areas. Many public and private companies may be willing to support the University as not only it will serve the noble cause of education, but would also be a good advertising opportunity for them.

Successful implementation of digital learning can only be possible if students and academics have sufficient training. The university may provide basic training to these students and academics before the execution of academic program activity. Incentives can also be given to those academics who participate in these training courses. To cater the needs of very large scale students, training videos can be made and provided to the students to let them learn by themselves about the use of digital technologies. Also printed manual on how to use ICT tools may be provided to distance learners along with online instructions. Quality assurance of these learning materials must be the responsibility of each head of the department in collaboration with ICT department.

Finally, there should be an annual needs assessment system for distance students to find out their study related needs before developing instructional learning material, and to update them from time to time.

References


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Culture, Identity and Learning: A Mediation Model in the Context of Blogging in Teacher Education

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Abstract

National culture has been an influential framework for comparative and international research. However, current theories suggest that people and societies are rather more complex constructs than their cultural layer. This work is based on a previous study in which, when students from Spain were compared to German students, the former showed higher levels of identity with their blogs and learning impact. The current study is a step forward as it presents the differences in identity and learning impact in blogging between Spanish and Israeli student teachers and offers a mediation model in which the relationship between culture and learning is mediated by the identity factor. The results show that Spanish student teachers feel more identified with their blogs and thus perceive a greater learning impact. Accordingly, this work suggests that blogging could act as learning spaces that may raise students’ identity with their learning products and their self-perceived learning impact.

Keywords: Culture, identity, teacher education, Personal learning environment, Blog

Introduction

Personal Learning Environments (PLE) is the approach to Technology Enhanced Learning (TEL), which focuses on the need to give students control and ownership of their learning process. Although it was initially explored from a technical perspective, the pedagogical strand subsequently went on to explore the importance of developing students’ skills for self-regulated learning rather than being limited to tools (Fiedler & Väljataga 2010; 2014). In this sense, Buchem (2012) observed the impact on learning afforded by feeling a sense of ownership especially related to intangible elements of Personal Learning Environments – such as control of content and data – rather than tangible elements, such as control over technical tools.

This line of research is rooted in the theory of psychological ownership and based on previous work exploring the impact of psychological ownership on learning (Buchem, 2012; Buchem, Tur, & Holterhof, 2014). In the study by Buchem et al. (2014), psychological ownership was explored in its five dimensions – sense of responsibility, sense of self-identity, sense of accountability, sense of self-efficacy and sense of belongingness – and compared in three international groups of students, two from Germany (Berlin and Duisburg), and one from Spain (Ibiza). In general, it was observed that the Ibiza sample developed the strongest sense of ownership over their Personal Learning Environments.
and perceived the highest impact of the changes in the way they learned. A detailed analysis of data showed that students from Ibiza obtained the most positive results in terms of a sense of identity, thus uncovering a challenging relationship between identity and learning.

Furthermore, previous studies of PLEs were conducted from a cross-cultural perspective, indicating that the use of social media may be affected by the users’ national culture (Carpenter, Tur & Marín, 2016; Chen, Mashhadi, Ang, & Harkrider, 1999; Tur, Marín & Carpenter, 2017). Conclusions from these studies were extremely interesting and suggested the importance of further work in order to be able to explore new implementations of PLEs and analyse the possible influence of cultural aspects. Thus, this new stage of research explores in greater depth the previously rather unexplored relationship between culture, identity and learning. Specifically, the study explores the relationship between culture and learning from the perspective of the mediator role of identity in two groups of student teachers from Israel and Spain.

The study presented in this paper applies a holistic approach as it is derived from two educational perspectives. Firstly, it adopts a psychological perspective and focuses on the concept of psychological ownership and secondly it is based on a socio-anthropological perspective with the focus on Hofstede’s (1986; 2011) concept of culture and the alternative social identity model for describing cultures (Straub, Loch, Evaristo, Karahanna, & Srite, 2002). In the current research stage, participants are student teachers with a common academic background (i.e., academic culture) but differ in their national culture (Spain vs. Israel). Thus, the element of identity ownership is explored in terms of learning impact through the cultural lens in a mediation model. The Spanish (Ibiza) sample was chosen since the students had previously shown a strong sense of identity which in turn had a greater impact on learning. The mediation model is explored and compared with a corresponding sample of student teachers from Israel. This is of especial interest since the students from Spain and Israel represent the furthermost eastern and western sides of the Mediterranean region, which could reveal interesting differences and commonalities with relevant implications for international research.

**Background**

*Culture, Learning and Technology*

Culture is a very complex and abstract concept with a variety of definitions and interpretations attributed to it. According to Biesta (2011) cultures may be seen as a way of acting and being. Cultures are produced and reproduced through human collective activity. Thus, individuals are neither totally determined by culture, nor are they totally free of them. Gunawardena et al. (2001) argue that culture is not static, as it is being constantly changed by individuals who are polycultural, holding different cultural identities at the same time. Hofstede (2011) defined culture as “the collective programming of the mind that distinguishes the members of one group or category of people from others” (p. 3). There are two approaches to the cultural dimension in his framework: a very popular and frequently explored framework in which culture is said to play a dominant role in predicting human behaviour; and an alternative one in which identity is perceived as more than just a national culture. In his classic work, Hofstede (1986) related to culture at the national level. He initially developed a four-dimensional model, which has since been extended to six dimensions, to describe national cultures (Hofstede, 2011). This model has represented one of the most influential existing frameworks and has been supported by a large number of empirical studies (Sánchez Franco, Martínez López, & Martín-Velicia, 2009). It can be informative for online learning design as it can be of assistance in understanding how it is perceived by students.
According to data on the Hofstede’s website\(^1\), Israel and Spain do not differ significantly since similar results are obtained in dimensions such as individualism (54-51), masculinity (47-42), and uncertainty avoidance (81-86), whereas the greatest difference is in power distance (13-57) followed by long term orientation (38-48). Based on scores obtained in Israel and Spain, at an educational level, both countries share some patterns for the teacher-student interaction as argued by Hofstede (1986). Therefore, it can be hypothesised that both Israel and Spain would have similar educational patterns such as (a) little symbolic value given to diplomas and the importance of developing skills (both Israel and Spain are individualistic societies); (b) being comfortable in structured learning situations; (c) the conception of teachers as experts (strong uncertainty avoidance societies); (d) rewarding students’ academic performance; (e) and a competitive approach in education (masculine societies). Considering the individualistic attribute in particular, ICT should be easily integrated into both Israeli and Spanish societies, as ICT can be used to connect individuals (Viberg & Grönlund, 2013). However, Israel should presumably be less hierarchical than Spain and better allow student-centred education and a two-way communication in class, which can also be initiated by students, as a result of the characteristics of the power distance dimension. It has been said that in cultures with short power distance, quality of learning is determined by student excellence whereas in long power distance cultures, it is considered to be the teachers’ responsibility (Viberg & Grönlund, 2013). This is extremely challenging in the context of educational technology since TEL has been deemed as critical for the shift towards a more flexible model with the student at the centre (Salinas, 2013), which seems especially suitable for small power distance societies.

Culture influence values and perceptions may shape how learners respond to computer-based learning (Collis, 1999). In early research, the need to consider culture as variable for the design of software was affirmed (William-Green, Holmes, & Sherman, 1997; Chen et al., 1999) and for example, in the creation of instructional software, the cultural factors were alleged to be important for issues related to the design of graphical interface, symbols and sounds (Chen et al., 1999) as well as the presentation of text and information design (Marcus, 2002). Jayatilake and Gunawardena (2016) carried out research into how 30 university academics from Mauritius, Sri Lanka and Pakistan perceived their own cultural context and how it influenced their online learning. In regard to perceptions on the influence of culture in online communication, the scholars found that, in contrast to the Pakistani participants, the majority of the participants from Mauritius and Sri Lanka felt that the cultural aspects of the power difference between teachers and learners may influence the way they participate and engage in online interactions. Moreover, Sri Lankan participants felt that they were less likely to challenge the ideas expressed by their peers as opposed to Pakistani and Mauritian participants. In contrast to all the Sri Lankan participants, the other two groups of participants felt that opposing ideas online would be taken at a personal level rather than at the level of sharing ideas. According to these results, the scholars argued that “it is still crucial to examine the cultural frameworks and expectations students and teachers bring with them in order to build an inclusive online learning environment” (p. 60).

In recent research, through the development of Web 2.0, the focus has been on social media – see for example, the literature review by Jackson and Wang (2013), and by Tarhini, Hone and Liu (2015) – and mobile learning – see for example, the revision of literature by Arpaci (2015), and Choi, Im, and Hofstede (2016). Although there are numerous nuances, the general conclusion is that cultural differences exist among users of social media for diverse aims: technology has never been more dominant than culture (Choi et al., 2016). It has also been argued that online environments reflect offline culture (Jackson & Wang, 2013). Research has permitted the exploration of some

\(^1\)Retrieved from: https://geert-hofstede.com/israel.html
cultural patterns. In general, in more collectivist societies such as China, social media use has been observed as being of less importance to users than in more individualistic countries such as the US (Jackson & Wang, 2013). In relation to Twitter, in particular, users from collectivist societies prefer to strengthen relationships with people they already know, while users from individualistic societies prefer to use Twitter to connect to strangers (García-Gavilanes, Quercia, & Jaimes, 2013).

In research by Krasnova, Veltri and Günther (2012) the level of self-disclosure in social networks was related to American and German cultural factors and it was concluded that American participants in particular were influenced by trust in those services rather than by privacy issues. Within an educational context, Sánchez-Franco et al. (2009) conclude that cultural factors are relevant for the acceptance and usage of ICT: in weak uncertainty avoidance societies e-learning should be designed based on a clear description of tasks, roles, games and competitions, whereas in societies with strong uncertainty avoidance levels, e-learning should be designed to help in risk management and give more opportunities for control and self-efficacy perceptions. It has also been argued that cultures with higher levels of acceptance of uncertainty will show more willingness for innovation (Arpaci, 2015).

There also exists research that seems to show that data may not always respond to patterns described by Hofstede’s model and unexpected results lead to the questioning of its validity (Viberg & Grönlund, 2013). There have also been critiques of Hofstede’s quantitative methodology since it fails to explain a possible variability within the same national culture, something which Hofstede has himself understood, arguing that his framework aims to describe the characteristics of an entire nation rather than an individual person (Cronjé, 2011).

However, when considering the concept ‘culture’ as fluid, it should be noted that Hofstede’s cultural dimensions model was criticised by other scholars regarding its validity and limitations, and in particular for its theoretical basis and sampling. For example, Gunawardena and Jung (2014) pointed out the important limitations of the model focusing on: a) limitations of bipolar dimensions, (b) assumption that members of a national culture are homogeneous, (c) samples based on a single multinational organisation, (d) participants predominantly middle-class males, (e) neglect of subcultures within various countries, (f) dated results as cultures are not static but change over time, and (g) the danger of stereotyping individuals of a particular culture (p. 22). In this regard, scholars presented other culture models. For example, considering that cultures are context related, Hall (1976) posited a difference between high-context and low-context cultures as displayed in a communication message. In order to understand messages in a low-context cultures one may only imply the explicit code of the message. While in high-context cultures one may state directly the information in the message.

The Social Identity Theory (SIT) and the virtual onion metaphor (Straub et al., 2002) have been argued as an entire new perspective in offering a more complex description of culture and individual identity that can guide and complement technology research beyond simplistic frameworks (Gallivan & Srite, 2005; Straub et al., 2002; Sánchez-Franco et al., 2009). Although one cannot ignore Hofstede’s model’s shortcomings and limitations, the main rationale for adopting his classic framework is both because it helped to address the learning design for each group and because the mediation model tested in the current pilot study approaches ‘cultures’ as different nations.

Identity, Learning and Technology

After an in depth literature review of the fragmentary and analytical perspective of national cultures, Gallivan and Srite (2005) expose a more holistic approach grounded in the Social Identity Theory (SIT) and the virtual onion metaphor introduced by Straub et al. (2002). The virtual onion metaphor is based on the idea that a person’s cultural identity is more than just national identity
Culture, Identity and Learning: A Mediation Model in the Context of Blogging in Teacher Education

A similar onion-like model of culture has been proposed by Trompenaars and Hampden-Turner (1997). This approach argues that individuals contain layers of cultural identity and experiences rather like the layers of an onion. These layers of social identity are the reflection of the depth at which a certain attitude or belief lies in a person and they can shift depending on variables such as time and circumstance or how they converge or interact in each individual. Thus, there is no fixed representation of the order of layers in relation to their distance from the onion core and a key issue is that there are different ways in which these layers may combine and impact an individual’s set of beliefs and attitudes towards an object in a specific setting. As an example, Gallivan and Srite (2005) suggest that national culture is presumably of greater importance in relation to beliefs about international policy, whereas professional cultures are more likely to influence attitudes towards technology. SIT explains three processes in the development of self-identity: (a) the categorisation of objects and people in order to understand them; (b) identification with one particular group and not others; and, (c) the comparison between in-groups and out-groups (Gallivan & Srite, 2005). The authors suggest that research into technology cannot only be guided by a single factor of an individual’s identity such as culture because this may overlook other relevant elements such as gender, age, ethnicity, or social or linguistic groups. Although there does exist some work based on this model, it has not as yet been validated (Choi et al., 2016) and more empirical data is needed in the context of ICT research (Gallivan & Srite, 2005).

In the context of PLE research, identity has been previously rather unexplored as demonstrated in the literature review by Buchem, Attwell and Torres (2011). When applying the Activity Theory lens, the authors observed that identity is usually studied in relation to the subject; specifically, research on learners’ autonomy and empowerment, their role in identity management and, to a lesser extent, in relation to their interest in learning towards the object. In general, it can be argued that identity has often been addressed in research on PLEs in relation to the skills needed by learners to develop their online identities. This paper suggests that identity is classified as a dimension of PLEs for learner autonomy.

The Study

This section describes the context of learning for the two samples of teacher students from Israel and Spain including learning activities, technical tools and sample characteristics.

Context and Learning Activity

The similar educational characteristics based on Hofstede’s (1986) framework, permitted the integration of ICT into the learning process under the PLE approach in both countries, stressing the usage of blogging for reflective aims. However, each PLE was developed from different characteristics that could be useful in addressing the great difference of both groups regarding their power distance dimension. In Israel, Moodle as the Virtual Learning Environment was considered as the institutional part of students’ PLE (Biberman-Shalev, 2018). This is a closed platform, in the sense that only the student teachers participating in the course with the addition of the lecturer can read the posts and add comments, and the amount of freedom in designing the blogs is rather limited by the Moodle characteristics and possibilities, and thus might receive greater acceptance by high power distance groups of people. In Spain, the task was developed with Blogger, as openness had been considered a central issue in students’ PLEs (Tur & Urbina, 2014), and students were free both for the content and the digital design of their blogs, which in turn were totally open for everyone and could be aligned with the lower power distance dimension that might be expected from the Spanish group.
Thus, the main difference in both activities related to the role of the VLE in students’ PLE, which has evolved towards a more interactive approach with students’ social media (Dabbagh & Fake, 2017). Nevertheless, one can argue that the role of educational technology in both activities was similar to the communal blogs described by Biberman-Shalev (2018), in which students could read and comment their peers’ work, but with a different degree of openness towards a wide audience.

Although the digital platform was different, the learning design was common to both groups. Thus, students had to write their reflective written pieces and read and comment on their peers’ work once a week. The topics addressed were those studied in class, from a theoretical perspective in Spain (e.g. write your thoughts about the way the new lesson has changed your vision on traditional methodologies) and practical in Israel (e.g., write your thoughts about your practical day at the school). Both groups were given general instructions for their written text, which enabled the student teachers to have quite a broad control of the content of their posts, comments and their designing (i.e., including pictures or not, films and links to other websites). However, the Israeli student teachers were restricted to the ethical code as they were posting about specific students engaged in their practical work.

Participants

The participants in this study were student teachers from Spain and Israel, with different training backgrounds, as can be seen in table 1 –B.A and M.A programs of Spanish students and a B.A. program of Israeli students. The rationale for selecting these two groups was related to the similarities and differences between them. The geographical basis (i.e. Mediterranean Basin) as well as the professional interest (i.e. teacher education) of these two groups related to their shared characteristics. The main difference between these two groups is their country of origin and the predominant culture that each may embody. This main difference supports the theoretical mediation model examined in the current pilot study (see figure 1). This means that the focus is on the generic relationship between culture and learning and thus it can be examined across different cultures whether in the case of Spain and Israel or other countries (Jayatilleke & Gunawardena, 2016). The descriptive statistics of the two groups are represented in table 1.

<table>
<thead>
<tr>
<th>Sample</th>
<th>N</th>
<th>Age M(SD)</th>
<th>Gender (%)</th>
<th>Academic Program (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>Spanish</td>
<td>75</td>
<td>23.4(2.96)</td>
<td>85</td>
<td>15</td>
</tr>
<tr>
<td>Israeli</td>
<td>32</td>
<td>23.4(2.14)</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Method

For the examination of the mediatory role of identity in the association between culture and learning, we offer a mediation model (see Figure 1) which follows Baron and Kenny’s (1986) three-path scheme. The first path (path c) establishes the direct relation between culture and learning. As mentioned above, this path has received some empirical support in previous studies (Hofstede, 1986; 2011). The second and third paths of the model constitute our main contribution by establishing...
the association between culture and identity (path a), as well as the effect of the identity factor on learning (path b). In line with the theoretical background of our mediation model, we offer the following research hypotheses:

Leaning on previous studies (Buchem et al., 2014) which have found that Spanish student teachers perceived that blogs have a stronger impact on their learning, we introduce the following hypothesis 1 (culture and learning; see Figure 1, path c): Ibiza (Spain) student teachers will perceive the blog as contributing to their learning process more than Israeli student teachers.

The characteristics of the Spanish group’s task enabled the students to have more freedom and control than those afforded by the Israeli task. Moreover, it was found that the more control students have of their learning task, the more they tend to identify with it (Buchem, 2012). Accordingly, we introduce hypothesis 2 (culture and identity; see Figure 1, path a): Ibiza student teachers will express a higher level of identity with their blogs as compared to Israeli student teachers.

The previous study by Buchem et al. (2014) found a positive relationship between student identification with the technological product and the perceived impact on learning. Therefore, we introduce hypothesis 3 (identity and learning; see Figure 1, path b): student teachers who express high identity with their blogs will perceive this PLE as having a greater impact on their learning process.

These hypotheses can be integrated into the following mediation hypothesis (Figure 1, path c’): Ibiza student teachers will identify more with their blogs, and so will perceive their blogs as having more impact on their learning. Conversely, Israeli student teachers will identify less with their blogs, and so will perceive the blogs as having a lesser impact on their learning.

**Figure 1: Research Mediation Model.**

**Instrument**

The Israeli as well as the Spanish participants were recruited using convenience sampling. This sample fits the current study as it constitutes a pilot testing of the theoretical mediation model. Maintaining the ethical guideline, the Israeli author received institutional permission to conduct this study, which was also valid in the case of the Spanish author as no other authorisation was required to go ahead with the project. At the end of the year and after the students’ work had been graded and assessed, the authors sent a digital message to all the course participants asking them to complete an anonymous online and personal questionnaire. The questionnaire was created using a Google form and was attached as a link to the message. The questionnaire included 6 items regarding the impact of combining blogs in their academic learning process and their sense of identity related to their blogs. This questionnaire is based on a validated questionnaire (Buchem et al., 2014). Possible responses ranged in a Likert scale from 1 = fully agree to 5 = fully disagree. Completing the questionnaire was on a voluntary basis and the students were able to complete the questionnaire either in class or outside the classroom as they preferred, but the time-frame for completing the
questionnaire was until a week after the sending of the message. The return rate for the Spanish sampling was 100% while the return rate of the Israeli sample was 46%. Each of the responses completed all the 6 items included in the questionnaire. Thus, the statistical tests included all the data that was received from the responses. One might argue that the responses resulted in a rather reduced sample size. However, leaning on Bujang, Sa’at and Bakar (2017) as well as on Roscoe (1975) it seems that activating linear regressions in order to test the theoretical model is possible if the sample is higher than 30 participants. The return rate of each of the samples allowed us to lean on these criteria and to continue to test this pilot model.

**Measures**

**Dependent Variable: Learning Impact**

The learning impact of blogs included 3 items:

1. I have a feeling that with my blog I was collaborating for learning
2. I can use the idea of creating my own blog for my further learning
3. Creating my blog has changed the way I learn

The descriptives statistics of the learning impact dependent variable are Cronbach’s $\alpha=.86$; Ibiza $M=1.95$, $SD=.67$; Israeli $M=3.14$, $SD=.59$.

**Independent Variable: Teacher Student National Culture**

This categorical variable was coded into a dummy variable (Hardy, 1993). Israeli culture was used as the comparison point:

1. 1=Ibiza
2. 0=Israel

**Mediation Variable: Sense of Identity**

The student teachers’ identity with their blogs included 3 items:

1. I was happy to take the responsibility for creating my blog
2. I can identify with my blog. This is my creation
3. I am proud of my blog

The descriptives statistics of the sense of identity mediation variable are Cronbach’s $\alpha=.74$; Ibiza $M=1.96$, $SD=.70$; Israeli $M=3.54$, $SD=.45$.

**Results**

**Mediation Model**

The methodology developed by Baron and Kenny (1986) has proven useful for testing mediation model regressions. In our mediation model we applied three ordinary linear regressions for each path of the mediation model.
**Path c: The Direct Effect of Culture on Learning Impact when Using Blogs.** We first carried out a linear regression, with student teacher culture as the independent variable. Findings in Table 1 (Model 1) indicate that the student teachers’ culture had a significant negative effect on their learning impact when using blogs ($\beta = -.65, p < .001, 95\% CI [-.46, -.91]$) accounting for 42% of the variance ($F(1,105)= 74.87, p < .001$). Specifically, Ibiza student teachers perceived that the blog had more impact on their learning than the Israeli students. These results supported our first hypothesis. The explanation for these results may be related to the different interpretation of the term ‘culture’. If the meaning of ‘culture’ is related to ‘national culture’, one may explain the difference between the two groups as the way the impact of integrating blogs or other technological platform on students’ learning is perceived by its members. If the term ‘culture’ means the extent of openness and control that the technological platform allows its users, the difference in the learning impact between the two groups may be related to the platform’s characteristics.

<table>
<thead>
<tr>
<th>Step 1: Independent variable: Culture (1=IB; 0=IS)</th>
<th>( \beta )</th>
<th>SE</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culture</td>
<td>-.65***</td>
<td>.14</td>
<td>.42</td>
</tr>
</tbody>
</table>

**Path a: The Effect of Culture on Students’ Identity with their Blogs.** Findings in Table 1 (Model 2) indicate that the dummy culture variable also had a strong significantly negative affect on student teachers’ identity with their blogs ($\beta = -.75, p < .001, 95\% CI [.05, .30]; \beta = .25, p < .001, 95\% CI [-1.84, -1.31])$, accounting for 57% of the variance ($F(1,105)=137.80, p < .001$). Specifically, Ibiza student teachers identified more with their blogs than the Israeli students did, thus, supporting hypothesis 2. These results may be explained according to the characteristics of the learning task and the technological platform of the Ibiza group. As previously mentioned, the Ibiza group’s task allowed for more student control and as a result more identification with their blogs.

<table>
<thead>
<tr>
<th>Step 2: Mediation variable: Identity</th>
<th>( \beta )</th>
<th>SE</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identity</td>
<td>-.75***</td>
<td>.13</td>
<td>.57</td>
</tr>
</tbody>
</table>

**Path b: The Effect of Identity on Learning Impact.** Findings in Table 1 (Model 3) indicate that the mediator student’ identity with their blogs had a significantly positive effect on learning impact ($\beta = .75, p < .001, 95\% CI [.54, .77]$), accounting for 57% of the variance ($F(1,105)=132.81, p < .001$). Specifically, the more students identify with their blogs, the stronger the impact on their learning, thus, supporting hypothesis 3. This positive relation between identity and perceived learning impact is also supported by the previous study by Buchem et al. (2014).
Path c': The Mediating Role of Students' Identity with their Blogs on their Learning. Finally, we examined the extent to which the effect of students’ culture on learning impact is mediated by students’ identity with their blogs (path c’). Accordingly, we applied a linear regression, entering the dummy culture variable in the first step and the mediator variable (identity) in the second step. Examination of the mediation hypothesis (Table 1 Model 4) reveals that, when students’ identity with their blog was introduced into the model of effects on learning impact, the estimated culture effect was no longer significant, and the accounting variance was increased from 42% to 57%. According to Baron and Kenny's (1986) when the independent variable no longer affects the dependent variable after the mediator had been controlled (path c zero) it specifies a complete mediation model. Thus, according to this study's results, the relationship between students’ culture and the learning impact when using blogs was mediated by the students’ identity with their blogs.

Discussion and conclusions

In the current study it was found that the relationship between students’ national culture and learning impact in the context of blogs may be mediated by the extent to which the students identify with their blogs. In particular, the Spanish students expressed a higher level of learning impact when integrating blogs into their study program than the Israeli students. These results are of considerable interest since from the sociological perspective with the focus on cultural mapping (Hofstede, 2011), blogs may support the student-centred education idea, which Israeli educational culture tends to encourage more than Spanish educational culture may do. Data obtained lead to the idea that learning has more to do with context and personal characteristics than national identities. This result leads to further hypothesis as to the mechanisms that activate or stand behind the relationship between national culture and learning impact when integrating blogs.

An examination of the results of previous studies by Buchem et al. (2014) revealed that Spanish students developed the strongest feelings of identity in their learning environments (i.e., blogs) compared to German students. In other words, Spanish students focused more than German students on designing the representations of their identity in their blogs and thus perceived that the blog had a greater impact on their learning. Our study’s results supported these findings as it was also found that Spanish student teachers identified with their blogs more than the Israeli students did, and that the more the student teachers identified with their blog, the greater the impact on their learning. One explanation for these differences in perception of identity between the two groups was ascribed by other researchers (Buchem et al., 2014) to the disciplinary culture (Becher & Trowler, 2001) or the academic background of their research participants. Our study’s results may refute this explanation as both groups of students had the same academic background, i.e., teacher education. However, as there are some differences in their educational backgrounds, further research is needed to explore this issue.

All of the above made us think of ‘identity’ as a factor which may act as the psychological mechanism in the relationship between culture and learning impact. Examination of our mediation model revealed that the level of student identity with their blogs mediated the associations between the students’ national culture and their perception of the learning impact of blogs. In particular, complete mediation was found as the Spanish students identified more with their blogs than the Israeli students did and thus, they perceived that the blogs had a greater impact on their learning. In this regard, one may suggest that factors such as identification with the technological product may in fact have a greater effect on student learning than students’ national culture.
Buchem et al. (2014) also suggested that the differences in perception of identity can be ascribed to the learning activity or its context, especially in relation to how much freedom of choice and thus control is granted to students in their PLE practice. In this regard, the meaning of ‘culture’ in the current study may not refer only to the students’ nationality. As the learning activities that were given to each of the groups differ in their extent of freedom of choice and in their context (i.e., Moodle vs. Blogger), ‘culture’ may also represent the different characteristics of the tools involved in the learning activities. Embracing this interpretation into this study’s mediation model, one may argue that the characteristics of the learning activity, as well as the technological platform chosen to display it, may affect the level of students’ identity with their learning products and thus to perceive that it has a greater impact on their learning. Furthermore, these tools mainly differ in their possibilities for openness, allowing us to suggest for further research the hypothesis of openness as a possible variable for identity in students’ PLEs.

Research Implications

The main results of this current study and the mediation model it presents may suggest some educational implications for educators in the context of higher education and especially in teacher education programs. A general but major implication is related to the significant direct relationship between culture and learning. The effect of culture on students’ learning may empirically strengthen the importance of taking into account students’ culture in designing learning environments as well as the idea of multicultural teaching and learning. In this regard, educators should consider the socio-cultural context of their learners and adapt their instructional design for online learning to their cultures, as has already been suggested by Barberà, Layne and Gunawardena (2014). Specifically, in their courses, teacher-educators should continue to place emphasis on the concept of multicultural education and the multicultural competences needed to understand the effect of culture on students’ learning in face to face settings (Alismail, 2016) as well as in virtual learning platforms (Jayatilleke & Gunawardena, 2016).

Teacher-educators who wish to achieve a greater impact on students’ learning process, may design their learning activities in a way in which students will be able to better identify with their learning outcomes. For example, when integrating blogs into the learning process, educators should allow more open and flexible assignments (i.e., flexibility in postings and blog design) which would allow students to identify more with their blogs and to perceive a greater impact on their learning process. Furthermore, the research presented in this paper has been carried out in relation to Teacher Education programs, with implications for future transferability to other educational levels and inter-professional programs.

Therefore, this work is a contribution to international research and suggests important implications for further research from a comparative approach. The national culture element has been relevant in the analysis of possible differences in its impact on learning and particularly in the context of educational technology, as has been demonstrated in the literature review. The work by Hofstede (1986; 2011) has been paramount for comparative research; and it could still be useful even in the analysis of national educational technology programs for stakeholders at different levels. However, this does not seem to offer a sufficient explanation for identity, which is a more complex construct, as the social identity framework suggests. This work is in line with the alternative vision of the dominance of the culture element above all, since the mediation model evidences that factors such as personal identity can also be influential.

Although a considerable amount of work on identity has already been carried out, our focus on identity and learning impact is a rather under-researched perspective in the context of social media.
On the one hand, it has mostly been addressed as the image individuals create of themselves in virtual worlds or, regarding learning in PLEs, as the development of skills to manage one’s own identity, as has been shown in the literature review. On the other hand, it has been observed as one of the main issues in teachers’ professionalisation, and it has been said that the empowerment of student teachers’ identity needs to be improved all across Europe (European Commission, 2013). In recent times, some issues in relation to teachers’ professionalisation have been observed from in-service teacher identity as reflected in social media (Kimmons & Veletsianos, 2015). Moreover, it has been stated that blogs are currently being used as a place in which to express opinions and local implications of national educational policy (Greene, 2017). Nonetheless, blogging in Teacher Education can be of great relevance in order to help student teachers to define their own self-identity, by becoming spaces in which to express and reflect on their educational knowledge, beliefs and attitudes, which may well have very relevant implications in student teacher learning and outcomes. Similarly, in another study with pre-service teachers, the greater reflective activity on blogs was carried out by those students who also perceived their potential for their future professional careers (Pinya, Tur, & Rosselló, 2016).

The polyhedral approach to identity and culture in online learning that this research supports requires a new phase in which the conceptual background is extended. The models referred to above have contributed to the foundation of the concepts for the learning design and data collection although our conclusions would suggest a highly multifaceted approach concept for which other theoretical frameworks should be reviewed in future work. This is the case of the concept ‘idioculture’, which was described as highly contextual, but also included “multiple cultural selves and hybrid identities on the Internet that interact with each other cross-culturally to form unique cultures of their own” (Gunawardena, 2014, p. 84). Therefore, further research should include and state how these varied layers of identity and culture interact and influence student teachers’ learning.

Research Limitations

One cannot ignore the fact that testing the mediation model in the current study has some major limitations that should be considered. The first limitation is that the sample of our study is rather small, thus making it more complicated to generalise its results. Moreover, the two samples also differ in size since the Spanish sample was more than twice that of the Israeli sample. The reason for that was the relatively low return rate of completed questionnaires which may also reflect a cultural aspect relating to the academic context. The second limitation is that the participants in each sample are (in part) not homogeneous in their belonging to the same academic program. In this regard, B.A. programs compared to M.A. programs may be perceived as different academic contexts and cultures.

The third limitation is related to the idea of culture and the way to address it in the mediation model. Since the definitions, limits and constructs of culture as a concept are complicated, fluid and interpretative, in the current study we leaned on Hofstede’s classic model which argues that different nations may display different cultures. Thus, the current study looks on Spain and Israel as different cultures despite the fact that each of these two countries may be viewed as subcultural and multicultural nations. For example, Israel is a country composed of a Jewish sector and an Arab sector and each of these sectors also contains sub-sectors (i.e. Jewish secular, Jewish orthodox, Muslim Arabs, Christian Arabs, Druze etc.). These sectors design and display different subcultures encompassing ‘national culture’ as an umbrella term for the concept of ‘Israeli culture’. This means that the Israeli as well as Spanish population may in fact have a polycultural identity. Thus, the participants in each sample may not present only one culture but in fact, a whole variety of cultures.
In this regard, the three major limitations of this study related to variance errors especially related to within-group variation. Thus, future research should validate our mediation model by including, both larger and more homogeneous groups of participants, and a greater variety of national cultures and subcultures including gender and age.

References


Developing a framework for managing the quality use of podcasts in open distance and e-learning environments

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Abstract

The integration of podcasts in an open distance e-learning environment can play a crucial role in reducing transactional distance through providing quality educational opportunities and access to information through any digital device. However, technology does not improve teaching, unless if there is a well-conceived educational process taking place. The question therefore is how lecturers can be guided towards the quality use of podcasts in order to achieve most of the learning objectives. Therefore, this paper aims to design and develop a framework that manages the quality use of podcasts for teaching and learning in ODeL environments.

Using literature review, a developmental qualitative research design was used to develop a framework. McGarr’s (2009) and the revised Bloom’s taxonomy (Anderson et al., 2001) were used as domain specific guiders in the development of the framework. Results provided a framework to guide academic developers, learning technologists and course designers interested in quality in online environments.

Keywords: Podcasts, quality, open distance and e-learning, ODeL, support technology, framework, higher education

Introduction

Higher education has evolved markedly over the last decade and the range of changes demand a revision in the way that students are supported as part of the greater aim of ensuring the success of the university. The 21st century is globally seen as the century of technology-supported learning options, with developments that offer many opportunities for a new range of technology-based learner support possibilities. Because of the above fact most distance education universities moved towards the open distance and e-learning (ODeL) model (Unisa, 2015). An ODeL environment is understood to be an accumulation of openness and distance in education that seek to limit transactional distance through e-learning (Unisa, 2015). The use of any electronic technology to aid in the acquisition and development of knowledge is e-learning (Sener, 2015) and transactional distance is defined as “the gap of understanding and communication between the teachers and learners caused by geographic distance that must be bridged through distinctive procedures in instructional design and the facilitation of interaction” (Moore & Kearsley, 2012, p. 223). Due to the acceptance of support technologies as part of the open distance and e-learning (ODeL) operational plan, a number of changes in the higher education sector occurred nationally, continentally and globally. These were necessary to bridge the transactional distance in ODeL higher education. For example, technology could reduce the effects of isolation and promote inclusivity for distance learners through podcasting (Lee & Chan, 2007). Therefore, the inclusion of support technologies like podcasts became an important positive advancement in ODeL universities. The integration of podcasts played a crucial role in providing quality educational opportunities and access to information through any digital device.

Podcasting is an Internet technology that distributes audio files, commonly in MP3 format, over the Internet, which educators can use to provide students with course materials, which they can use at anytime and from anywhere, even when they are not connected to a computer (Rahimi & Katal, 2012). The use of podcast technology in education is a widespread occurrence, and its benefits in teaching and learning environments are extensively documented (Schreiber, Fukuta & Gordon, 2010;
Campell, 2005; Huann & Thong, 2006). Podcasts have several advantages such as lecturers using it to augment their teaching and to teach without restrictions in regard to time or place (Schreiber et al., 2010). However, using podcasts become less meaningful without appropriate objectives and goals for its use, structures for its application, trained and skilful deliverers, and clearly envisioned plans for evaluating its effectiveness (Bolliger, Supanakorn & Boggs, 2010). The successful implementation and suitability of podcasts, to support online teaching and learning, are guaranteed if a pedagogical model for using podcasts for academic learning is properly planned and reflected upon in order to engage the students and support their understanding of the individual modules.

As universities continue to emphasise the need for technology integration in teaching and learning, this has, in turn, increased the expectation placed on the role that technology can play in harnessing effective learning (Roblyer, McDaniel, Webb, Herman & Witty, 2010). The role of technology should be to enhance education by, for example, helping to organise and provide structure to the material consumed by students. Technology like podcasts should help to improve teaching and learning in higher education, as it can reach across racial, gender and geographic divides and serve as an extension and enhancer for handicapped students (for example, a blind student). Though the most suitable technology to use for different modules, time and space in online environments can be easily identified, not much attention is given to the lecturers who use the technology and what guides the quality use of the technology by the lectures (Education Week, 2003). There is a need to manage how the use of technology is applied across the expected knowledge, tasks and activities of the students. Therefore, for the lecturers at ODeL universities to be effective and efficient in the use of support technologies, like podcasts, the universities should offer the lecturers with practical ideas that can be used efficiently to direct and enhance desired learning outcomes for the students.

The quality use of podcasts for teaching and learning

There is great interest in podcasts in higher education, but relatively little evidence in the educational literature to support quality use of podcasts for teaching and learning in distance education (Abdous, Facer & Yen, 2012; Bolliger et al., 2010; O’Bannon, Lubke, Beard & Britt, 2011). Quality, in this paper, is defined as a process of qualitative change (fitness for purpose) or quality in results as the impact “on the students’ knowledge and personal development and on the faculty members’ scholarly and pedagogical ability and productivity” (Astin, 1985, in Bogue, 1998, p. 9). Therefore, a proactive intervention needs to be put in place to empower academics to take full advantage of using podcasts to achieve online pedagogical principles in their teaching.

Though innovations in technology, together with the use of the Internet, have transformed teaching and learning practices within ODeL institutions, technology does not improve teaching, unless there is a well-conceived educational process taking place that will enhance the teaching process (Mayer, 2009; Gibson, 2001). In fact, there is some evidence that online learning, unless carefully planned, can encourage students to focus on lower level cognitive skills (James, McInnis & Devlin, 2002). Podcasting has brought about new, ongoing social phenomena and, therefore, a new learning paradigm (Ractham & Zhang, 2006). Hence, podcasting for teaching and learning should usher in a new learning paradigm through a series of design iteration, innovation and collaboration among the participants in the academic world (Ractham & Zhang, 2006). All these developments must happen more qualitatively than quantitatively. If there are no proper plans in place for the use of podcasts, students may be less engaged in the learning and their motivation to learn may suffer.

The choice and use of a technology must closely align with the intent of the learning and teaching transaction. This goes hand in hand with the claim that the “media does not influence or motivate learning, but that learning is influenced by the content and instructional strategy” (Clark, 1994,
p. 21). An approach that holistically considers students’ knowledge and the use of technology can
inform lecturers to support and monitor students’ needs in a holistic way. Support technologies
(e.g. podcasting) must be grounded by sound educational goals, not by ambitious expectations
(Edirisingha & Salmon, 2007). The focus should be shifted from not only the benefits of podcasts, but
to also the quality use of podcasts. Therefore, there is a need to develop evidence-based strategies
for technology integration that will contribute to high achievement for all students.

The concept of teaching and learning is a lot more complex than simply the transmission of
knowledge and skills from a teacher to students. It is rather the integrating of many kinds of knowledge
and skills, and the management of and sensitivity to many different variables, that merge to create
an environment conducive to e-learning (Sfard, 2007; Hammerness et al., 2005). Therefore, there is
a need for a systematic and reflective process to translate the principles of learning and instruction
into plans for activities, information resources, and so forth (Gagne, Wager, Golas & Keller, 2005).

Research in the use of podcasts

The purpose behind the use of podcasting falls into three broad categories, namely to enhance the
flexibility of learning; to increase accessibility to learning (particularly in relation to enabling mobile
access) and to enhance the student’s learning experience (Lane, 2006; Nie, 2006; Rachtham &
Zhang, 2006). However, much that is written about podcasting in literature, refers only to its ability
to enhance convenience through flexibility and accessibility to learning (Frydenberg, 2006; Nathan &
Chan, 2007). The use of podcasts as a key element to broaden and deepen students’ understanding
is rarely highlighted in most research (Laurillard, 2002; Copley, 2007). Though a few models have
been created to guide some other types of technologies in the achievement of students’ learning
goals, few guiding models have been designed particularly for podcasts (Laurillard, 2002; Abt &
Barry, 2007; Kay, 2012). Studies that have looked at podcasts have focused on student perception,
satisfaction, achievement and the accessibility and functionality of podcasts in education (Fouts,
2000; Hill & Nelson, 2011). Furthermore, only a very small proportion of studies have centred on the
quality use of podcasts by the lecturer in ODeL (Nwosu, Monnery, Reid & Chapman, 2017).

In a study by Makina, Tshivhase and Madiope (2013), students were asked to indicate the types of
podcasts that they were receiving from the lecturers in their modules. In addition, extensive research
was done to identify all possible uses of podcasts in online teaching and learning. The results are
shown in diagram 1.

<table>
<thead>
<tr>
<th>Benefits derived from research</th>
<th>Responses from the students survey (Makina et al., 2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Prior to presenting a new topic, podcast provided a general overview as an advanced organiser</td>
<td>• Arouse interest and curiosity about a new topic</td>
</tr>
<tr>
<td>• Before teaching a complex skill or procedure, it provided a mental framework from which to approach it</td>
<td>• Inform you of the learning outcomes or benefits of learning new content</td>
</tr>
<tr>
<td>• Explained difficult concept, principle or abstract process</td>
<td>• Influence my feelings and attitudes about a topic</td>
</tr>
<tr>
<td>• Provided a lead-in to an assignment or learning activity</td>
<td>• Influence my feelings and attitudes about an assignment</td>
</tr>
<tr>
<td>• Provided some variety in the learning environment</td>
<td>• Was motivated to learn</td>
</tr>
<tr>
<td>• Welcoming students at the beginning of the semester</td>
<td>• Was introduced to the subject</td>
</tr>
<tr>
<td>• Teaching of complex and difficult topics</td>
<td>• Was introduced to the lecturer</td>
</tr>
<tr>
<td>• Limitations of conventional feedback approaches, like print tutorial letters</td>
<td></td>
</tr>
<tr>
<td>• Provide timely module supplements</td>
<td></td>
</tr>
<tr>
<td>• Alleviate broad issues faced by ODL students</td>
<td></td>
</tr>
<tr>
<td>• Giving immediate assessment feedback</td>
<td></td>
</tr>
<tr>
<td>• Giving support before writing exams-examination tips</td>
<td></td>
</tr>
</tbody>
</table>

Diagram 1: Comparing The Uses/Benefits Of Podcasts.
The results, in the diagram 1 indicate the types of podcasts students were receiving for their study. The results from literature (Makina et al., 2013) indicate that there were more uses for podcasts that were not being taken into consideration by the lecturers. It seemed that lecturers were not making maximum use of podcasts to enable students to understand their subjects. Further informal studies were also done by Makina (2018), at the same institution, that confirmed that 80% of the podcasts were used for technical issues and only the remaining 20% were used for the benefit of students’ learning (Makina, 2018). Future uses of podcasts should be guided by sound educational goals that aim to improve students’ learning.

**Lecturers and podcasts for teaching**

The challenges and role expectations related to supporting students through the use of podcasts are complex and demand robust guidance for the lecturers to achieve productive student learning. The focus should be to design and promote the use of podcasts in circumstances that will be beneficial to student learning. An invaluable source of support to lecturers, and the university at large, in the advancement of the scholarship of quality teaching and learning should be offered. Therefore, a proactive intervention needs to be put in place to empower academics to take full advantage of using podcasts for online pedagogical principles in their teaching. This can be done through specific recommendations about how to manage the effectiveness of technologies like podcasts in the enhancement of teaching and learning for students’ achievement. It is against this background that this paper seeks to develop a framework that can guide the lecturers in the quality use of podcasts, in order to meet most of students’ learning expectations that are aligned to productive learning.

Studies of some lecturers in higher education institutions to date, show many to be digitally unsophisticated and limited in the reality of teaching and learning online (Brown & Green, 2007; Kay, 2012). For the lecturers at ODeL universities to be effective and efficient in online environments, the university must offer the lecturers practical ideas that can be used efficiently to directly enhance desired learning outcomes. The lecturers should be able to identify learners’ needs and goals in such a way that the use of podcasts can be beneficial. Through the podcast, the lecturers should be able to create podcasts that enable the learning goals to be met. A proactive intervention needs to be in place to empower academics to take full advantage of the use of podcasts that is in alignment with online pedagogical principles. Therefore, any genuine attempt at improving the quality use of podcasts for teaching and learning should probably start with providing proper guidance for lecturers. This is required since, with the availability of new technologies, there is a need to create new ways of teaching and learning to include these technologies. Such a statement presupposes that a framework must exist to guide academics in that process. It was against this background that the development of a conceptual framework for managing the quality use of podcasts for teaching and learning in open distance and e-learning (ODeL) was initiated.

**Statement of the problem**

Based on the background of the problem, outlined above, it appears that podcasts are not being used to fulfil the maximum purpose of teaching as per students’ learning objectives.

**The research question**

The question therefore is: “How can lecturers use podcasts efficiently and effectively to achieve most expected students learning objectives?” Therefore, the aim of this paper is to design and develop
a framework that manages the quality use of podcasts (to variate or spread the use of podcasts) in order to achieve expected learning outcomes for modules or courses.

**Methodology**

A developmental qualitative research design was used in the design and development of the first prototype of the framework by using insights derived from a literature review, literature on reflective practices and researcher experiences in the management of quality podcasts for teaching and learning. The literature review in this paper focused only on published studies about podcasts used in higher education (Uddin, Onah & Samuel, 2019; Nwachokor, Abu & Arasi, 2019; Nwosu et al., 2017; Supanakorn & Bolliger, 2014; Bolliger et al., 2010; De Souza-Hart, 2011; Lazzari, 2009; Lonn & Teasley, 2009). The overall uses of podcasts that were obtained from literature are shown in appendix 4. Two useful teaching and planning tools, namely McGarr’s (2009) uses of podcasts for teaching and the revised Bloom’s taxonomy (1956; Common Sense Education, 2015) model by Anderson et al. (2001) (Appendix 2), which illustrates the interrelation of the taxonomy to the expected knowledge dimensions of students, were used in the design of the framework in this paper. McGarr (2009) categorised the uses of podcasts into three broad types: substitutional, supplementary and creative. Six categories were then adapted from McGarr’s (2009) categories and were related to the four expected competences of the students. The four expected student competences of knowledge are: practical, conceptual, perceptual and affective. The qualitative data analysis method chosen for this paper was thematic content analysis (TCA). TCA entails identification, analysis and reporting of themes within data. The development was in five stages:

**Stage 1:** This stage categorically put together all the uses of podcasts found in the literature of podcasts for teaching and learning in higher education literature (Salmon & Edirisingha, 2008; McGarr, 2009; Lin, Zimmer & Lee, 2013; Lazzari, 2009; Popova, Kirschner & Joiner, 2008) (appendix 4).

**Stage 2:** Data was classified into six categories that were derived from the literature review (appendix 2) and McGarr’s educational uses of podcasts (appendix 1) and then described in line with the objectives and outcomes of expected student learning. Each of the six categories had expected student learning within a podcast environment (appendix 2).

**Stage 3:** The categories with the real student knowledge dimensions were then aligned to the revised Bloom’s taxonomy (appendix 3) model. The categories were adapted to the real student knowledge dimensions, while providing reflection opportunities for discussion.

**Stage 4:** A proposed framework was then developed that is ready for use (diagram 2).

**Stage 5:** The framework was made available, to be presented at group conversations or conferences to allow critical analysis of the idea. This will prompt cycles of revisions and refinements until the framework is deemed satisfactory enough to guide institutions during the process of change towards the use of podcasts.

**The theoretical framework**

Insights that guided the design of the framework were the revised model of Bloom’s taxonomy by Anderson et al. (2001) (diagram 2), Bloom’s Digital Taxonomy (Common Sense Education, 2015) and McGarr’s (2009) educational uses of podcasting to enhance the lecture (diagram 3). The revised model of Bloom’s taxonomy has been linked to the expected knowledge dimensions.
The bloom’s taxonomy has not been used in its original form (1956) but in its revised form that is referred to as Bloom’s Digital Taxonomy (Common Sense Education, 2015). This is because a group of cognitive psychologists, curriculum theorists and instructional researchers, and testing and assessment specialists published a revision of Bloom’s Taxonomy in 2001 with the title “A Taxonomy for Teaching, Learning, and Assessment”. It draws attention away from the static notion of “educational objectives” (in Bloom’s original title) and points to a more dynamic conception of classification (Koppelman, 2013, Traxler, 2017).

The purpose of Bloom’s Digital Taxonomy is to inform instructors on how to use technology and digital tools to facilitate student learning experiences and outcomes (Koppelman, 2013). It expands upon the skills associated with each level as technology becomes an essential part of learning in open distance learning. Aligning the bloom’s taxonomy to podcasts act as a vehicle for transforming student thinking at different levels. Connecting characteristics of Bloom’s Revised Taxonomy is necessary for creating online learning activities that are in accordance with the students’ needs in open distance learning (Traxler, 2017). The revised model of Bloom’s taxonomy (Common Sense Education, 2015) classifies educational learning objectives into levels of complexity, specificity and originality, with three levels of knowledge: factual, conceptual and procedural. According to the revised model of Bloom’s digital taxonomy (Common Sense Education, 2015), cognitive processes seek to teach learners how to remember, understand, apply, analyse, evaluate and create. These are the basic elements students must have in order to acquaint themselves with a discipline and be able to solve the problems. All the issues in Bloom’s taxonomy should be taken into consideration during the use of podcasts for a particular course or module.

### Diagram 2: Category of the adapted revised Bloom’s taxonomy
(Anderson et al., 2001).

<table>
<thead>
<tr>
<th>Bloom’s taxonomy</th>
<th>Knowledge</th>
<th>Comprehension</th>
<th>Application</th>
<th>Analysis</th>
<th>Synthesis</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revised taxonomy</td>
<td>Remembering</td>
<td>Understanding</td>
<td>Applying</td>
<td>Analysing</td>
<td>Evaluating</td>
<td>Creating</td>
</tr>
<tr>
<td>Bloom’s definition</td>
<td>Remember previously learned information.</td>
<td>Demonstrate an understanding of the facts.</td>
<td>Apply knowledge to actual situations.</td>
<td>Break down objects or ideas into simpler parts and find evidence to support generalisations.</td>
<td>Compile component ideas into a new whole or propose alternative solutions</td>
<td>Make and defend judgments based on internal evidence or external criteria.</td>
</tr>
</tbody>
</table>

The table above shows the categories of the adapted revised Bloom’s taxonomy. The taxonomy has been adapted to include digital tools and technologies in the learning process.

### Diagram 3: Educational uses of podcasting in supporting/enhancing the lecture (McGarr, 2009)
Educational uses in supporting/enhancing the lecture.

- **Passive receivers of information**
  - Receiving complete lecture recordings
- **Substitutional**
  - Accessing summaries of lectures and course content
- **Supplementary**
  - Accessing additional learning material
- **Creative**
  - Creating podcasts to be distributed to peers and other learners

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McGarr (2009) categorised the uses of podcasts into three broad types of uses: substitutional, supplementary and creative. These categories were further unpacked into six categories that fitted into a podcast environment. The categories were adapted to improve future policies and practices for using podcasts, bearing in mind the expected student competences from Bloom’s taxonomy. The uses of podcasts, gained from the literature review (diagram 1; appendix 1), provided the suggested categories and were adapted to align with McGarr’s (2009) uses of podcasts, which provided the six categories for the framework (diagram 4).

A holistic approach was adopted to enable the construction of the framework through a literature review. Information was also derived from the revised model of Bloom’s taxonomy –Bloom’s Digital Taxonomy (Common Sense Education, 2015)– and the expected knowledge dimensions from McGarr’s (2009) model. The framework aligned Bloom’s Digital Taxonomy to the quality use of podcasts. Bloom’s cognitive processes were used to form a matrix (indicated in diagram 2) and thus performance objectives were created that were linked to the quality use of podcasts in student learning. Anderson et al. (2001) clarified the knowledge relationships within Bloom’s Digital Taxonomy. Bloom’s Digital Taxonomy could easily be adapted to the open distance learning environment.

**Results, discussion and recommendation**

The framework was partly designed to address recommendations made by Kay (2014), which called for the creation of video podcasts that contain effective instructional guidelines. The study was initiated with the assumption that podcasts are not being used effectively for teaching and learning. It builds upon previous research on the relationship between the uses of podcasts as a tool and the cognitive theories about teaching and learning (Laurillard, 2002; Copley, 2007). The paper presents a
framework that can guide the use of podcasts for teaching and learning in an open distance learning environment.

<table>
<thead>
<tr>
<th>Category (revised Bloom’s taxonomy) (Anderson et al., 2001)</th>
<th>Knowledge expected</th>
<th>Quality spread of podcast use (Appendix 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Remembering</td>
<td>Learnt by heart; recall or retrieve present or previously learned information</td>
<td>Technical issues</td>
</tr>
<tr>
<td>2. Understanding</td>
<td>To be able to explain, in your own words; comprehending the meaning, translation, interpolation, and interpretation of instructions and problems; state a problem in one’s own words.</td>
<td>Substitute for classes (substantial)</td>
</tr>
<tr>
<td>3. Applying</td>
<td>Using ideas and methods; use a concept in a new situation or unprompted use of an abstraction; application of learning in the classroom into real situations</td>
<td>Summaries of what has been taught (supplementary)</td>
</tr>
<tr>
<td>4. Analysing</td>
<td>Taking an idea or thing apart and explaining how it functions; separates material or concepts into component parts so that its organisational structure is understood; distinguishes between facts and inferences</td>
<td>Provide reflection</td>
</tr>
<tr>
<td>5. Evaluating</td>
<td>Critiquing ideas or things; make judgments about the value of ideas or materials</td>
<td>Using the learned knowledge</td>
</tr>
<tr>
<td>6. Creating</td>
<td>Putting different ideas or things together to create new wholes; builds a structure or pattern from diverse elements; put parts together to form a whole, with emphasis on creating a new meaning or structure</td>
<td>Generated by learners (creative)</td>
</tr>
</tbody>
</table>

Diagram 5: The framework for the quality use of podcasts.

A practical model for the missing link in the offer of quality podcasts for e-teaching and learning was provided. The framework (Diagram 5) is a designed tool for the use of podcast in higher education, through which key characteristics of teaching and learning objectives have been identified and synthesised. It is a direct output from the survey findings from previous papers and a discussion of relevant literature (Nerantzi, 2017; Makina, 2018; Makina et al., 2013; McGarr, 2009). The framework consists of six dimensions that have been adapted from Bloom’s Digital taxonomy, the students’ knowledge expectations (diagram 3). They are related to the quality spread that is suggested for podcast use (appendix 1). The characteristics are unpacked, using the general categories of outcomes that are required for the students to achieve in any discipline. The important objectives to be achieved with podcasts include the four key areas summarised by Kay (2014), which are as follows: establishing context, creating effective explanations, minimising extraneous cognitive load and maintaining student engagement. The results of the framework in this paper suggests that guiding principles can be given to the academics using podcasts to teach online. Future research needs to examine in more detail whether the suggested criteria, outlined in the designed framework, can contribute to effective student learning.

The framework is a self-explanatory tool, clarified in all the different categories and can be adapted and described in more detail in any relevant context. Diagram 5 is a visualisation of the framework and a quick reference guide intended to be used by, for example, academics, course leaders, instructional designers or designers.

Discussion

This study designed and created a research-based framework for the use of podcasts for teaching and learning. Students perceive online learning and its associated technologies, like podcasts,
as a strategic advantage to them. This is because it is beneficial, convenient and enhances their communication and interaction with their immediate learning environment (Ciampa & Revels, 2012; Hill & Nelson, 2011). For example, Agina-Obua (2005) shows that instructional materials, like podcasts, have an important influence on students’ academic achievement. Lucas (2015) sees instructional materials as objects that can help the academic to make learning more meaningful to the learner. The use of podcasts in teaching and learning should, therefore, assist students to learn more and to retain better what has been taught or what is to be taught. A podcast, as an instructional technology, is seen as a didactic instrument that makes learning and teaching possible. The framework shows the direct relationship between instructional material and the teaching methodology, which is of great importance for students’ academic achievement.

The framework serves as an educational tool that acts as a sign post for managing the quality use of podcasts, in order to monitor the quality of online learning experiences in an open distance and e-learning environments. To prevent the degradation of the podcast service, the framework sets minimum quality requirements for the use of podcasts for online learning. The focus is to clarify the validation and reliability of the framework to guarantee the quality use of podcasts in online modules. The development of this framework is aimed at providing an educational tool, which will help universities to use podcasts productively in the achievement of expected student knowledge. The objective of the framework is to identify a pedagogy and course design approach that will develop and monitor quality online learning experiences in open distance and e-learning environments. The framework offers academics with practical ideas that can be efficiently used to directly enhance the desired learning outcomes in online environments. The framework offers an instrument that enables learning objects users to create reviews consisting of ratings or some dimensions of quality (Nesbit, Belfer & Leacock, 2004).

The aim of the framework is to transform and guide the practices of the lecturers in the use of podcasts by offering lecturers practical ideas that can be efficiently used to achieve a variety of students’ knowledge expectations that result in productive learning. A framework that allows the effective capture of the knowledge requirements and expectations of students is the best way to verify the appropriateness of the podcast as a support technology. Nwachokor et al. (2019) point out that educational software, like podcasts, should have these five functions: drill, practice, tutorial, simulation/games and problem solving. The question of how users can create, distribute and share knowledge via podcasting is pertinent (Mugwanya, Marsden & Boateng, 2011). This is because the roles that podcasts have in the production and sharing of knowledge can improve the student’s online learning performance. Knowledge is situated in part as a product of the activity, context, and culture in which it is developed and used and therefore the framework will help instructors apply the right tool to the right learning goals (Koppelman, 2013). The framework designed in this paper will serve as an eye-opener to the numerous advantages to using podcasts as instructional material. Lecturers will benefit from this paper in that the framework will provide them with adequate techniques to effectively teach with technology.

The findings of this paper also provide curriculum planners with the information needed to enrich future trends in the curriculum that aims to reduce the declining overall performance of students (Jarvis & Dickie, 2010). The pedagogical skills of lecturers will improve, if the findings in this paper are well implemented. Although it has yet to be formally tested, its potential usefulness, in practice, has been noted. Further work is needed to consolidate the usefulness of the framework designed in this study. This paper shows that by clearly managing the use of podcasts, it is possible to design settings and standards that are theoretically grounded, practically feasible and adequate for the specific purposes and goals. Although managing the effectiveness of support technologies in higher
education is still very intimidating and appears complex, it is a good return on technology investment, as the expenditure on podcasts must be accounted for and deliver on its promise.

**Recommendation**

The results of this paper have several implications for professional development in the future use of podcasts. It highlights some of the more general issues that lecturers face when attempting to use support technologies and new skills in their practice. The framework guides lecturers to utilise podcasts for the benefit of productive student learning. Staff or professional development can therefore be complemented by showcasing the relationship between pedagogical knowledge and the quality use of podcasts, to support quality student learning in ODEL and other environments that use support technologies. Lecturers can gain skills and experience in the quality use of podcasts by using the standards that talk to the expected quality of instruction and learning. This goes hand in hand with Sandholtz and Reilly’s (2004) idea that professional development programmes that focus on instructional rather than technical issues are more effective in the productive and creative uses of technology.

The need to transform and guide the practices of the lecturers regarding the use of technology in teaching and learning is a key issue for further research. Educational leaders and policymakers, at all levels, need to carefully plan the use of podcasts, in conjunction with key technology stakeholders, who have the practical information at hand. Based on the findings and results, it is recommended, among others, that higher education institutions organise capacity building workshops, centred on the quality use of technology for effective learning in the 21st century education. The university should motivate lecturers to employ technological tools in teaching, using the guidance provided by the framework.

It can be concluded that the framework proposed in this study is a reasonable starting point for providing a useful guide and design tool to academic developers, learning technologists and course designers interested in quality online teaching and learning. If the framework is discussed on several curriculum and learning development platforms, it can be improved on, to the point of having the findings generalised to other education institutions. The framework needs to be piloted through a trial implementation process, using real data, before it can be recommended for adaptation in higher education institutions.

**Limitation**

Recent literature review of quality in the use of podcasts in open distance learning environments in higher education was not easily available. The designed framework will require contextualisation and adaption before application. It has not been used in practice.

**Conclusion**

The provision of quality education in higher education institutions can be undermined by the lack of an organised use of support technologies for teaching and learning. This paper demonstrates that Bloom’s taxonomy can be used to evaluate the quality use of podcasts. It provides an assessment of the quality use of podcasts for those who want to provide a benchmark for its use. In addition, higher education institutions might also assist teacher educators, school district personnel and researchers to better understand the value, challenge, and benefits of using podcasts in courses or programmes. The framework may also be of interest to other disciplines and professional areas, in higher education contexts, and could be considered as a tool for further research about online learning.
References


Appendix 1
Uses of podcasts from literature

Appendix 2
Categories and description of the educational uses of podcasts to support learning

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>• Welcome students to the course</td>
<td>• Teaching complex and difficult topics</td>
<td>• Provide guidelines for revision</td>
<td>• Provide and explain activities</td>
<td>• Students giving feedback about an activity</td>
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<tr>
<td>• Introducing the lecturer</td>
<td>• Presenting a short lecture</td>
<td>• Assessment feed forward and feedback</td>
<td>• An interview /dialogue podcast</td>
<td>• Make available useful and authentic information</td>
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<tr>
<td>• Overview of the module</td>
<td>• Provide further explanations</td>
<td>• Guidance before students face their first major exam</td>
<td>• Preparation before final examinations</td>
<td>• Proactive academic intervention given to students</td>
<td></td>
</tr>
<tr>
<td>• Guidance to the tools used in the management system</td>
<td>• Support students who are “at-risk”</td>
<td>• Support students who are “at-risk”</td>
<td>• Make available useful and authentic information</td>
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<tr>
<td>• Orientate students around the course</td>
<td></td>
<td></td>
<td>• Quizzes</td>
<td>• Recall / integrate previously learned material with new content</td>
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<tr>
<td>• Pace student studies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>• Motivate and hold students' interest</td>
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<tr>
<td>• Announce ment of critical issues (e.g. temporary breakdown of the learner management system)</td>
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<tr>
<td>• Alleviate broad issues faced by ODL students</td>
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<tr>
<td>• Provide guidelines</td>
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</table>

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Appendix 3
Aligning the framework with Bloom’s taxonomy

<table>
<thead>
<tr>
<th>Category of the adapted or revised model of Bloom’s taxonomy</th>
<th>Knowledge expected (McGarr, 2009)</th>
<th>Examples of podcast activities and outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Technical</td>
<td>Advertising course</td>
<td>• Welcome students to the course</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Motivate students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Holding their interest.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pace studies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Clarifying exam expectations</td>
</tr>
<tr>
<td>2. Remembering</td>
<td>Substitutional use</td>
<td>• Receiving complete lecture recordings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Repeat of a lecture</td>
</tr>
<tr>
<td>3. Understanding</td>
<td></td>
<td>• Provide timely academic material</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Provide subject</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Related news to students.</td>
</tr>
<tr>
<td>4. Applying:</td>
<td>Supplementary use</td>
<td>• Providing supplementary material</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Providing additional learning material</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Preparing students before they write final examinations</td>
</tr>
<tr>
<td>5. Analysing</td>
<td></td>
<td>• Providing summaries of lectures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Identifying important aspects of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>course content</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Presenting a short lecture on the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>main facts/topic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Explaining a problem</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Solving the problem</td>
</tr>
<tr>
<td>6. Evaluating</td>
<td>Creative use</td>
<td>• Lecturer’s opinion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Speaker’s perspectives</td>
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<tr>
<td></td>
<td></td>
<td>• Syntheses of core readings and course materials.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Explaining/Solving the problem</td>
</tr>
<tr>
<td>7. Creating</td>
<td></td>
<td>• Creating podcasts by students to be</td>
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<tr>
<td></td>
<td></td>
<td>distributed to the lecturer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Creating podcasts by students to be</td>
</tr>
<tr>
<td></td>
<td></td>
<td>distributed to other learners</td>
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</tbody>
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Results from a Psychology OER pilot program: faculty and student perceptions, cost savings, and academic outcomes

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Abstract

This case study describes the library’s experience of collaborating with an undergraduate Psychology Department at Touro College to integrate open textbooks into their program. We discuss the pedagogical changes as well as explore the impact of Open Educational Resources (OER) on students’ savings, their academic outcomes and perceptions of OER. Furthermore, we highlight the successes and shortcomings in having the library as a central OER partner. To measure the results, we surveyed students and conducted a faculty survey and a focus group, in addition to analyzing the students’ final grades. This pilot program delivered strong results. The students’ perception was very positive, and faculty’s opinions on the textbooks used were mixed. Some professors felt that the textbook lacked important content, but because of its openness, they added their own content to the book. Students enrolled in OER courses performed better than those enrolled in the same courses using a commercial textbook.

Keywords: OER, Open Educational Resources, Higher Education, Libraries, Psychology

Introduction

The price of textbooks has risen steadily, increasing more than 1000% since 1977 (Popken, 2015). In 2017, for the first time, prices have stopped rising and started to decrease. While speculating about possible reasons, Dr. Mark Perry credits Open Educational Resources publishers as responsible for this historical break in the trend (Perry, 2017). The influence of OER, however, goes beyond cost. Current research on its impact measures not only Cost, but also Outcomes, Usage, and Perceptions (known as COUP Framework, Open Education Group, n.d.). We briefly discuss research measuring these elements below.

Using Open Educational Resources instead of traditional textbooks has been shown to be cost effective based on many studies. Among them, John Hilton III and his colleagues have conducted several large-scale studies over the years in different programs, majors and multiple colleges (Hilton, Robinson, Wiley, & Ackerman, 2014; Hilton, Gaudet, Clark, Robinson, & Wiley, 2013; Hilton, 2016; Ikahihifo, Spring, Rosecrans, & Watson, 2017).

In addition to being cost effective, studies have shown that the academic efficacy of students has been the same or even increased when utilizing OER. Jhangiani and Jhangiani (2017) citing Hilton (2016); Hilton, Fischer, Wiley, and Williams (2016), note in their article that “thirteen studies (with an aggregated sample of 119,720 students) that have investigated the impact of OER adoption on course performance found that 95% of these students have achieved the same or better outcomes when using OER” (p. 3). Similar outcomes have been confirmed by a 2018 study at the University of Georgia with large student samples over a period of six years (Colvard, Watson, & Park, 2018) finding improvements in grade levels as well as in completion and retention. Smaller and shorter studies have also reported positive student academic results (Clinton, 2018).

§First author affiliation changed from Touro College to NYU Grossman School of Medicine after the paper was submitted.
A third measure, usage, can provide insight on how students and educators take advantage of open licensing permissions to adapt OER. This can be achieved by observing how materials are Deleted, Inserted, Moved, or Edited (known as DIME model, Open Education Group, n.d.).

The last component of the COUP framework is perception. Ample research has examined students' and faculty's perception of OER. Such studies provide both quantitative data, which is especially valued by administrators, and qualitative data, which can provide impactful stories that can be used during outreach. Cooney (2017) examined students' perceptions of the Psychology OpenStax textbook, after also reviewing the literature on this subject. As pointed out by the author, the majority of previous studies reported positive perceptions (Bliss, Hilton, Wiley, & Thanos, 2013a; Bliss, Robinson, Hilton, & Wiley, 2013b; Hilton et al., 2013; Petrides, Jimes, Middleton-Detzner, Walling, & Weiss, 2011, as cited in Cooney, 2017). Cooney's study differs from most in the sense that the author conducted interviews and focus groups with students, in addition to surveys. The findings confirm what has been previously reported by other studies, with students preferring OER to traditional textbooks. It is important to note that the students highlighted the convenience of accessing open textbooks. This observation is of interest to the present research, since Touro College also caters to urban commuter students.

Hilton's (n.d.) summary of empirical research on OER discusses faculty perceptions in five studies (Petrides et al., 2011, Jhangiani, Pitt, Hendricks, Key, & Lalonde, 2016; The California OER Council, 2016; Jung, Bauer & Heaps, 2017; and Watson, Domizi, & Clouser, 2017). As with traditional textbooks, faculty identify both negative and positive characteristics of open textbooks, but overall find that quality is comparable. Watson et al. (2017), for example, mention that "professors using an OpenStax textbook agreed that there were things missing from the text", but that "the flexibility allowed by open licensing was an opportunity to rethink and modify their classes, and add supplemental resources" (pp. 294-295).

This paper aims to add to the growing body of empirical data that measures cost, outcomes, usage, and perceptions of OER. Moreover, we reflect on the collaboration between faculty and library in the creation of an OER program. We conducted a faculty survey, a student survey, a faculty focus group, and analyzed the academic outcomes of the students enrolled in eight psychology course sessions using OER, compared to the outcomes of students using traditional textbooks in the same course in the previous semester.

These instruments were used to answer the following research questions: (i) how aware are faculty of Open Educational Resources, open textbooks, and licensing (copyright, public domain, and creative commons)? (ii) how much can students save when faculty uses an open textbook? (iii) how does the cost of traditional textbooks affect Touro College's students, and what measures have been taken to reduce those costs? (iv) what are students' perceptions of open textbook quality, use and format? (v) what are faculty's perceptions of open textbook quality, use, and outcomes?, and (vi) how do academic outcomes of students enrolled in OER courses compare to those enrolled in courses using traditional textbooks? These questions were designed to measure cost, outcomes, usage, and perceptions of OER quality, following the COUP framework (Open Education Group, n.d.).

**Outreach**

In higher education, librarians are increasingly more involved with OER. In addition to the librarians' expertise, it is beneficial to have the library as an OER partner because of "its centrality and visibility on campus" (Alpi, Cross, Raschke, & Sullivan, 2017, p. 71). As with many other aspects of the library profession, librarians can take many roles in OER initiatives. Dr. Bradlee and VanScoy (2019) summarized the ways librarians engage in OER. According to the most recent literature:
librarians can be involved in adoption; advocacy; curation, preservation, and repositories; content development; description, cataloging, and metadata; discovery; funding; information literacy; licensing, intellectual property, and copyright assistance; professional development; publishing; recognition of OER leaders, and also serving as information specialists in OER teams (Bradlee & VanScoy, 2019, pp. 429-430).

Touro College New York is a medium sized commuter institution compromised of ten campuses in New York City, with “a mission to offer neighborhood-based programs that serve and encourage service to under-resourced communities” (Touro College, n.d.). Touro College libraries initiated a college wide OER program, took on the responsibility of advocating for OER, and later offered professional development webinars to faculty seeking to learn more about these resources. This particular study was conducted at Touro College’s New York School of Career and Applied Studies.

Higher Education OER programs grow both as bottom-up and top-down initiatives, depending on the context of each institution. For this reason, it is crucial to understand how the institution works. One of the librarians involved in this initiative has worked at the college for more than a decade and recommended that in order to create a sustainable OER program, higher administration had to be a part of the program.

Based on this strategy, our first step, after gaining knowledge about the OER movement, was to meet with Touro College’s deans. Although some were skeptical of the quality of OER, as it often is reported with people who are first exposed to OER, most were supportive. We believe that their support was immediate because we demonstrated how an OER initiative could help the college fulfill its mission and meet its strategic goals. The deans instructed the library to treat the initiative as a pilot, and the results are reported in this paper.

During our outreach to different departments, we contacted the chair of the Psychology Department. She was concerned with the rise of textbook prices and its impact on students’ education, and expressed her eagerness to discuss the use of open textbooks. Seeking for a solution, that department had already tried different alternatives, investigating information about online vendors, encouraging students to rent textbooks, and adopting bundles that included digital or print books at significant discounts. These efforts yielded limited success.

The chair and her department discussed the possibility of using open textbooks but had reservations about OER. At the library’s presentation, they were able to voice their concerns and gather the information needed about these resources. Aside from a general overview of OER, the librarians compared commercial textbooks used by faculty against similar available open textbooks. This facilitated the process, since the professors did not have to search for the textbooks themselves.

After this presentation, three professors decided to use open textbooks in place of commercial textbooks during the fall 2018 semester. Two of them adopted the textbook Psychology, by OpenStax (2014), and one adopted the textbook Research Methods for Psychology (Crump, Price, Jhangiani, Chiang, & Leighton, 2018). Touro College’s Psychology department at the New York School of Career and Applied Studies was thus the first department in the institution to adopt open textbooks in multiple course sections. Naturally, the pilot requested by the deans was conducted at this department.

Methods

The methods employed in this study were designed according to the COUP Framework (Open Education Group, n.d.). By measuring the cost, outcomes, usage, and perception of OER, we believe we can provide a deeper understanding of both efficacy and perceptions OER quality in the context of our institution. We also trust that research that studies the impact of OER in all of the metrics mentioned can better inform new research and OER adoption in the future.
As a first step in outreach, we intended to gauge faculty’s awareness of OER through a college-wide survey. Although this survey did not produce significant results, it informed our next outreach decisions. After the first semester of adoption, we assessed cost, outcomes, usage and perception using four instruments: textbook cost savings, an analysis of the students’ academic outcomes, the perceptions of students through a survey, and the perceptions of faculty by conducting a focus group. The results are explained below. We will discuss each method in the appropriate sub-section, as well as the research questions they intend to answer.

**Faculty Survey**

To answer our first research question, “how aware are faculty of Open Educational Resources, open textbooks, and licensing (copyright, public domain, and creative commons)?”, we created a 25-question survey (exempted from IRB review), based on the surveys of Allen and Seaman (2016), Bliss et al. (2013b), and Seaman and Seaman (2017).

Like Seaman and Seaman (2017), we also intended to assess (a) the decision process behind the selection of educational resources: what materials are selected, when, and the faculty’s role in the decision. Also, what influences faculty’s decision and how satisfied they are with it; (b) the proportion of students who purchase required textbooks, as reported by the faculty, and textbook prices; (c) potential barriers to adoption of Open Educational Resources, and (d) future use of Open Educational Resources.

From an initial pool of over 600 faculty, only 62 responded. The low response rate can be attributed to several factors. First, this survey was sent out to all undergraduate faculty while unbeknown to us three other institution-wide surveys simultaneously requested faculty’s attention. Second, the survey was unnecessarily long, contained several matrix tables, and questions contained grammatical conjunctions. We are not reporting the results of this survey because we do not consider it to be significant.

Although we failed to reach a satisfying number of respondents, faculty’s comments informed our outreach decisions: we learned that several departments regulate textbook and other materials selection for courses. Until then, we were unaware of the different departmental practices when adopting course materials. Based on this finding, we decided to approach departments directly, instead of individual faculty members.

**Cost Savings for Students**

In order to address our second research question, “how much do students save when using an open textbook?”, we used SPARC’s cost-saving projections (Nyamweya, 2018). During the fall semester of 2018, 99 students enrolled in eight course sections of one introductory and one upper-level psychology course. When calculating cost savings, researchers can opt for one of two methods. In the first, one can calculate savings by using the cost of a new commercial textbook, multiplied by the number of students. This method does not account for the fact that most students do not buy new textbooks; rather, they can rent them, share them with fellow students, buy used copies, etc. Additionally, textbook prices vary widely in price: a chemistry textbook, for example, can cost a few hundred dollars, while an anthropology one can cost under fifty. To solve this issue, SPARC collected data from 600 courses at 120 U.S. institutions. They found that “the average price for courses using traditional materials was $134.26 and the average price for courses using OER was $17.32. Therefore, the average savings between courses that use traditional materials and those that use OER was $116.94” (Nyamweya, 2018).
There were 99 students enrolled in psychology courses using open textbooks during the fall semester of 2018. Using SPARC’s cost-saving projection, the total savings for those students was $11,577.06.

**Student survey**

For our next research questions: (iii) how does the cost of traditional textbooks affect Touro College’s students, and what measures have been taken to reduce those costs? and (iv) what are students’ perceptions of open textbook quality, use and format?, we developed a survey of 13 open and close-ended questions. These questions were based on studies from Florida Virtual Campus (2016), Jhangiani and Jhangiani (2017), and Bliss, et al. (2013a). Some additional questions were formulated by the authors. Through this survey we also hoped to determine the likelihood of future student enrollment in OER course sections.

At the end of the fall 2018 term, in which faculty used open textbooks for the first time, the librarians administered a survey to all students enrolled in the eight sections of psychology courses (six introductory, and two upper-level courses, 99 students). This survey was exempt from IRB review. We decided to deliver a paper-and-pencil survey, instead of a web-based one, as we believed that this method would result in higher completion rates, compared to an online delivery.

The printed survey was distributed to all students, who were instructed to read the informed consent, presented in a cover letter on top of the survey instrument. Using the informed consent as a script, we reinforced that their participation was voluntary, that no personal information would be collected, and that the survey would not interfere with their grade, or any other aspect of their class.

Sixty-one students responded to the survey, with a response rate of 61%. In the sub-sections below, we discuss the students’ answers for the consequences of traditional textbook costs, format preference and usage, perceptions of OER quality, and the likelihood of future enrollment in an OER course section.

**Consequences of Textbook Costs**

Many studies surveyed students on the consequences of the prohibitive cost of textbooks (e.g. Florida Virtual Campus, 2016 and 2019). We replicated this question, and found similar results to those studies. Seventy percent of the students surveyed responded that the cost of required textbooks has caused them to not purchase them, either frequently (31.1%), occasionally (27.8%), or seldom (11.1%).

Not having purchased textbooks affects students in many ways. 41% do not register for a specific course, and 41% take fewer courses because of the price of textbooks. 42% earn a poor grade, 29% fail a course because they could not afford the textbook. Additionally, 20% drop and 23% withdraw from a course because of the price of required materials. Although this is a small sample, it shows that the reality of the students surveyed is very similar to other students nationwide (Florida Virtual Campus, 2016 and 2019).

From the students surveyed, only two reported that they do not attempt to reduce the price of required materials, purchasing them at regular cost. The remaining 59 students take several measures to reduce the cost of required textbooks.

These findings are illustrated below (figure 1).
**Format preference and usage**

One of the concerns expressed by Touro College’s faculty is that the students might not like digital-only textbooks. This is a valid concern, since this institution caters to religious students who may not use electronic devices during certain days. Based on this, we included a question asking the students how they feel about the format of the course materials. Only 3.4% responded that they like it less than print textbooks; 57.6% like it more than print textbooks and 39% are indifferent. All students but one also answered that they are very likely to register for a future course with online texts like the open textbook used in their OER courses. Half of the students reported that they printed sections of the textbook.

The surveyed students predominantly used their smartphones and laptops to read their textbook. Less often, they used tablets and desktop computers, as illustrated by the bar graph below:

**Quality**

Two questions were included regarding the quality of the open textbooks used. The first asked students how they would rate the quality of the textbook used in the course. The participants could choose from
better, same, or worse than the quality of the texts used in my other courses. The majority of the students (68%) answered that it was better than other texts, and 32% answered that it was the same. No one reported that the quality of the open textbook is worse than the quality of textbooks used in other classes. The following pie chart (figure 3) demonstrates the students’ perception of quality:

![Pie chart showing students' perception of quality](image)

**Figure 3: Quality of open textbooks.**

The following question asked students to justify why they thought the quality of the open textbooks was worse, the same, or better than traditional textbooks. To analyze their answers, we first coded each response using an open-coded process. In this first analysis, twenty codes emerged. Upon reviewing them, we grouped the most similar ones into the following six themes (table 1).

<table>
<thead>
<tr>
<th>Themes</th>
<th>Initial codes</th>
<th># of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Convenience</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Easy to access (online, phone, tablet, etc.)</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>No need to carry a heavy textbook</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I can study anywhere</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Cost</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Free</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I can use the money saved for transportation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I can use the money saved to pay for my tuition</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Quality</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Straightforward text</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clearly written</td>
<td></td>
</tr>
<tr>
<td></td>
<td>More detailed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Comprehensive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thorough</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Easy to understand</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well organized</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brief</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“Personal feel”</td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
As the table above shows, there were five positive themes: convenience, cost, quality, access, and format. There was also one neutral theme, and no negative comments. Students determined that the online textbook was easy to access across devices, enabling them to study anywhere, and reducing the weight of their backpacks. They also judged that the cost and quality of the textbook were important factors. One student mentioned that having access to the required materials from day-one allowed the professor to continue the class without delays, since they did not have to wait for students to acquire the textbook. In addition, one student confirmed using the textbook more often, and one mentioned that not having markings from used textbooks was very positive. For four students, using the open textbook was the same as using a traditional textbook.

Future Enrollment in OER Course Sections

The last survey question intended to assess whether students would enroll in future courses using open textbooks (question reproduced from Bliss et al., 2013a):

Imagine a future course you are required to take. If two different sections of this course were offered by the same instructor during equally desirable time slots, but one section used texts similar to the one used in this course and the other used traditional published texts, which section would you prefer to enroll in?

Which section would you prefer to enroll in?

Figure 4: Students’ course preference.
Twenty-three percent of the students did not answer this question. This was the last question, and this was a paper-and-pencil survey. Having an open-ended question as the last survey question was not a good strategy, and it certainly contributed to lower response rates. We will consider switching the order of the questions in future surveys. Still, as seen in the illustration above (figure 4), the majority of those who responded (39 students) declared that they would enroll in a course using texts similar to the ones used in their OER class. Three students prefer traditional textbooks, four would base their choice on the price of the traditional textbook, and one is unsure.

The students’ perceptions of open textbooks, as demonstrated above, was very positive. We expected that the money saved when using an OER would guide the students’ impressions. However, the students also praised the quality of the textbook used, as well as the convenience, and the ability to access the textbook, as a group, since the start of the classes. After assessing the students’ perceptions, we determined that it would be important to learn whether the professors had similar attitudes.

**Faculty Focus Group**

For the fifth research question, regarding faculty’s perception of open textbook quality, use and outcomes, we conducted a focus group with three professors who had adopted open textbooks the previous semester. The conversation was led by a few open-ended questions from Bliss et al. (2013b). We also wanted to assess how the library can better support faculty who had already transitioned to OER.

In order to protect the faculty members’ identities, their names were removed. This focus group was approved by the institution’s review board.

**Q1: How much time did you spend preparing for this class, compared to a previous, commercial textbook?**

Professor 1 said that the times were perfectly comparable. The other two professors agreed that it took more time to transition to an OpenStax textbook, compared to the previous commercial textbook. This was justified because, according to them, the OpenStax Psychology textbook is lacking in some respects. To account for that, they had to complement the textbook, which was not needed before.

**Q2: How did the students’ preparedness compare between semesters? Was there any difference?**

It was evident that the professors agreed that they could not really isolate the open textbook impact on the students. However, they recognize that, because the students now have access to the textbook, they are better prepared. The contrast, here, is not between the quality of commercial textbooks versus open textbooks, rather between textbooks that are not purchased because of their prohibitive costs versus textbooks all students can access freely.

*I’d say a little bit. Because it seems that most of the students are actually reading the material.* (Professor 2)

*There is more involvement, because they are reading it on their phones as well.* (Professor 3)

**Q3: How often did you think that the students used this textbook throughout the semester?**

The responses to this question were very similar to the previous one. Two professors stated that they could not assess how often the students were using the textbook. One professor expressed that
her students were reading the assigned chapters at least once. One professor also mentioned that, because the students can print a chapter at a time, or read on their phones or tablets, they use their commuting time to catch up with the weekly readings:

*We have a mantra in our class, we all have to do our readings on the subway, especially in the mornings. We use it as an example of an empirical question too: it is easier to read in the mornings on the way to work, than it is to read in the evenings. When I assign a reading, I say: this is the reading for the subway for this week.* (Professor 1)

**Q4: On average, how would you rate the quality of this text, compared to the traditional one?**

The two professors who use the OpenStax textbook agree that the quality is lower. The third professor, who uses a different textbook, thinks that the quality is good. Regarding the OpenStax textbook:

*The way it stands now, much lower, but we will try to improve it. They missed many things. I do not know if they purposefully deleted them, but they are very important, and everybody would agree that they should be there. The chapters are very similar, but the content is not.* (Professor 3)

During the conversation, faculty pointed out that they were not aware of other options for open textbooks in that same discipline. This shows that the library needs to do a better job in checking in with faculty using OER to make sure that their needs are met, to provide continuous support, and to offer options when they are available, and to promote OER repositories.

**Q5: What feedback, if any, did you receive from students about the textbook used in this course?**

Professor 1 reported that her students have been happy with the textbook being used. She uses a textbook written and published using a typesetting system. When the typesetting was converted to a PDF, some formatting errors resulted in mislabeled figures, for example. One of her students complained about it.

*I think it’s true that when you lack the big business of a publishing house… the perfect copy-editing [does not] happen. Arguably, I could have kept track of these suggestions, and changed them later.* (Professor 1)

The code for this textbook is available to everyone, and because it is published under an open license, anyone can make changes. Additionally, the author encourages the community to use Hypothes.is, a web annotation tool, to point out typos and errors that need to be fixed, or to suggest alterations.

The professors using Psychology OpenStax plan to adapt the textbook using the OpenStax CNX platform. Regarding student feedback from the OpenStax textbooks, the professors mentioned that the students appreciate free access to the textbooks.

**Q6: Has anything changed in the way you teach this class?**

One of the faculty participants used the new textbook to restructure the class. This was an opportunity to think about what content is most important for the class, rather covering all content simply because the students were required to buy the textbook. Aside from rethinking the content, this professor chose a different strategy to present the textbook to the students. She posted one
chapter at a time on the Learning Management System, so the students could focus on only that chapter.

Because I don’t require a whole textbook to be bought, I have been more willing to cut chapters that I choose not to spend time on, which allows my students to focus on the chapters that I have selected… I only post one PDF at a time on the LMS. In the semester, it is better to select the contents that you think most important for how you are organizing the class… I think it helps students to be able to focus on a little less, rather than being inundated with more. (Professor 1)

The other two faculty members teach an introductory course. Rather than cutting chapters, they felt the need to include more content to supplement the OpenStax textbook.

Q7: In future courses, how likely are you to use open textbooks?

Despite some quality concerns, and the need to supplement their textbooks (in the case of OpenStax), all faculty participants plan to continue using open textbooks in the future.

I almost think it is wrong not to. Unless you are teaching a class where it is simply not available. But even then, you’d feel more compelled to find online sources, or compile something in your own way… I think it’s immoral to require a $100 textbook. (Professor 1)

Q8: How do you envision the role of the library when it comes to OER?

The faculty participants reiterated that they would like the library to help them navigate different options, offering opportunity to review other textbooks.

Academic Outcomes

Our sixth and last research question concerned students’ academic outcomes: “how do academic outcomes of students enrolled in OER courses compare to those enrolled in courses using traditional textbooks?”. In order to test if there was a difference in academic outcomes between the open textbook and the traditional textbook, we compared the grades of 180 students. The first group, which we named Traditional, had 81 students enrolled in psychology courses using a traditional, commercially published textbook in the spring of 2018. The second group, named OER, had 99 students enrolled in the same courses, taught by the same professors, but using an open textbook in the fall of 2018. The groups are compared as independent groups, because they comprise different groups of students.

We received the grades from the professors as letter values, and assigned them numerical values based on the correspondent grade percentage. We assumed that grades ranging from A+ to C- would be passing grades. All grades D and F would be considered non-passing grades (below 70).

As the summary below shows (table 2), the two independent groups (OER and Traditional) have similar distributions: the standard deviation of the two groups are similar, and the median and mean values of each group are also similar. Hence, the two groups had somewhat similar data distributions. The grades of students enrolled in OER classes were higher in the 25th and 75th percentiles.
### Table 2: Comparative summary of OER and traditional outcomes

<table>
<thead>
<tr>
<th>Term</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Std Dev</th>
<th>25th Pctl</th>
<th>75th Pctl</th>
</tr>
</thead>
<tbody>
<tr>
<td>OER</td>
<td>99</td>
<td>86.64</td>
<td>88.00</td>
<td>10.05</td>
<td>84.50</td>
<td>94.50</td>
</tr>
<tr>
<td>Traditional</td>
<td>81</td>
<td>84.61</td>
<td>84.50</td>
<td>9.28</td>
<td>78.00</td>
<td>91.00</td>
</tr>
</tbody>
</table>

The comparative histograms below (figure 5) show the frequency of grades of students enrolled in courses using traditional textbooks (left), and open textbooks (right):

![Histogram of Traditional group](image1.png)
![Histogram of OER group](image2.png)

**Figure 5: Comparative histogram of OER and traditional outcomes.**

After converting the grades to numerical values, we used a normal probability plot to assess whether or not the data set was normally distributed. In this test, “the data are plotted against a theoretical normal distribution in such a way that the points should form an approximate straight line. Departures from this straight line indicate departures from normality” (Heckert & Filliben, 2003). The two quantile plots below (figures 6 and 7) show that the data is not normally distributed, as the grades are scattered in small horizontal groups, not forming a straight line. For this data to be considered a normal distribution, it would have to be distributed along the diagonal lines indicated in each plot.

![Quantile-Quantile plot of OER group](image3.png)

**Figure 6: Quantile-Quantile plot of OER group.**

*Open Praxis*, vol. 12 issue 1, January–March 2020, pp. 83–99
To test the two independent and not normally distributed data sets, we performed a Wilcoxon Rank Sum test. The comparison between the OER and the Traditional group showed that students enrolled in classes using OER had better scores than those enrolled in classes using traditional textbooks. This comparison is statistically significant, with a p-value<0.05 (0.046).

**Discussion**

With the research instruments discussed above, we were able to answer our research questions related to cost, outcomes, usage, and perceptions. The first research question, (how aware are faculty of Open Educational Resources, open textbooks, and licensing?), remains unanswered, since the first college-wide faculty survey did not produce significant results. Since the survey was administered, we believe that OER awareness is growing, due to the workshops and webinars conducted by Touro Libraries.

The second research question regarded students cost savings. In one single semester, 99 students enrolled in Psychology courses at Touro College’s New York School of Career and Applied Studies saved $11,577.06.

Through the student survey, we investigated how the price of traditional textbooks affected students (research question iii: how does the cost of traditional textbooks affect Touro College’s students, and what measures have been taken to reduce those costs?). The reality of the students surveyed mirrored what has been reported in the literature so far: 70% of the students surveyed reported not purchasing required textbooks. Only two students (3% of students surveyed) declared purchasing them at regular cost. All other students have taken different measures in an attempt to reduce the costs of required materials.

The same survey showed that students viewed their open textbooks positively (research question (iv) what are students’ perceptions of open textbook quality, use and format?). They acknowledged the convenience of using open textbooks, as observed by other researchers (e.g. Cooney, 2017), and despite institutional concerns, found that the format of open textbooks was beneficial and practical, especially since these are commuter students. Furthermore, students declared that the quality of the open textbook used was the same or better than other textbooks.

In addition to students’ perceptions, we also proposed to investigate faculty’s perceptions, of open textbook quality, use, and format (research question v). The two professors who used the OpenStax textbook agree that there is content missing from what they need to cover in an introductory psychology
course. Watson et al. (2017) reported the same findings. However, because this is an open textbook, they do have the option to edit it and supplement the materials they need. In fact, these professors recently received an internal grant to adapt the Psychology OpenStax textbook.

The use of the textbook differed for the professor using Crump et al. (2018). Rather than adding material, the professor decided to delete some chapters and provide a more focused class to her students. Again, this shows the advantage of working with a resource published under an open license, which provides more options and more freedom to educators to design their classes with the students’ learning in mind.

Regarding the students’ academic outcomes, this study corroborates previous data (Hilton et al. 2016) showing that students enrolled in OER courses performed better than students enrolled in classes using commercially published textbooks. This robust finding will allow us to continue our advocacy for an institution-wide OER program, and answers our last research question positively (vi: how do academic outcomes of students enrolled in OER courses compare to those enrolled in courses using traditional textbooks?). Equally important, these results contribute to global data on OER outcomes.

We recognize that using grade comparison to measure student learning is more complex than how we approached this study. Grimaldi, Mallick, Waters and Baraniuk (2019) analyzed previous research on the impact of OER on student learning. The authors introduced the *access hypothesis*, stating that “OER might improve learning outcomes relative to traditional course materials by improving access to the textbook” (Grimaldi et al., 2019, p. 9). In an experiment, an intervention should affect all participants of the experimental group. In the case of OER, this comparison should be between students who did not have access to textbooks to students using OER. According to the authors, one should always expect null results, and be cautious of reporting positive results (Grimaldi et al., p. 9). Indeed, we do not know how many students in our control group had access to the traditional course material. An additional limitation is our sample size (n=180), which is considered to be small. Further, we are comparing different student groups, and other confound variables might be in place and impossible to isolate, such as students’ individual performance, faculty grading styles, and differences in tests and class policies of which we are not aware.

Independent of these statistical implications, this pilot project exceeded our expectations in providing both positive results and important learning opportunities. We should not keep students from learning and achieving their potential only because they cannot afford expensive textbooks. Moreover, we should highlight that faculty using OER have more freedom to design their own classes, and students enrolled in those courses were satisfied because they had immediate and unlimited access to their required course materials. These results show that transitioning to an OER course is not seamless. However, the advantages are too large to be dismissed.

We recommend librarians to learn about institutional practices of textbook adoption prior to start advocating for OER. Also, when possible, librarians should offer faculty development workshops that include an overview of OER repositories. Another helpful practice is to identify institutional strategic goals that can be advanced with the adoption of OER.

**Faculty-library collaboration**

This pilot shed light upon some of our practices when collaborating with faculty. We changed our outreach methods to approach departments, instead of individual faculty members, which has been effective, as the results in this study show. More importantly, through the focus group described in this study, we learned that faculty were unsure about other options of psychology textbooks. Providing a selection of open textbooks simplified the search process, but also limited the faculty’s options,
since they did not learn about OER repositories. In hindsight, the librarians should have facilitated a workshop where faculty could have searched for the textbooks themselves. This would have given them more autonomy to choose their textbooks, search for other options, and find resources other than textbooks when exploring different OER repositories.

Conclusion

In this study, we examined the academic outcomes and perceptions of students enrolled in two psychology courses using open textbooks, as well as the perceptions of three faculty members teaching those courses. The most obvious outcome of switching the required courses materials to OER is cost savings. However, many faculty and administrators still have concerns about the quality of such resources. With this pilot program, we demonstrated that students perceive OER positively when judging its quality, format, and use. Commuter students praised the ability of having unlimited digital access to the open textbook across devices. Faculty members had mixed opinions and, while two out of the three faculty involved in this project felt that the textbook lacked important materials, they appreciated the possibility of altering the textbook to better suit their classes’ needs. Most importantly, we showed that students enrolled in OER courses performed better than those students enrolled in the same courses using a traditional textbook.

Acknowledgements

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Quality and Cost Matter: Students’ Perceptions of Open versus Non-Open Texts through a Single-Blind Review

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Abstract

Although prior research has examined student perceptions of open materials, research investigating students’ perceptions of open versus copyright-restricted textbooks through a direct, experimental approach is lacking. To better understand how students perceive open textbooks outside the context of the classroom, we examined students’ perceptions of unfamiliar open and non-open (copyright-restricted) psychology textbooks. Forty-four introductory psychology students reviewed chapters from two open textbooks and two traditional/copyright-restricted textbooks and then ranked the textbooks from most to least favourite. Students rated each chapter on several quality measures, including layout structure, visual appeal, ease of reading, and instructional features. Next, bibliographical information and cost were revealed, and students re-ranked the textbooks accordingly. Before knowing the bibliographic information and cost, students were more likely to prefer the two traditional textbooks. Thereafter, they were more likely to select the open texts. Students often referred to textbook price as a determining factor for their change.

Keywords: open textbook, copyright restricted textbook, textbook cost, textbook evaluation, student perceptions

Introduction

As the use of open materials in classrooms becomes increasingly common, educators and researchers are calling for closer examination of the quality of open materials, including open textbooks. In contrast to traditional publishers’ textbooks, open textbooks allow users to reuse, revise, remix, redistribute, and retain the material for free (Wiley, 2014). Open textbooks are typically offered online free of charge, and printed copies are typically available for a nominal charge. Open textbooks can save students money while potentially increasing their performance through increased accessibility to materials, and students generally provide positive feedback about the open materials they use (Hilton, 2016).

In the open textbook literature, researchers often follow the COUP framework, which examines the quality of open textbooks by assessing cost savings, outcomes, use, and perceptions (Bliss, Robinson, Hilton, & Wiley, 2013). Using this framework, the main dimensions of open materials can be examined. The last dimension–student perceptions of textbook quality– was the focus of the present study.

Some significant limitations have been noted of several current studies investigating student perceptions to open textbooks, including potential bias from instructors using the text. In his review of the literature of open textbooks, Hilton (2016) concluded that future research should be conducted in less-biased settings.
suggesting that “They (students and teachers) could blindly [without knowing which textbooks are OER] evaluate the textbooks on a variety of metrics including their ease of use, accuracy of information and so forth” (p. 588). At least one study has carried out a blind comparison of open and traditional textbooks (Clinton, Legerski, & Rhodes, 2019) through a between-subjects design (where students only reviewed either open or traditional texts). To allow students to draw direct comparisons between the texts, we carried out a within-subjects design, something that has not yet been done.

In the present study, to minimize bias from others (namely faculty and classmates) on students reviewing the textbooks, we recruited students from an introductory psychology classroom to blindly review chapters from two unfamiliar open and two unfamiliar non-open textbooks on the first day of class. Students provided their feedback on the chapters’ readability, organization, visual appeal, and add-ons (e.g., website links) and ranked their textbook preference from most to least favourite. Because it was a blind review, students did not know the bibliographic information at first. After students had conducted their initial review, the information for each text was revealed, including author, publisher, publishing year, location, available format (print and/or ebook) and price for each format in which the text was available. The researchers then asked students to rank their textbook preference again. By doing so, it was better understood how additional bibliographic information (including price) affects students’ perception of open and traditional textbooks, compared to the content and quality of the textbook. This is to our knowledge the first study that required students to compare open and traditional textbooks through a direct, single-blind study where students were unaware whether the textbooks were open or non-open. Further, the study was carried out through within-subjects experimental design to minimize the effect of extraneous participant and other (e.g., classroom) variables that could affect the measures of perception.

Literature Review

Existing research suggests that students who use open textbooks generally consider them equal to traditional texts (e.g., Feldstein et al., 2012; Gil, Candelas, Jara, Garcia, & Torres, 2013; Petrides, Jimes, Middleton-Detzner, Walling, & Weiss, 2011; Pitt, Ebrahimi, McAndrew, & Coughlan, 2013). In Hilton’s (2016) review of nine studies, it was concluded that “roughly half of students found OER to be comparable to traditional resources, a sizeable minority believed they were superior, and a smaller minority found them to be inferior” (p. 588). In conclusion, much of the research on open textbooks and OER suggests that students (and faculty) view OER positively (Hilton, 2016).

A top reason students have cited for liking open texts is cost. For example, Petrides et al. (2011) found that two-thirds of students preferred OER compared to a traditional statistics textbook, citing cost, as well as ease of use, as important factors. Similarly, Lindshield and Adhikari (2013) found that students using a digital textbook in a Human Nutrition course did not like to purchase a textbook. This is not surprising, considering students oftentimes do not purchase textbooks because of cost (Jhangiani & Jhangiani, 2017).

Reasons other than cost have been cited as causes for students’ preference to use and enjoy open access materials. Feldstein et al. (2012) found that of 315 students taking a course in the business department at Virginia State University, two-thirds preferred OER materials to traditional materials. The majority of students explained that they found the OER were “easy to use” (95%) and up-to-date (78%). Other reasons include convenience of accessing online materials (Bliss, Hilton, Wiley, & Thanos, 2013; Lindshield & Adhikari, 2013). These findings were consistent with those from Grissett and Huffman (2019), who found that students perceived cost, weight, and convenience as the biggest advantages of open versus traditional books. Other studies have found that students prefer or are willing to use an open textbook after using one (e.g., Illowsky, Hilton, Whiting, & Ackerman, 2016).
As highlighted, oftentimes cost has been cited as a driving reason why students prefer the texts that they do (Petrides et al., 2011). To better understand what factors, other than cost, drive student attitudes toward OER, researchers must continue examining these additional factors through empirical methods. Researchers must be cautious because the instructor may influence the students’ perceptions (intentionally or unintentionally), which could potentially skew the results in favour of OER. In fact, in his thorough review of the research on OER, Hilton (2016) states that many studies on OER are affected by “the limitations of student perceptions and the potential biases of teachers involved in the creation or adoption of OER” (p. 581). Thus, when considering the factors that influence students’ perceptions on the materials they are using, more research is needed to understand the textbook qualities that students value.

With at least two exceptions (Clinton et al., 2019; Woodward, Lloyd, & Kimmons, 2017), most research on student perceptions towards open materials to date has focused on texts that students are currently using. Familiarity with the text may influence students’ attitudes toward the text; therefore, it is important to introduce texts that students have not previously used. Woodward et al. (2017) asked two graduate students to examine eight project management textbooks, two of which were open, and the other six were copyright-restricted. Their study focused on the process of qualitatively analyzing open versus non-open texts, not necessarily on the actual reviews themselves. Clinton et al. (2019) asked students to blindly review either open or non-open textbooks, taking a knowledge assessment afterwards and reviewing the texts, similar to the present study; however, in the current study, students blindly reviewed a set of texts and answer a series of questions about the quality of each textbook. By conducting a blind review, students could take an unbiased view of the texts they were reviewing. The study was carried out on the first day of an introductory psychology class in a further attempt to lessen students’ familiarity with any psychology text. Bibliographic information was revealed at a strategic point in the study to capture students’ pre- and post-knowledge perceptions to better understand the role several qualities, in addition to cost, have on students’ perceptions of textbooks. These findings could provide additional insight into what students value in open textbooks.

To emphasize the importance of their responses and to increase student engagement with the review process, we asked students to help the faculty select a textbook to use next semester. The purpose of our study was to examine the role cost, content, quality, and design (e.g., images, study aids, organization) have on students’ perceptions of textbooks. Our specific research questions were as follows:

1. Do students perceive the quality (e.g., content, organization, visual appeal) of open and non-open introductory psychology textbooks differently?
2. What do students value when making their textbook selections?

The study involved within-subjects experimental design, where students reviewed both open and non-open textbooks (these were counterbalanced across participants) and gave their feedback for each. The study aim was to increase internal validity by eliminating extraneous variables to understand the factors that drive student textbook preference.

**Methods**

**Participants**

Participants were forty-four students (21 females, 22 males, 1 did not report) in an introductory psychology course at a regional, four-year university in the United States.
Test Materials (Textbooks)

The textbooks used in our study were purposively selected due to their popularity and representative cost for their respective textbook type. For the open textbooks, we selected *Introduction to Psychology* (Anonymous, 2015), published by the University of Minnesota Library, and *Psychology* (Spielman, Dumper, Jenkins, Lovett, & Perlmutter, 2014), published by OpenStax. Both textbooks are free of cost and are available online in downloadable and print forms. For the non-open textbooks, we selected *Mastering the World of Psychology*, 5th ed. (Wood, Wood, & Boyd, 2014), published by Pearson and *Understanding Psychology*, 10th ed. (Feldman, 2010), published by McGraw-Hill. *Mastering the World* retails for $199.40 for a new print version of text, and *Understanding Psychology* retails for $92.34 for a new print version of the text. Both non-open textbooks also provided eBook options and students can find rental options and used books to buy. We do not claim that the two non-open textbooks are representative of all traditional textbooks in terms of quality but rather are an example of a text that would be used in an introductory psychology course. The same notion applies to open textbooks that we selected.

Students were provided with a packet containing black-and-white copies of select areas of the textbook: The Table of Contents (to provide students with an idea of the chapter titles and content) and the introductory chapter on the topic (Chapter 1). Each set of textbook information (Table of Contents and the first chapter) was stapled with a sheet of white paper on top with the typed title of the textbook. We did not include the actual image of the textbook cover to avoid potential bias. It is worth emphasizing that the open textbooks used were also available in hard copy format. Although open textbooks often have interactive qualities that non-open textbooks may lack, the books selected in this study were virtually identical to the format of non-open textbooks. This decision was intentional in order to minimize potential uncontrolled differences between textbooks.

Students also received a questionnaire (listed below) to complete at the end of each textbook review:

“Now based on what you have seen, please rate the following qualities for [name of textbook] on a scale from 1-5, with 1 = Not at all; 2 = Almost not at all; 3 = Neutral; 4 = Some-what; 5 = Very.”

Q1. Easy to understand
Q2. Suitable for my learning style
Q3. Interesting to read
Q4. Comprehensive- the book covers the topics that I need to know
Q5. Well supported by research.

“Further, please rate how much you agree with the following statements about [name of textbook] on a scale of 1-5 with 1 = Strongly Disagree to 5 = Strongly Agree.”

Q6. Images and visual aids help me understand the concepts.
Q7. Visual aids are appealing.
Q8. Images are distracting.
Q9. It would keep me reading.
Q10. Study aids are provided and are helpful.
Q11. Research information is well used to explain the materials.
Q12. Based on the table of contents, the content covered in the book is interesting to me. I can’t wait to get started.
**Procedure**

To make the task more goal-specific and meaningful to the students, on the first day of class in an introductory psychology course, students were told that the instructor needed help selecting a textbook for the next semester. After attaining informed consent, students were asked to provide feedback about their textbook preferences to assist with the instructor’s textbook selection. Students were given a sealed packet containing black-and-white, stapled copies of four textbook chapters and three sets of questionnaires, which were completed at different stages of the study. Students looked over the chapters in pairs, meaning they shared the four chapters with a classmate, yet reviews were completed independently. The study took approximately 40 minutes to complete and took place within the classroom. The true purpose of the study—to directly compare open versus non-open textbooks and to further understand what students value when selecting a textbook—were not revealed until the end of the study during the debriefing process.

Students were not expected to read the material in its entirety but were instead instructed to “look over the material as though you were flipping through a textbook for the first time. Read a few of the passages, look at the pictures, look at the format of the material”. After the instructions were provided, students were given 10 minutes to review all four chapters. Students shared the textbook chapters with a partner to cut down on paper. Students were asked not to talk during the review except to exchange chapters. Textbook chapters were counterbalanced across all participants, so that each participant received a different order of textbooks to review. Students were notified once the 10-minute review time had ended.

After reviewing the four chapters, students answered the questions provided. The first question asked students to rank their textbook preference from most favourite to least favourite and to “Please explain below what influenced your decision to place the textbooks in this order.” Next, students were asked to rate each of the four textbook chapters on a set of twelve qualities (Q1-Q12). Students had access to the textbook chapters while completing their reviews, so they could refer to the chapters while answering their questions.

Next, students were provided with a document that revealed the bibliographical information of all textbooks after their first selection/ranking and ratings of the twelve qualities. Bibliographical information included title, author, publication year, publisher, available formats (i.e., print, Ebook), and respective cost/price. Students were given a moment to review this form and were given another questionnaire about whether their selection changed and why. If they changed, they were asked to re-rank the textbooks again with explanations.

Finally, in order to better understand what students value in their textbook selection process, students were asked “What would be your preferences in terms of textbook access?” They were asked to only choose one. Choices included a combination of buying, renting, or borrowing new or used print or electronic copies of books. They were then asked why they made the choice they did.

After students completed the questions and the questionnaires were collected, the instructor then debriefed the students about the purpose of the study—to compare student perceptions of open vs. non-open textbooks and to better understand what students value when choosing a textbook. Participant questions were addressed and the class was adjourned.

**Data Analysis**

Two quantitative analysis methods were applied. Wilcoxon signed-rank test was used to assess the differences on the book ranking before and after the bibliographical information was revealed to students. The test works with ordinal data (i.e., ranking of book) to compute the difference between
pretest and posttest data for each person (Dimitrov, 2008). The confidence interval of the difference was 95% and the standard significance (2-tailed) value level was set at .05.

Simple repeated-measures ANOVA, used to examine a group of subjects with repeated measures (Dimitrov, 2008), was applied to detect the differences in the students’ perspective regarding the four books. In the current study, book was the independent variable, including two open textbooks and two non-open textbooks. Each question’s rating score (total 12 questions) was the dependent variable.

Additionally, qualitative content analysis was done to analyze student responses from the open-ended questions, which inquired about factors that influence their ranking at the first time and second time. Content analysis is considered a flexible method to analyze text data from impressionistic, intuitive, interpretive to systematic, strict textual analysis (Cavanagh, 1997; Rosengren, 1981) by summarizing and reporting the content of data and their messages (Cohen, Manion, & Morrison, 2007). The researchers first went over all the responses from the open-ended questions. Next, we further classified responses extracted from each student’s response for coding purposes. We rescreened the coded materials again after all the respondents’ responses were coded. Then, categories of similar or matched content were merged, and several themes further emerged from the data, thus allowing us to explore the messages beneath students’ responses.

Results

Student Perceptions on Textbook Qualities

The review sheet consisted of 12 qualities that students valued when selecting textbooks. Other important criteria, like content accuracy, were not included as students might not have the ability to judge that criteria. For all 12 questions, the only statistically significant difference between the textbooks were on Q6 (helpfulness of image and visual aids) and Q7 (appeal of visual aid), both of which asked about visual images (Table 1). Results from the repeated measures ANOVA indicated there are statistically significant differences in the rating for Question 6, ‘Images and visual aids help me understand the concepts’ \([F (3, 123) = 3.50, p = .018]\) and Question 7, ‘Visual aids are appealing’ \([F (3, 123) = 3.62, p = .015]\) between the four books at the .05 level (See Table 2). *Introduction to Psychology* (open) had lowest average rating on all review items, as it has almost no visual aids in the book.

<table>
<thead>
<tr>
<th>Question</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Psychology (open)</td>
<td>3.31</td>
<td>1.18</td>
<td>42</td>
</tr>
<tr>
<td>Psychology (open)</td>
<td>3.83</td>
<td>1.01</td>
<td>42</td>
</tr>
<tr>
<td>Mastering Psychology (non-open)</td>
<td>3.98</td>
<td>0.92</td>
<td>42</td>
</tr>
<tr>
<td>Understanding Psychology (non-open)</td>
<td>3.86</td>
<td>1.12</td>
<td>42</td>
</tr>
<tr>
<td>Q7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Psychology (open)</td>
<td>3.24</td>
<td>1.08</td>
<td>42</td>
</tr>
<tr>
<td>Psychology (open)</td>
<td>3.57</td>
<td>1.09</td>
<td>42</td>
</tr>
<tr>
<td>Mastering Psychology (non-open)</td>
<td>3.83</td>
<td>0.91</td>
<td>42</td>
</tr>
<tr>
<td>Understanding Psychology (non-open)</td>
<td>3.86</td>
<td>1.03</td>
<td>42</td>
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</table>
Table 2: Analysis of Variance for Book Rating

<table>
<thead>
<tr>
<th></th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q6 (Images and visual aids help me understand the concepts)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Book</td>
<td>11.07</td>
<td>3</td>
<td>3.69</td>
<td>3.50</td>
<td>.018</td>
</tr>
<tr>
<td>Error</td>
<td>129.69</td>
<td>123</td>
<td>1.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>140.76</td>
<td>126</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q7 (Visual aids are appealing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Book</td>
<td>10.50</td>
<td>3</td>
<td>3.50</td>
<td>3.62</td>
<td>.015</td>
</tr>
<tr>
<td>Error</td>
<td>118.76</td>
<td>123</td>
<td>0.97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>129.76</td>
<td>126</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Student Textbook Ranking

As seen in Table 3, 28 students out of 44 (63.6%) selected the non-open texts as their favourite texts in the first round of ranking. After reviewing the additional bibliographic information, 28 out of 44 (63.6%) students selected the open textbooks as their favourite texts. Regardless the reason for changing book ranking and the direction of changes (upward or downward), 23 out of 44 students changed their ranking.

Table 3: Ranking as first choice (n=44)

<table>
<thead>
<tr>
<th>Book</th>
<th>Title</th>
<th>License type</th>
<th>First Round n</th>
<th>Second round n</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Psychology</td>
<td>Open</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>Psychology</td>
<td>Open</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>Mastering Psychology</td>
<td>Non-open</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Understanding Psychology</td>
<td>Non-open</td>
<td>15</td>
<td>11</td>
</tr>
</tbody>
</table>

Factors that Influence Textbook Selection Ranking

Students’ responses about the factors that influenced their rankings were coded according to categories, arranged in four groups. Each group represents an emergent theme from the data. The first group referred to the learner-appropriate features. The second group involved the learning supports and application of instructional strategies. The third group addressed the design and layout of the textbooks. The fourth group concerned topics and contents. The final group included responses that did not provide a specific feature or factor relevant to the other categories. As evident in the subsequent discussion, some categories overlap and interact.

Learner-appropriate writing/wording. The most salient theme to emerge from students’ responses was learner-appropriate word usages and that the texts were easy to digest, understand, were straightforward, and to the point.
“I liked the most because it was easy to understand.” (Student #7)

“I put [partial title] last because I feel like that has more in depth wording and understanding which makes me not want to read it because I do not have a understanding yet.” (Student #3)

“…… was straight forward and to the point. It told me what I wanted and needed to know without being really wordy.” (Student #1)

“……. was written in [an] easy to understand format.” (Student #40)

The use of examples was also important to students. They were relevant to the audience and students can easily relate the examples to their experiences or surroundings.

“……. is more clear and its relationship that relates to the life around us.” (Student #2)

**Supportive learning tools.** Another salient theme that emerged from the responses was the supportive learning tools in the textbooks that help students study, such as overview, glossaries/key terms, summaries, exercises/activities, and study guide.

“I thought the key terms and recaps were very helpful.” (Student # 17)

“… because it gave study guides and things to help.” (Student #16)

“I appreciated the examples and the key terms at the end.” (Student #28)

**Design of the textbook.** The third theme that emerged from the responses was regarding the design of the book that makes reading the book go more ‘smoothly’ and ‘effectively’. Categories under this group include page layout, visual aid, font size, graphics, and text structure

“…… has more charts and looked like it was a better set up book.” (Student#30)

“……. had interesting fronts and caught the readers eye. Throughout the text the [font] families helped assist the reader with specific topics.” (Student #17)

‘I am more of a visual learner and I like how [title] just didn’t contain words but also had pictures and diagrams [has] caught my eye and kept me interested.” (Student #29)

**Topics and content areas.** The fourth theme was that topics or subject-related content were factors that influenced students’ decisions on textbook selection.

“I like the topics which are covered. Eg. What do our brains do when we sleep?” (Student #27)

“The topic of each chapter and what they are about.” (Student #18)

“……. was first because it covered things I think people should know.” (Student #32)

**Other: Credibility and general feeling.** This group included the responses that (1) did not provide any specific features or factors or (2) did not belong to any of the major groups above. The categories include credibility, ownership of the book, and overall feeling about the books.

“I placed these text in this order based on where I feel like I can learn quicker and more efficiently.” (Student#6)
“…… the information didn’t seem very credible.” (Student #20)

“I had the book already.” (Student #28)

Changes of Ranking

Results of the Wilcoxon signed-rank test showed significant differences in the change of book ranking for *Introduction to Psychology* (open) \( (z = -3.5, p < .001) \), *Psychology* (open) \( (z = -2.57, p = .01) \), and *Mastering Psychology* (non-open) \( (z = -3.25, p = .001) \) before and after disclosure bibliographic information, while no significant differences for *Understanding Psychology* (non-open) \( (z = -1.76, p = .79) \).

For *Introduction to Psychology* (open), the mean of the book ranking before receiving the bibliographic information (0.00) was lower than the mean ranks after receiving the bibliographic information (8.00). Similarly, the mean of *Psychology* (open) ranking before receiving the bibliographic information (5.50) was lower than the mean ranks after receiving the bibliographic information (8.63). On the other hand, the average ranking for *Mastering Psychology* (non-open) before obtaining the bibliographic information (9.60) was higher than the average ranking after obtaining the bibliographic information (4.50). We can conclude that in the population, the observed difference/changes in preference ranking regarding the four different books is not likely due to chance.

Furthermore, the extent of the difference in book ranking after bibliographic information revealing was explored. 20.5% \( (n = 9) \) of the respondents raised the ranking for *Introduction to Psychology* (open) by one, 9.1% \( (n = 4) \) of students raised the ranking by 2, and 4.5% \( (n = 2) \) moved the book ranking up by 3. For *Psychology* (open), 15.9% of respondents \( (n = 7) \) raised the ranking of *Psychology* (open), around 11.4% percent \( (n = 5) \) raised the *Psychology* (open) ranking by 2, while 6.8% of students \( (n = 3) \) dropped the ranking down by 1. In regard of *Mastering Psychology* (non-open), around five percent of students moved the ranking for *Mastering Psychology* (non-open) up by 1. On the other hand, 13.6% of respondents \( (n = 6) \) dropped the ranking by 1 and 2, respectively, and 6.8% of students \( (n = 3) \) moved the ranking down by 3.

That is, after revealing the bibliographic information, the ranking for *Introduction to Psychology* (open) and *Psychology* (open) moved upward, while the ranking of *Mastering Psychology* (non-open) and *Understanding Psychology* (non-open) moved downward. The above results suggested that the bibliographic information was relevant to the changes in the ranking by students, especially for *Introduction to Psychology* (open), *Psychology* (open), and *Mastering Psychology* (non-open).

Qualitative Data from Open-Ended Responses

Students were asked to provide open-ended responses for the following questions: (1) Factors that influenced their initial textbook ranking; (2) Factors that influenced their second textbook ranking; and (3) Justification for textbook preference. Each of these questions were analyzed for themes, which are provided in the following sections.

**Students who did change their ranking.** After reviewing additional bibliographic information, 22 students changed their ranking/preference of textbook selection. When asked what influenced their decision if they change their ranking order, cost/price was mentioned by most of students (19 out of 22), followed by publication date (2 out of 22) and easy access (1 student). Sample responses involving cost/price as a deciding factor include:

“The price, if it’s free or cheaper I will adjust and put aside preference.” (Student #9)
“Price was def my main reason, along with the content in the more money one is not worth it” (Student #40)

“……the introduction to psychology was cheaper and had just as much info as mastering the world of psychology” (Student #41)

As mentioned earlier, more than half students were on the Pell grant or student loan. The cost of textbook will potentially contribute to more financial burden to students.

“The price, because as a college student you have budget your money. As a college student you have to buy more than one book” (Student #11)

“I am a broke college student” (Student #39)

Finally, two students out of 22 indicated that publication date was a factor that influenced their ranking solely. One changed ranking solely because of publication year.

“Year of publication was the major factoring decision. Psychology is a science and therefore always, with that information I would like the newest date option available.” (Student #25)

**Students who did not change their ranking.** After reviewing additional bibliographic information, 22 students did not change their ranking/preference of textbook selection. The top reason why their preference remained the same was how books helped them succeed (See Table 4). Comments included “easy to read”, “easy to understand”, “more interesting”, “suit my learning style”, and “help me learn” etc. By reviewing their previous response, the helpfulness could be associated with the quality and feature of the books.

Three students expressed that topics of the book covered were the reasons, which were also consistent with the influential factors they pointed out in the first round. Three students’ reasons related to cost/price. One said the book s/he likes the most happened to be the cheapest one. One student said the one s/he chose “was within reasonable price.” The third student said “I liked the more cheap book.” Our interpretation of this response was that the book the student chose was the cheaper one among the four. Under the “other” category, one student said that s/he already had the book as the reason s/he did not change the ranking. It was the same reason why s/he rank the topic choice in the first round. One did not provide any reason; and one said “no reason” for not changing textbook selection preference.

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Number of Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helpfulness to learning</td>
<td>10</td>
</tr>
<tr>
<td>Topics</td>
<td>3</td>
</tr>
<tr>
<td>Cost/Price</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
</tr>
</tbody>
</table>

As you can see in the responses above, price/cost was also noticed by students who did not change their top choice or ranking order. For some, what helped them most in learning was the primary...
reason, regardless the price. In some cases, the book they chose happened to be the cheapest one or in a reasonable price range.

“Because the book I ranked at number one is within a reasonable price range” (Student #26)

“I did not change my opinion because the cost of something doesn’t change how informational the book is. The book I chose as the best happens to be the cheaper ones.” (Student #32)

To sum up, based on the student responses to the open-ended questions, we noticed that good textbook features that help students learn do matter to students. They consider factors that contribute to the overall learning effectiveness. These features include message design (i.e., layout, the use of font style and size, organization of text) and instructional support (i.e., study guide, key terms, overview and recap/review, additional resources for further exploring). Students noticed those textbook design and features and mentioned they will choose the book because these features are helpful to their learning. Another thing worth noting was that students also pay attention to the publication date. And the accessibility and the format also play some roles in students’ decision process.

Discussion

The purpose of the study was to examine the role various textbook qualities, including print options (electronic versus hard copy), content, quality, design (e.g., images, study aids, organization), and cost have on students’ perceptions of textbooks. Specifically, we aimed to draw a direct, blind, non-biased comparison between two types of textbooks—open versus non-open—to better understand students’ perceptions of these textbooks on the textbook qualities outlined above.

Most studies on student perceptions of open textbooks have centered on texts that were currently being used for a course. One study that did draw direct comparison between open and non-open textbooks (Woodward et al., 2017) did not carry out a blind review or focus on textbook qualities. Because teacher (and student) bias may serve as a confounding variable in these studies, we had students blindly review textbooks, not knowing which were open and which were not. Students were therefore able to assess each textbook on key qualities of the text itself, not necessarily price or faculty preference. Other research that has controlled for these factors (Clinton et al., 2019) carried out a between-subjects study, which did not provide the same direct comparison offered in the present study.

Our results showed that students liked the non-open textbooks initially; however, after revealing bibliographic information (print options, publisher, publishing date, cost), students preferred open textbooks. Although cost/price was the primary reason of changing preference, students did not appear to simply change it because of cost/price by itself. Students do weigh the cost with the additional perceived values. In other words, students still care about the quality and features of the textbook, but they do not necessarily feel the price is justifiable. These findings are compatible with previous findings that suggest students value qualities other than cost (e.g., Grissett & Huffman, 2019).

Students also found the textbooks generally comparable, only pointing to differences in visual appeal between an open textbook, Introduction to Psychology and non-open textbooks, Understanding Psychology and Mastering Psychology. The remaining qualities were not statistically significant, illustrating that students did not differentiate between the two forms of text (at least with the texts that were used). These findings suggest that open textbooks—at least those used in the current study—are more similar than different in their qualities. Perhaps if different, more interactive texts were used, students would perceive the two types differently.
Our qualitative data revealed that students found reading ease as a major reason for selecting the textbook they did. Reading comfort is important, as it can motivate students to continue reading. If the wording was challenging or somehow difficult to read, it may turn students away from the textbook, an essential material for their learning.

Still, the present study was not without limitations. First, we examined students’ initial perceptions of potential course material. Students had virtually no relationship with the text. The study may have yielded different results had the study examined students’ relationships with the material over time, as students would have more time to become familiar with the texts’ strengths and limitations. This approach, however, would be difficult to carry out with a within-subjects design (where each student was exposed to each type of text). It is possible, though, that a similar semester-long approach could be carried out, where students would each use a different textbook and their perceptions of each would be compared across groups. Similar research has been done before (e.g., Grissett & Huffman, 2019), but future research may continue to examine the effects of textbook quality and cost on student perceptions over time.

Similarly, the current study occurred outside the context of a classroom experience. Although the study occurred in a class setting with an instructor present, the impact of the class context on students’ perceptions of the texts were not considered. In fact, our study intentionally controlled for these contextual factors to isolate and exclusively focus on the textbook. Future research may explore the interrelationships between the textbook and other factors, including the teacher, setting, relationship with other students, level of engagement, and learning activities.

Another potential limitation was that students reviewed chapters from four textbooks, which could potentially lead to evaluation fatigue. If students experienced this, it is possible that students’ reviews of later chapters were negatively impacted and perhaps students viewed the first text as most satisfactory. We tried to prevent this through counterbalancing the texts across participants, but future research should try to capture potential order effects, as well.

Finally, it is worth noting the context in which students reviewed the texts. We believe the students were genuinely invested in their textbook reviews because they were helping a faculty member choose a textbook for the next semester. We recommend that future research implement textbook review studies so that students are involved in the process.

Conclusion

Based on the results, we can conclude that textbook quality matters, and not all textbooks meet students’ needs in the areas of design and pedagogy, regardless if open or copyright restricted textbooks. Qualitative data shows that students care about the quality of the materials they use. Some students may not be able to articulate how textbook design or quality influence their preference, but they do express the overall feeling on textbook towards their learning effectiveness. Some students in our study were able to point out specific textbook features that help or motivate them to study (i.e., study aid, key points, visual representation of the concepts, wording, visual layout, and aesthetics). While they may not have enough expertise to judge the accuracy or depth of the content, they are able to choose the proper level of difficulty for their learning.

We can also conclude that students value textbook design (i.e., layout, visual representation) and pedagogy, including learner-appropriate wording, scaffolding, and instructional support tools such as overviews, study aids, and key points/summaries. Students may not have the expertise to judge the content accuracy or level of expertise in the area, but they are able to point out what textbook features are helpful to their learning.
Finally, (and most importantly) when students review and select these textbooks, they consider both cost and quality of the textbook as it is relevant to the value of learning. They are not choosing books solely on the cost, although it is an important factor to their academic success. Students choose what they think they can learn most out of the book they choose. However, while the cost was not justifiable to the value of "quality," students choose more affordable options. The study provides insight from students’ perspective and helps identify areas to be considered so that students’ needs may be better served.

Acknowledgments

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References


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Undergraduate Student Perspectives on Textbook Costs and Implications for Academic Success

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Abstract
To provide more affordable course content to our students and faculty, local data on how students perceive textbook expenses and how the costs impact student success would be necessary in order to advocate to faculty and other stakeholders. This survey, conducted at a mid-sized research public institution, aims to explore student perceptions of textbooks and how these perceptions influence academic success. The results reveal that students feel that the cost of required textbooks is unreasonable and that students are more likely to purchase required textbooks for in-major classes than for elective or general education courses. The most common means of reducing costs are purchasing from a vendor other than the campus bookstore, renting, or sharing books with classmates. Implications for academic success included not purchasing required textbooks or withdrawing from a course due to not having the materials. Students whose majors are housed in the College of Business have the highest textbook costs.

Keywords: Textbook costs, Affordable course content, Open Educational Resources, Undergraduate students, Academic Library

Introduction
In the early stages of a grassroots movement to promote the use of Open Educational Resources (OER) to faculty at our University –Old Dominion University–, we knew that local data would be necessary in making a case to faculty and administrators about how the use of OER could improve the educational experience of our students. Providing national statistics about the rising cost of textbooks and sharing data from longitudinal studies is useful to begin a conversation, but providing local data about student perceptions can assist with gaining buy-in from faculty and administrators and to build interest in use of OER or Affordable Course Content (ACC) instead of using traditional course materials. The goal of this study was to gain insight into the student experience at our institution, Old Dominion University, a mid-sized research university located in Norfolk, Virginia.

Old Dominion University is unique in several ways. An average of 800 students per year transfer to our institution from a nearby community college, which was one of the original leaders in implementing OER courses. We are also located within the same metropolitan as the largest Navy base in the world, and have a large military presence within our student population, including active duty, veterans, and spouses, as well as more non-traditional students than many of our peer institutions or institutions represented in large-scale textbook studies. Therefore, presenting data from our own student body would be quite meaningful to our constituents.
This paper presents a study conducted by librarians at Old Dominion University on student perceptions of textbooks and whether the cost of textbooks plays a role in factors related to student success; and to explore how students at our University engage with course materials. While there are studies that examine similar questions, our study is distinctive in that it studies one specific and unique population. While the results contribute to the growing body of international research on this topic, they are also useful to the situation at our University.

**Literature Review**

Numerous publications report on the cost of textbooks and course materials such as access codes that go along with commercial textbooks (Allen, 2010; Carbaugh & Ghosh, 2005), and comparisons of traditional textbooks to Open Educational Resources (OER) as they relate to cost savings and efficacy (Allen, Guzman-Alvarez, Molinaro, & Larsen, 2015; Feldstein et al., 2012; Hilton, 2016). Examining student perceptions of textbook cost is a relatively new endeavor in this area, and much of the focus is on comparing the quality or efficacy of traditional textbooks to OER. There are a handful of studies that explore student perceptions of impact of the cost of course materials on their quality of life; how cost impacts student success; and how students describe their engagement with course materials (Brandle et al., 2019; Martin, Belikov, Hilton, Wiley & Fischer, 2017; Stein, Hart, Keaney & White, 2017).

City University of New York (CUNY) developed a zero textbook program and conducted a survey (N=890) to determine student perceptions of the program (Brandle et al., 2019). Fifty-five percent of participants indicated that the top benefit of the zero textbook program was cost savings. The second highest ranking benefit was ease of access. Indeed, ease of access had an impact on student use of the textbook, as 90% of participants indicated that they accessed the textbook before or during the first week of class (Brandle et al., 2019). When asked to compare ease of access to their traditional textbook courses, 76% indicated that the zero textbook courses provided easier access than traditional textbook courses.

Researchers at Brigham Young University (BYU) sought to learn more about student and faculty perceptions and administered two separate surveys to faculty and students to examine their perceptions of traditional textbook costs and OER (Martin et al., 2017). The student survey, N=676, investigated how students would spend the money saved if they did not have to purchase textbooks, and student perceptions of the impact of textbook cost on their academic success (Martin et al., 2017). The most common responses to how students would spend money saved from not purchasing textbooks were on housing and on food (Martin et al., 2017). The researchers pointed out that the qualitative data collected from the open-ended questions indicated that the ability to spend saved money on housing would contribute to less hours working for students.

Several studies have sought to explore the impact of the cost of course materials on student academic success. The Florida Virtual Campus has conducted two large-scale student surveys on textbooks and course materials, most recently in 2017 (Florida Virtual Campus, 2016). One of the key findings was that the cost of textbooks continues to have a negative impact on student academic achievement and completion rates. Similarly, student participants from the BYU study felt that the cost of textbooks had a negative impact on their academic success, with 66% stating that they had not purchased a textbook because of its price and 47% indicating that not purchasing a textbook had negatively impacted their grade in a course (Martin et al., 2017). Stein et al. (2017) conducted a study...
at a university in New Zealand and also found that more than half of their respondents indicated that they felt that the cost of textbooks has had a negative impact on their academic success. The Student Public Interest Research Groups (PIRGs) conducted a large-scale survey with 2,039 students from over 150 different universities (Selnack, 2014). Two key findings of this study were that 65% of the participants did not purchase their course materials when the cost was too high and that the cost of textbooks had an impact on how many classes or which specific classes they could take each semester. Jhangiani and Jhangiani (2017) conducted a similar study at a university in Canada and only 27% of respondents indicated that they had taken fewer courses and slightly less than that indicated that they had decided not to register for a course because of textbook costs.

Another growing concern among educators is how students engage with their course materials and how lack of engagement results in poor academic performance. A study conducted by Taylor (2011) indicated that regardless of format or course materials, student understanding of content relies on students reading and that this is a primary barrier to student success. Multiple studies on undergraduate students and reading found that students often do not complete their assigned readings for class, and several instructors have redesigned their course structure to better assist students with reading comprehension (Bliss, Hilton, Wiley, & Thanos, 2013; Bliss, Robinson, Hilton & Wiley, 2013; Jensen, 2018; Lieu, Wong, Asefirad & Shaffer, 2017, Berry Cook, Hill, & Stevens, 2010). Jhangiani and Jhangiani (2017) point out that respondents to their survey indicated required textbooks were used about half of the time. Berry et al. (2010) discovered that most students are aware of the importance of reading and its impact on their grades, but still often choose not to complete course readings. Lieu et al. (2017) learned that providing students with structured reading guides for introductory level Biology students had a positive impact on student grades. Participants in the BYU study indicated that they did not always use their textbooks when they did purchase the required textbooks (Martin et al., 2017). Although it is difficult to determine whether or not use of OER has an impact on whether or not students read required materials, Jensen (2018) conducted a survey that investigated student usage of affordable course content and found that 70% of participants indicated that they read more of the required materials that were available online and 67% did so because the resources were free or affordable.

Although these studies discover similar patterns, the different student bodies show different degrees of these patterns. Therefore, we posit that the demographic differences of the student populations make a difference in how students perceive and behave the cost of textbooks, and it is necessary to conduct local studies in order to advise specific institutions on understanding their own student populations.

Methodology

The study was implemented at Old Dominion University. The study was deemed exempt status by the University’s Institutional Review Board (IRB). During the semester of administration there were 15,063 full-time undergraduate students and 4,504 undergraduate students. The researchers used the Florida Virtual Campus Survey 2016 survey as a model for development of their local survey and modified it to meet local needs.

The survey was distributed to a random sample of undergraduate students via link provided in a direct email. Using the Qualtrics software, researchers sent one initial solicitation and two reminder emails, removing students who had already participated each time.
Research Questions

1. How do students at Old Dominion University perceive the cost of course materials?
2. How does the cost of course materials influence student success at Old Dominion University?
3. How do Old Dominion University students engage with course materials?

To investigate the questions of the study, the researchers administered a survey (Appendix A) to a random representative sample of undergraduate students at Old Dominion University (n=489). The researchers used the Florida Virtual Campus 2016 survey as a model in addition to creating original items relevant to the research questions the Old Dominion University population. The survey took place during the last three weeks of the academic semester, and included 19 forced choice and 1 open-ended response items. The survey asked students who had transferred to Old Dominion University from Tidewater Community College to identify themselves and followed-up by inviting these students to participate in a follow up study.

Results

The results section will provide a discussion of the findings; to report on the amount that students spend on course materials, the actions they take to reduce the costs of purchasing these materials, and the consequent impact upon student academic success.

Participant Demographics

Of the 488 participants, two identified themselves as graduate students and 1 as “other.” These three participants were not invited to complete the survey, and 485 undergraduate students completed the survey in its entirety. Figure 1 provides the percentage of survey participants from each academic college at the University compared to the undergraduate full-time enrollment at the University, as reported in 2016. As figure 2 shows, 47% of participants were seniors, 27% were juniors, 14% were sophomores, and 12% were freshman. Over half of the survey participants (58%) indicated that they had transferred to the University from another academic institution and 43% of the participants who indicated that they were transfer students transferred to Old Dominion University from Tidewater Community College.
In addition to basic demographic information, the researchers were interested in how many participants were first generation college students, received financial aid or scholarships, participated in a work study program, or had jobs outside of the University (table 1). Participants who reported working, either through a work-study program or outside job were asked how many hours a week they work. Over 34% of working students reported working over 31 hours per week (figure 3).

Transfer students tended to work more hours per week than non-transfer students as about 60% of the transfer students worked more than 31 hours per week, compared with about 25% of non-transfer students. A higher percentage of transfer students (32%) would take fewer courses to offset the cost of textbooks than non-transfer students (21%). However, a much lower percentage of transfer students (57%) would not purchase the required textbooks than non-transfer students (75%).

<table>
<thead>
<tr>
<th>Which of the following applies to you? (check all that apply)</th>
<th>% of Survey Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am a first generation college student</td>
<td>22.8%</td>
</tr>
<tr>
<td>I receive financial aid or scholarships</td>
<td>38.21%</td>
</tr>
<tr>
<td>I am part of a work-study program</td>
<td>2.07%</td>
</tr>
<tr>
<td>I have a job (or jobs) that is not part of a work-study program</td>
<td>33.03%</td>
</tr>
<tr>
<td>None of the above</td>
<td>3.89%</td>
</tr>
</tbody>
</table>

Figure 3: Number of Work Hours per Week as Reported by Employed Participants.
How much are University students spending on course materials and how do they attempt to save money?

The survey asked participants how many courses the participant was enrolled in that semester and how many of those courses required textbooks. The results were as follows (figure 4).

![Course Enrollment & Required Textbooks](image)

**Figure 4: Number of Courses Enrolled in and Number of Required Textbooks Needed.**

Most participants reported spending between $300-$400 for their course materials during the Spring 2017 semester. Figure 5 provides the breakdown of participant spending on course materials. When asked how reasonable or unreasonable participants felt the amount that they spent on course materials was, 75% selected extremely unreasonable or somewhat unreasonable (figure 6).

Chi-Square statistical analysis shows that there is a statistically significant relationship ($X^2$ (20, N= 447) = 0.01, p = .05) between how many courses respondents enrolled in in Spring 2017 and the class year they were currently in. While 90% of the Freshman respondents (n= 50) enrolled in 4 or more courses, only about 63% of the Senior respondents (n=209) enrolled in 4 or more courses. In fact, 86% of the sophomore (n= 64), and 75% of the juniors (n=122) follow the pattern of the higher the students’ class years, the lower percentage of them enrolled in 4 or more courses.

The data reveals that out of all the colleges, the highest percentage of students in the College of Business (82%) reported that they found that the amount they had to spend on purchasing course materials were either somewhat or extremely unreasonable. The percentage of students who shared these sentiments were all lower at other colleges: the College of Health Sciences (75%); College of
Engineering and Technology (74%); College of Arts & Letters (74%); College of Education (73%); College of Sciences (73%).

The results of the survey compared how much participants budgeted for their course materials in Spring 2017 to how much participants actually paid. Participants on the lower-end of cost, the zero to $300 range, budgeted more than they actually paid. Students who paid over $300 for course materials budgeted less than they actually paid (figure 7). Key findings from the survey indicate that
46% of all respondents (n=455) felt that the cost of textbooks was extremely unreasonable. The highest percentage of respondents (26%, n=118) reported paying between $300-$400 for course materials in Spring 2017.

There is a significant relationship between how much students budget for course materials each semester and how reasonable or unreasonable they felt about the amount spent. ($^2 (20, N = 455) = 0.00, P = .05$) We found that, the more students budgeted each semester, the more unreasonable they found the amount they had to spend. Of the respondents who budgeted $501 or more per semester, two-third of them felt that the amount was extremely unreasonable. Comparatively, for respondents who budgeted $200 or less, only about 35% of them felt the same way.

Finally, the survey sought to determine how the University students save money on course materials by prompting students to select what actions they take to reduce costs. The most common way for participants to save money on course materials is to buy their books somewhere other than the campus bookstore (30%), followed by renting printed textbooks (20%). Only about 3% of respondents indicated that they did not attempt to reduce the cost of their assigned course materials (table 2).

### Table 2: What actions do University students take to reduce the cost of course materials?

<table>
<thead>
<tr>
<th>What are the top three actions you have taken to reduce required course materials cost? (select up to three)</th>
<th>% of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy books from somewhere other than the campus bookstore</td>
<td>29.68%</td>
</tr>
<tr>
<td>Rent printed textbooks</td>
<td>20.32%</td>
</tr>
<tr>
<td>Rent digital textbooks</td>
<td>13.94%</td>
</tr>
<tr>
<td>Buy used copies from the campus bookstore</td>
<td>13.58%</td>
</tr>
<tr>
<td>Share books with classmates</td>
<td>9.80%</td>
</tr>
<tr>
<td>Check to see if the Libraries have the required textbook</td>
<td>4.23%</td>
</tr>
<tr>
<td>Other</td>
<td>2.70%</td>
</tr>
<tr>
<td>Rent only the digital textbook chapters needed for the course</td>
<td>2.34%</td>
</tr>
</tbody>
</table>
Impact on Academic Success

The survey explored possible impacts of cost of course materials on student success by asking participants if they had taken specific actions based on the cost of course materials. Thirty-eight percent of participants indicated that they had chosen not to purchase required course materials due to cost and 20% indicated that they had received a lower grade than expected in a course because they could not afford to purchase the course materials (figure 8).

Participants who selected drop or withdraw a course were asked a follow-up question to determine how often they drop or withdraw from courses in general. Twenty-eight percent of participants who answered the follow-up question indicated that they had only dropped one course due to cost. Thirty-six percent indicated that they dropped courses occasionally due to cost, and 36% indicated that they regularly dropped courses due to cost. A higher percentage of students in the College of Business (12%) dropped or withdrew from a course due to the cost of textbooks than students in other colleges. About 9% of students in College of Health Sciences; and 7% of students in the College of Sciences dropped or withdrew.

Over 20% of students in four of the colleges (College of Arts and Letters; College of Education; College of Engineering; and College of Sciences) reported that earned a lower grade than expected in a course because they could not afford to buy the course materials.

The survey also investigated student perceptions of the necessity of having the course materials. We sought to find out whether there was a difference in perception based on whether or not the materials were required, supplementary, for a course within the major, or for a general education or elective course (figure 9). While 41% (n=183) of all respondents (n = 449) rated it extremely necessary to have the required textbook in order to succeed in a course in general, a higher number
of respondents (58%, n= 262) have the same rating for courses in their major. There are significant relationships between the college of the students’ and their rating for required textbook necessity to succeed in both general courses ($X^2 (18, N = 449) = 0.02, P = .05$), and courses in their major ($X^2 (18, N = 449) = 0.00, P = .05$).

The highest percentage of students in the College of Health Sciences (67%, n = 65) felt that having the required textbook extremely necessary to succeed in courses in their major; while the College of Sciences has the lowest percentage (44%, n =14). However, the College of Education has the highest percentage of students (48%, n =24) who found it extremely necessary to have the required textbook in order to succeed in a course outside of their major; and once again the College of Sciences has the lowest percentage (31%, n=10).

**Figure 9: Student perceptions of the necessity of having course materials**

**Practical Implications and Conclusions**

We posit that student demographics have an effect on how students perceive the cost of course materials. One key finding from the study was how much time our student worked outside of class. A high percentage of our working students worked over 31 hours per week. When asked how they usually pay for their course materials each semester, the most selected answer (61%) was students using money earned from a work-study or outside job. It is therefore likely that students who have to work and have to use their work earnings on course materials would be more sensitive to the cost than those who do not work. In addition, more of our transfer students worked 31 or hours per week than our non-transfer students. With many of our transfer students coming from Tidewater Community College that heavily features z-courses (courses that only use OER), the transfer student population might be the most affected by the cost of textbooks. For future directions, we will reach out to transfer students, especially those from Tidewater Community College who completed their study without having to pay for textbooks (z-degree), and explore their perceptions of now having to pay for course materials at our university, and how they handle the new financial burden. The results from this study make us realize some of the obstacles these student face, and we can develop services for them to help the university’s retention effort.

Our results show that the more courses a student takes, the more they budget and spent for course materials. Naturally, the more they budgeted, the more they perceived their expenses on course materials as unreasonable. However, the discipline the students belong to also makes a difference in how they perceive the cost. For instance, business students were by far the most unsatisfied with the cost of course materials A higher percentage of our business students report paying $500 or
Undergraduate Student Perspectives on Textbook Costs and Implications for Academic Success

more for their books than any other college. So, it was not surprising to find that a higher percentage of students in the College of Business (12%) dropped or withdrew from a course due to the cost of textbooks than students in other colleges.

We found that over a third of the participants indicated that they had chosen not to purchase required course materials due to cost and about one-fifth of them indicated that they had received a lower grade than expected in a course because they could not afford to purchase the course materials. Furthermore, many students have dropped or withdrawn from courses due to the cost of the course materials. This suggests that the negative perception of textbook expenses could lead to negative impact on student grades and course completions, and potentially lead to negative impact on overall retention. With this information, the library could work specifically with the College of Business as well as the other Colleges to offer more library licensed materials for their courses in order to lower their students’ expenses.

Most respondents buy books from somewhere else other than the campus bookstore, they also rent or buy digital or used books. Twenty-four percent said that they shared books with classmates, and only about 10% checked to see if the Libraries have their textbooks. Only about 3% of respondents said that they did not attempt to reduce their textbooks costs. This has serious practical implication for the campus bookstore as they will need to modify their current business model. One possible future direction is to bring the campus bookstore into the conversation. Instead of treating it as a zero-sum game, it could be more productive to work with the bookstore to help student ease their textbook expense challenges.

We also learned that very few students were finding their textbooks on reserve at the Libraries, so this tells us that we could do a better job of marketing this service to students and faculty. Some of these methods for reducing costs could have an impact on student academic achievement. For example, if students are renting books or single chapters, this means that they will no longer have access to that information after the semester is over. If they are sharing books, this could cause problems if everyone has a test or assignment due at the same time.

The data reveals that students found it necessary to have the required textbooks in the courses of their major in order to succeed. This could mean that the students are more inclined to purchase textbooks for their major courses than for courses not in their major. As the highest percentage of students in the College of Health Sciences (67%, n = 65) felt that having the required textbook extremely necessary to succeed in courses in their major, the practical implication is for us to target those courses to offer more affordable options for their faculty and students. However, the results could also suggest that students would rather spend their money on textbooks for their major courses, thus not spend as much for non-major courses which they deem not as necessary. In this case, the practical implication for the libraries is to focus on the general education courses, which have large enrollments, to have the most impact on easing the financial burden as well as helping student success.

Although the cost of textbooks is relatively small in comparison to the other costs of higher education such as tuition and housing, student access to and engagement with course materials is essential to academic achievement. Communication and collaboration across university departments and disciplines is key to easing this burden for students and improving their educational experience. Faculty are responsible for the selection and implementation of course materials. Partners such as academic libraries, faculty development, and university administration can support faculty in course design by providing professional development, training, and incentives. Finally, including students in conversations about their experiences with and perceptions of course materials is essential to learning about how to best help them succeed. Sharing local stories and data from studies such as
this one can help to contextualize the broader concerns with the rising cost of textbooks and how it connects to student learning.

References


**Appendix A**

**Student Textbook Survey**

Q1 Which of these categories best defines you?
- Undergraduate Student (1)
- Graduate Student (2)
- Non-degree Student (3)
- Other (4)

Q2 How many courses are you enrolled in this semester?
- 0 (1)
- 1 (2)
- 2 (3)
- 3 (4)
- 4 (5)
- 5 or more (6)

Q3 How many of these courses have required textbooks?
- 0 (1)
- 1 (2)
- 2 (3)
- 3 (4)
- 4 (5)
- 5 or more (6)
- I am not sure (7)

Q4 How much do you estimate the cost of the course materials (including textbooks, course packets, access codes, and other print or digital learning materials) for ALL of your courses this semester?
- $0-100 (1)
- $101-200 (2)
- $201-300 (3)
- $301-400 (4)
- $401-500 (5)
- $501 or more (6)

Q5 How reasonable or unreasonable was the amount of money you spent on course materials this semester?
- Extremely reasonable (1)
- Somewhat reasonable (2)
- Somewhat unreasonable (3)
- Extremely unreasonable (4)
- I did not purchase course materials this semester (5)

Q6 How much do you budget for course materials each semester?
Q7 How do you usually pay for your course materials each semester? (Check all that apply)
   □ I use my own money earned from a work study or outside job (1)
   □ I use non-loan awarded money (Examples: Pell Grant, Scholarships, GI Bill) (2)
   □ I use money from student loans (3)
   □ My parents pay for my textbooks (4)
   □ Other (5) ________________________________________________

Q8 During your entire time at IV, the cost of materials for a course has caused you to (check all that apply):
   □ Take fewer courses (1)
   □ Not register for a specific course (2)
   □ Drop or withdraw from a course (3)
   □ Earn a lower grade than you expected in a course because you could not afford to buy the course materials (4)
   □ Not purchase the required textbook (5)
   □ Change your major (6)
   □ Other (7) ________________________________________________
   □ None of the above (8)

Q9 How often do you drop or withdraw from a course in general?

________________________________________________________________
________________________________________________________________
________________________________________________________________
________________________________________________________________

Q10 What are the top three actions you have taken to reduce required course materials costs? (Select up to three)
   □ I do not attempt to reduce textbook costs (1)
   □ Buy used copies from the campus bookstore (2)
   □ Buy books from somewhere other than the campus bookstore (3)
   □ Rent digital textbooks (4)
   □ Buy lifetime access to a digital version of a textbook (5)
Rent only the digital textbook chapters needed for the course (6)
Rent printed textbooks (7)
Check to see if ODU Libraries have the required textbook (8)
Use a reserve copy from the ODU Libraries (9)
Share books with classmates (10)
Other (please specify) (11)

Q11 In general, how would you rate the necessity of having the following?

<table>
<thead>
<tr>
<th></th>
<th>Extremely necessary (1)</th>
<th>Somewhat necessary (2)</th>
<th>Somewhat unnecessary (3)</th>
<th>Extremely unnecessary (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The required textbook in order to succeed in a course (1)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>The required textbook for a class that is in your major in order to succeed in a course (2)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Supplementary materials (online access codes, recommended/not required materials) in order to succeed in course (3)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Supplementary materials (online access codes, recommended/not required materials) in order to succeed in courses that are in your major (4)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Q12 What class year are you currently in?
- Senior (1)
- Junior (2)
- Sophomore (3)
- Freshman (4)
- Other (5) ________________________________________________

Q13 In what College is your major? (select from drop down)
- College of Arts & Letters
- College of Business
- College of Education & Professional Studies
- College of Engineering
- College of Health Sciences
- College of Sciences
- Unknown or Other
Q14 Which of the following applies to you? (Check all that apply)
  ○ I am a first generation college student (1)
  ○ I receive financial aid or scholarships (2)
  ○ I am part of a work-study program (3)
  ○ I have a job (or jobs) that is not part of a work-study program (4)
  ○ None of the above (5)

Q15 How many hours a week do you work?
  ○ 0-10 (1)
  ○ 11-20 (2)
  ○ 21-30 (3)
  ○ 31-40 (4)
  ○ 41 or more (5)

Q16 Are you a transfer student?
  ○ Yes (1)
  ○ No (2)

Q17 Did you transfer to // from ///
  ○ Yes (1)
  ○ No (2)

Q18 If you transferred to ODU from TCC, we are interested in learning more about your experiences at both institutions. Would you be interested in participating in a brief follow-up study?
  ○ Yes (1)
  ○ No (2)

Q19 If you are interested in participating in our follow-up study, we will contact you via email. Your information will remain protected and anonymous. Please enter your email:
______________________________
Faculty Members’ Lived Experiences with Choosing Open Educational Resources

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Abstract

The cost of textbooks has continued to increase with significant financial effects on students in higher education. Although many faculty express a desire and willingness to adopt and create open textbooks (and OER generally), few actually do. To better understand this gap between attitudes and practices, this phenomenological study builds upon the findings of a survey of faculty members at a large, nationally-ranked, high-research-activity university in the U.S. and uses in-depth interviews to understand faculty members’ lived experiences with OER adoption and creation. Results indicated that though faculty might be motivated to use and create OER to reduce cost and improve pedagogy, they are regularly stymied by quality considerations, copyright fears, technical difficulties, and sustainability concerns. We explore each of these issues in some depth and provide discussion and suggestions on how similar institutions (e.g., high-research-activity) should respond to help support OER adoption and creation.

Keywords: OER, textbooks, faculty, open educational resources, phenomenology

Academic performance increases when students use textbooks to prepare for class (Skinner & Howes, 2013), and educators have long been interested in providing the highest quality textbook to their students (Brandt, 1964). To select a textbook, educators face several challenges including ensuring that the textbook is of high quality (Oakes & Saunders, 2002) and that “it aligns with their pedagogical approaches” (Williams, 1983, p. 251). Recent studies show that a college student in the U.S. now spends over $900 per year on textbooks (Allen, 2010), and these prices have drastically increased in recent years (Senack & Donoghue, 2016), thereby making a college education prohibitively expensive for many students (Kingkade, 2011).

Open textbooks and open educational resources (OER) can significantly decrease costs for students, and faculty who have used them have expressed positive perceptions of their quality (Bliss, Hilton, Wiley, & Thanos, 2013; Petrides, Jimes, Middleton-Detzner, Walling, & Weiss, 2011), albeit many remain unaware of them (Allen & Seaman, 2014; Seaman & Seaman, 2018). Studies have shown that student learning is not negatively impacted by their use (Hilton, 2016) and that faculty who use these resources report them to be as good or better than their commercial counterparts (Bliss et al., 2013; Kimmons, 2015). Seaman and Seaman (2018) report that 39% of faculty believe that more than 10% of their students do not have access to the required textbook, that the main reason for this is cost, and that department chairpersons believe that the most important thing that textbook companies can do to improve their textbooks is to make them less expensive for students.
Despite a clear need for open textbooks, a recent regional survey in the U.S. found that although 91% of faculty would be willing to use such OER in their classrooms, less than 5% actually did (Martin, Belikov, Hilton, Wiley, & Fischer, 2017); this mimics national survey data, which shows that only 13% of faculty currently use free resources of any kind and that only 6% of non-adopters plan to use OER in the future (Seaman & Seaman, 2018). Why does such a disparity exist? If open textbooks are financially better for students, have similar quality to their commercial counterparts, and provide greater freedoms to instructors (e.g., sharing, printing), then why are they adopted at such a low rate?

Ehlers (2011), quoting a study (OPAL, 2011), argued “that there is a gap between the concept of giving knowledge for free … and the actual use of free and open resources for teaching and learning”. The OPAL (2011) study revealed that individuals are faced with five main barriers when they want to use OER: lack of institutional support; lack of technological tools for sharing and adapting resources; lack of user skills and time; lack of quality or fitness of the resources; and personal issues such as lack of trust and time. These results mimic those found with K-12 teachers (Kimmons, 2016) and suggest that we need to better “understand the personal, organizational, and environmental factors that hinder or enable creation, sharing, use, and reuse of OER” (Ehlers, 2011, p. 1) and how to better support open education literacies and practices among instructors (Kimmons, 2014; Mason & Kimmons, 2018).

**Method**

The aim of this phenomenological study (Moustakas, 1994) was to capture and understand faculty members’ lived experiences in seeking and adopting new content, and especially open content, for the courses they teach. In this study, we conducted over 16 hours of interviews with 8 different faculty members at a large, nationally-ranked, private university in the western U.S. to answer the following three research questions:

1. What influenced faculty to adopt new teaching materials like textbooks?
2. What influenced them to choose textbooks from a publisher vs. using alternatives like OER?
3. If they did select OER, how did they find them, did they modify them and with what tools, and did they take the effort to share them?

A previous (2016) Utah Academic Library Consortium (UALC) survey was conducted at the target institution to gather information about faculty and student perceptions toward OER. One of the questions asked of the participants in that survey was if the individual would like assistance in seeking open resources and if so, if they would share their personal contact information. Over 38% of respondents expressed interest in receiving help and shared their contact information so that they could learn more about where to find and adapt open resources for their courses. Operating from this list, we sent email requests to faculty members to request their participation.

**Participant Selection**

Patton (2002) argues that in order to conduct effective qualitative research the researcher does not need to “interview a large number of participants” (p. 245). Rather, the researcher can gather an appropriate amount of information when he/she focuses on intentional, purposeful sampling that captures the participants’ “rich descriptions” (p. 240). He further suggests an approach in which “researchers estimate the minimum number of samples required to cover the topic at the outset and make adjustments as needed if it becomes clear that more participants will be beneficial” (p. 246).
With this in mind, we interviewed 8 participants: 4 women and 4 men faculty with different departmental backgrounds, university status, and levels of involvement and interaction with OER (cf. Table 1). With regard to appropriate sample size, research suggests that the guiding principle should be the concept of saturation (Mason, 2010); in our study, 8 participants provided enough detail and rich description to reach saturation and to sufficiently answer the research questions.

<table>
<thead>
<tr>
<th>Faculty Member Pseudonym</th>
<th>Gender</th>
<th>Academic Rank &amp; Status</th>
<th>OER Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Julie</td>
<td>Female</td>
<td>Adjunct</td>
<td>New</td>
</tr>
<tr>
<td>Michelle</td>
<td>Female</td>
<td>Adjunct</td>
<td>Aware</td>
</tr>
<tr>
<td>Angela</td>
<td>Female</td>
<td>Tenure-track</td>
<td>New</td>
</tr>
<tr>
<td>Kate</td>
<td>Female</td>
<td>Tenure-track</td>
<td>Aware</td>
</tr>
<tr>
<td>Don</td>
<td>Male</td>
<td>Adjunct</td>
<td>New</td>
</tr>
<tr>
<td>Matt</td>
<td>Male</td>
<td>Adjunct</td>
<td>Aware</td>
</tr>
<tr>
<td>Phil</td>
<td>Male</td>
<td>Tenure-track</td>
<td>New</td>
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<tr>
<td>Colby</td>
<td>Male</td>
<td>Tenure-track</td>
<td>Aware</td>
</tr>
</tbody>
</table>

**Delimitations**

Because this is a phenomenological study of instructors’ experiences seeking and adopting OER, we intentionally delimited our participants to those who expressed some interest in these materials. This allowed us to focus on the rich experiences of these participants as key informants, but it also means that results will not reflect the experiences of those who did not express such interest and that (as with any qualitative study) results may not be generalizable to all instructors. Future survey and quantitative designs may utilize these results to create instruments for controlled analysis and determine how widespread and representative any qualitative findings might be.

**Data Collection**

We used a semi-structured interview protocol (Moustakas, 1994) and planned questions that encouraged the interviewee to share as much first-hand information as possible and also attempted to bracket our own assumptions. The three guiding questions for the interviews were:

1. What influences you to adopt new teaching materials?
2. What influences your decisions to select published content vs. open/free materials?
3. If you have searched for and selected open/free materials, how did you attempt to use them (e.g., adopted, adapted, or revised)?

We allowed the topic of OER to be raised naturally by participants in the course of the conversation and then asked follow-up questions focused around what they knew about OER and if OER was a consideration in the overall textbook selection process. All of the interviews took place in the participants’ respective offices so that they could show us how they searched for curricular materials, if desired. On several occasions they would show us books, policy statement, websites, and personal documentation on different subjects. Each interview was digitally recorded and then transcribed.
Analyzing Data

We used Strauss and Corbin’s (1990) approach of using three levels of codes including open, axial, and selective/thematic. This approach has proven to be an effective analytical method that guides the researcher past mere descriptions and into conceptualization and theorizing about the data obtained (Kendall, 1999). Open codes represented the main thought of the participant, using their own words. The open statements were then compared to create the axial and selective, or thematic codes. In the Results section, we will discuss themes at the thematic and axial levels and will also provide many thick, rich direct quotes to help ensure trustworthiness.

Results

Analysis of the open codes resulted in the development of various axial codes organized by 4 overarching themes: (1) Knowledge and Motivations; (2) Content Selection, (3) Technical Issues, and (4) Sustainability. The following sections will discuss each of these four thematic areas in more detail.

Knowledge and Motivations

In general, participants felt a need to move away from traditional textbooks, because “Textbooks, by definition, are not on the cutting edge in science. There’s no way they can be” (Julie). This is because the moment the textbook is printed, it is already out of date in areas like software development, engineering, or areas where there are constant discoveries being made and the content is in a constant state of change. Each instructor we interviewed stated that they were willing to use OER in the place of published/purchased textbooks. When asked why this was true, the usual response was to reduce the financial burden placed on students. They all knew that OER were available at no cost to the students, but while “free” was good, the quality of such resources was also important, and most participants equated “free” and “OER” textbooks to being “digital.” Two of the participants asked if OER material could be printed out, and many believed that OER only existed in digital formats.

Many participants misunderstood what “OER” meant. Don, for example, made the comment that, “…some students don’t care for digital content and would be very much against OER.” Angela stated that she was using an open textbook that was free but that “the only costs to the students were for gaining access to the [required] homework exercises and practice quizzes.” And Michelle explained that there is some “moral hazard” involved in using OER, because “you worry that [students] will share it with a roommate who is taking the same class” (Michelle). There were also many comments expressing concern that if “…we create an open textbook, other universities might get a copy of it and use it free of charge in their own classes” (Julie). We took such comments to mean that though faculty were sensitive to the financial burdens of their students, a number of lingering concerns related to monetization of content and academic integrity outweighed such concerns and that some of the perceived conflicts in their minds between openness and academic work rested on misunderstandings of what open means (e.g., digital) and strict assumptions on how classes should be taught (e.g., no sharing of content between students).

Julie went on to explain that many internal discussions in her department about OER heavily revolved around monetization:

[Department leads] considered building a website that students could use free of charge, but required them to log in and sign out for copies of our textbooks. ... One of the department chairs...
proposed—and I think we may actually do this—selling ancillary materials. Teacher packet, testing, learning activities, things like that. So they were all about monetizing it, and that’s their job. (Julie)

Such comments seemed to reflect a willingness to redirect costs from a printed textbook to an online medium but that such shifts may be heavily influenced by concerns about funding, credit, and security. A common sentiment among interviewees regarding sharing with colleagues at other institutions was one of dismay that someone else might take what they developed for a specific course and use it in a similar setting without providing financial or other benefits to them as the original author. From these conversations, there seemed to either be little understanding of the 5R activities (Wiley, 2017), a low recognition of their value, or unwillingness to learn the skills or engage in the practices necessary to share (such as packaging up a textbook and hosting it on a website).

Despite these sentiments, some faculty persisted in OER creation and use for two guiding reasons — Reducing Cost and Improving Learning — which we will now explore in greater depth.

Reducing Cost. Faculty participants generally expressed willingness to reduce financial burdens upon their students as long as quality was not sacrificed in the process:

We like the idea of OER from the point of our students—you know, saving money, etc. However you need to make sure that you [don’t] sacrifice quality. (Matt)

Realizing that OER materials equalled the quality of purchased textbooks helped us a lot when we made the decision. ... It was also important to know that the students could keep the books forever and build their personal libraries. (Don)

Thus, participants were motivated to use OER to save students money, but this motivation was secondary to using quality resources.

Additionally, temporarily disregarding some of the aforementioned complexities, there was a prevailing attitude that access to knowledge “has got to be free” (Phil). From a moral perspective, OER seemed to make sense to faculty members in that it is simply a way to package and distribute knowledge that they believe should be free, but ambiguities in morality vs. realism arose when participants were asked if it was reasonable to charge someone for the time and effort required to write OER. Morally, faculty believed that we should not charge students for access to knowledge, but realistically, they considered developing a textbook to be a service that takes a lot of time and that those who create textbooks should be compensated for. This line of reasoning seemed to consistently come full circle to the point that no real decision or stance on OER could be justified, and interviews at this stage generally involved an awkward pause followed by a statement like “...well, it’s probably easier to just keep doing what we have been doing.”

We took this to mean that though reducing cost may generally be viewed as a moral good, faculty had difficulty justifying this good against effort-based monetary considerations for creators, presenting an intractable problem in their actual lives and suggesting that the moral imperative to reduce cost or increase access for students is not sufficient as an isolated motivation.

Improving Learning. Other quotes revealed pedagogical advantages that faculty perceived from shifting to open textbooks that they had created:

[We wanted a standardized textbook for all the professors teaching [the course]. ... There were standard homework assignments, and there was a standardized approach to teaching that supported how I like to teach and how my students like to learn. (Phil)
[The students] discovered that the way I teach in the class matched the study material outside of class. (Julie)

As a [faculty] group, we were able to create a decent textbook that matched our teaching approach. (Don)

Pedagogically speaking, we were able to incorporate digital content such as video. We polled students and asked “what other tools do you use to learn?” “Videos” was a resounding ‘yes’. (Phil)

We chose to develop our own open textbook because the topic I teach is changing pretty quickly. No one knows our field like the instructors that teach it, so it was a no-brainer to invest the time needed to create our own textbook. (Matt)

By creating their own content, faculty were better able to align it to their classroom practices, expectations, and norms. This included having the ability to rearrange chapters as well as to modify content for accuracy and relevance. This also provided a speed benefit to faculty when designing their courses, due to better alignment and freedom to repurpose materials. Such alignment added another layer of motivation to choose OER, because it allowed faculty to feel like their pedagogical practices were improving because of the shift and to have more control over the learning experience for their students.

Content Selection

In almost every interview, discussions arose on how to identify good textbooks and the process by which participants learned to do this. Don explained that this was a tacit expectation of faculty:

To some degree, we assume that [new faculty] already know what is and isn’t a “good textbook.” I was a department chair for three years and I assumed [my faculty] already had some criteria to use in selecting textbooks. (Don)

In all cases, though participants mentioned criteria or processes of selection, these tended to be assumed, informal (e.g., modeling), and nondescript.

When pushed on how they ensured that the textbooks they selected were actually good, many faculty talked about the need for having a sense of empowerment or confidence by being active in departmental settings and participating in public conferences. Instructors also seemed to interpret quality very narrowly — solely in terms of content accuracy — as follows:

If the textbook is technically accurate, chances are that it will be considered “good” by other faculty. (Phil)

If new instructors have been taught how to interact in faculty meetings about textbooks that have correct content and if they know what’s being used nationally, or in other countries, you can be relatively confident that the textbooks are high quality. (Matt)

Such a narrow interpretation of quality means that faculty may have limited conceptualizations of what makes a textbook effective and that they may be unduly biased toward resources that are “technically accurate” but that are deficient in other ways (e.g., written poorly, structured illogically).

In addition, one of the recurring axial codes around integrating content was concern of complying with copyright restrictions on material. Though copyright concerns are not unique to OER, a shift to OER requires faculty to navigate copyright in new ways that are more complex than previous
approaches, wherein they could simply rely upon a publisher to make copyright determinations for them. The following quotes represent some common feelings around copyrighted material:

*Copyright is a big pain. I don't know how to make sure what I'm using is 'legal'.* (Julie)

*[In many ways [copyright is] the bane of my existence because I use huge quantities of images in my professional presentations, because I am a cherry picker, or an eclectic instructor, when it comes to the kinds of texts I want my students to be exposed to. I really wish there was a department on campus where I could go for help.* (Kate)

*Dr [X] retired a couple years ago … and knew the process for checking outside material that may, or may not be copyrighted. I don't know how to do that. … I haven’t really interacted with the copyright office enough to be able to say quote-unquote ‘whose side they’re on’. When I have interacted with them in the past, I left feeling overwhelmed with the amount of work required to include copyrighted content. I remember thinking ‘this is just not worth the time and effort’.* (Michelle)

The target university has a copyright office and other offices that can help faculty navigate these issues, but though faculty expressed a verbal desire to comply with copyright law and university policies, this was coupled with frustration, fear, and lack of understanding that such offices existed. Several instructors stated that they would be willing to generate more content, or even adapt content that they found online, but they feared being “caught” or reprimanded for possibly violating copyright. Every instructor expressed awareness of copyright rules and had a desire to be compliant, but very few had the desire to take the time to reach out to the copyright office and go through the steps necessary to have content reviewed and approved. This also made commercial textbooks more appealing to them, because they felt it was easier to use something that was already commercially published and not bother with materials that might require some copyright know-how to adapt, remix, etc.

When asked if OER were considered in the textbook selection process most said that they were not, and they generally cited lack of motivation or encouragement, as Matt explained:

*Inertia to use OER, or any other type of eTextbook, is non-existent. … We are very selective about choosing the textbook we’re going to use. We aren't going to use OER just to use OER. … Multiple programs and departments [are] relying on [our] classes to provide predictable content and predictable learning objectives.* (Matt)

To summarize this section, faculty relied on implicit criteria for determining material quality that revolved around content accuracy, predictability, etc., and OER were often not considered out of copyright fears and other uncertainties. Among departments, then, sticking to the previous practice of using non-open materials was seen as a safe (and quick) choice, and though everyone claimed to be familiar with and supportive of OER, concerns about quality and copyright often prevented their consideration.

**Technical Issues**

Most OER, including textbooks, are found on the Internet and stored in a digital format. It may seem obvious, but in order to use OER faculty need to know how to search for and download digital content. Searching for and downloading content from the Internet are fairly basic skills that we can assume most faculty know how to do in a general way, but we were interested to learn how instructors used these skills in order to find and download digital OER content. After beginning the interviews and talking about how they select content in general, we asked participants to show how they would find OER. In addition to searching for and downloading an open textbook, we wanted to know how
they would modify the content for use in their class. The following quote is indicative of nearly every response we received to the question:

*Well, I would probably start with Google, quite honestly. I’d probably just type in something into Google like, “[subject] OER textbook,” and see what comes up. From there I would just go to those websites and look for textbooks that had good reviews—you know, like shopping on Amazon.* (Julie)

Many of the searches like the one described return sites such as uen.com and openstax.org for general categories such as biology, math, etc. But, for more specific subjects there are relatively few options, and among those that exist, faculty noted that it is often easier to find information on how to donate to the provider than it is to find actual content and reviews.

Another common follow-up response within this category was exemplified by this statement from Michelle:

*I know that there are portals of open educational resources, but quite honestly, I have no idea where to find them. There are OER experts on campus that I would probably call.* (Michelle)

Most participants expressed interest in speaking to an OER expert and ask questions and seek guidance, but though Michelle knew one, she had not reached out. Such experts included faculty in other departments who either were known for creating OER or conducted research on topics of openness.

Furthermore, the ability to find and access textbooks was a major barrier. Even in the course of our interviews, we witnessed the frustration and confusion in going through the search process. On a few occasions, faculty were able to find and download an open textbook but then struggled with what to do next. One appealing feature of OER is the ability to modify and adapt the content to meet one’s needs; however, if the process for searching for OER was difficult, then the process for modifying the content was even more so. In part, this was because most OER were only available as large, book-length PDF files and were not editable with common word processing applications:

*I don’t know how to do that. I don’t know what tools are there to edit this book. It appears that most of the content is in digital format and we would probably need to hire a student with computer science skills in order to modify this file.* (Don)

*Maybe there are videos online that show techniques for how to edit this file.* (Kate)

*I have no idea [how to modify this file]. None of the ones I’ve found are modifiable. I wish that the website would include tools, or at least instructions on how to open and modify this textbook. There is nothing posted on their website for how to do this. I’m stumped.* (Don)

One instructor, Angela, was determined to figure OER out and went through the process of finding, downloading, and modifying a textbook she discovered online. She reported the following:

*I wish I would have known how difficult this process was going to be. I’m not sure I would have gone through it if I knew. It requires a lot of time and people with special skills. It was hard, and the process required us to use at least three different software programs. One that we used to ‘unlock’ the file and then another that we used to make changes. Before we could print it, we needed to use another software program … I can’t remember the specifics to give you the details.* (Angela)

Angela did, eventually, find a suitable textbook, but the next step of figuring out how to change it was even more difficult. Again, she took the time to push through this process, but most participants did not. She had to search, find, and learn how to use three separate applications that were needed.
in order to modify the textbook, and most participants simply were not willing to go through this process. 

From this, we concluded that a general lack of usable search and editing tools is a major barrier for many instructors, and only the most committed seem likely to stick with finding an open textbook, and among those, only a select few will go through the technical process of learning to adapt it, because doing so would require a great deal of time and effort, and most felt that they have neither the time nor incentive to do so.

**Sustainability**

And finally, as faculty discussed reasons why they did not use OER as much as they might like, conversations commonly pivoted back to resource availability for sustainability — specifically in terms of time and funding. Simply put, it takes time to find, download, and edit open textbooks, and many instructors do not feel like they have sufficient time to spare, and due to the technological and other issues mentioned above, faculty also felt that they needed funding to be successful with OER.

To illustrate, two faculty members, Julie and Michelle, received grants that provided time (away from their normal teaching load) and additional funding to create new textbooks. The funding was used to hire students, purchase software, and take additional courses to acquire new skills. This process, on average required over $10,000 per textbook and 12-18 months to produce.

A few departments that had supported the creation of OER for students still encouraged their faculty members to charge students in order to recuperate the invested development costs. Several departments received grants in order to develop the open textbooks but not funds necessary to cover ongoing maintenance to keep the content up-to-date. Because the target university typically prevents departments from charging course resource fees, some even took the surprising step of encouraging faculty teaching courses with OER to ask students for departmental donations to provide necessary resources.

To better unpack this theme, we will now explore Time and Funding as separate constructs.

**Time.** The lack of time to create or modify an open textbook was mentioned in each interview. Even the simple task of finding and downloading a new textbook takes time and due to the lack of useful search tools, many simply do not try. Some example quotes include the following:

- *I do think that the lack of time and money are two of the main reasons a lot of instructors just pick a textbook and go with it, because … it’s easier in terms of ‘everything is all in one place’. (Phil)*

- *I think when the publisher gives [faculty] a new edition of the textbook, they don’t want to go out and surf the web and find a new online textbook. I think that seems like too much of a daunting task for them.* (Colby)

- *That process of looking for a textbook took about 6 months. We did an extensive search--there was no way we could take an additional 6 months to modify it.* (Angela)

- *[The barrier is] time. The amount of time it takes and money. To adapt and change and to hire a TA to do the grunt work.* (Kate)

- *The amount of time that it takes [to] look for a new textbook is greater than the reward or the incentive to do so on its own.* (Don)

Such feelings are not surprising given the earlier discussion of technology issues, but the problem of perceived lack of time as a resource seems to be exacerbated by faculty perceptions of tenure,
promotion, and contract requirements. Classified as a Doctoral University with High Research Activity by the Carnegie Classification, the target university has a heavy emphasis on research in addition to teaching, which means that tenure-track faculty will organize their time in ways that prioritize elements of their jobs that they will be evaluated for (e.g., publications in scholarly outlets), which means that if the creation or adaptation of OER is not perceived as being valued for tenure and promotion, then faculty will never feel that they have time for it. Multiple participants expressed these feelings as follows:

Most professors are involved in their research ... they are involved in contributing to various projects and there simply is not enough time to stop any of those and to look for additional textbooks that might play an important role in the classroom. (Michelle)

If you’re really gunning for publications, you just don’t have so much time to think about [OER]. (Julie)

For me, it’s [tenure] first. Nothing else matters for me at this point until I achieve [tenure]. (Kate)

A clear takeaway from this realization is that faculty concerns about time to work with OER may merely be manifestations of a deeper issue: that such efforts are not valued by their institutions. For instance, faculty at such institutions likely would not say “I don’t have time to do research,” because research is viewed as part of their jobs that they will be evaluated for. This means that institutional considerations are made to make time available to engage in research (e.g., course releases), and faculty are evaluated on their success in this regard. So, although faculty across the world may echo our participants’ concerns about not having time for OER, such statements actually seem to mean that our institutions lack systems that value and encourage such activities.

Funding. Due in large part to lack of time and expertise mentioned above, money is needed to augment existing staff, to reformat content, to create new content, and to maintain existing content. Money is also needed to license software used in editing and formatting content. Faculty reported that both types of money were needed:

[Developing OER is] still a thing we’re thinking through, … and we thought we had enough [funding] in the beginning, [but] ... we didn’t have enough. Thanks to the library, we were able to acquire additional funds to complete the project. (Kate)

Once we created our textbook we were asked, “how do you plan to maintain this?” There has to be some source of revenue. (Angela)

I don’t know what, if any, resources exist on campus who know about and are willing to help us create OER. I received an email once from the library and was invited to go to an OER seminar. ... Aside from that one seminar, I’m unaware of other resources. (Matt)

These quotes highlight that although some initial financial impeti may have been provided to faculty and departments to move toward OER, they perceive that sustaining such efforts requires some ongoing funding. The comment on donations is also noteworthy, because it entails that though departments may initially move toward OER to drive down costs for students, they may end up merely reassigning costs to students in different forms via either voluntary means (e.g., donations) or involuntary means (e.g., course fees).

Such approaches reflect perhaps a potential difference in mindset between personnel wherein some assume that students should directly share in the ongoing cost of OER maintenance,
essentially replicating commercial course-packet-type practices with OER, while others may not. Similarly, some may believe that such support should be garnered coercively (e.g., required course fees) while others prefer a non-coercive approach (e.g., donations). Furthermore, even if faculty are not seeking remuneration themselves for time spent creating and curating OER, there seemed to be an implicit assumption among our interviewees that they should not be expected to perpetually be involved in OER creation and that those who continued these efforts within their departments merited remuneration. In any case, though OER is often touted as a “free solution,” faculty who have tried OER seem to recognize that free comes at a price that must be sustained, and because OER creation and maintenance are not accepted as common faculty expectations for tenure and promotion, there seems to be confusion and uncertainty among faculty regarding (1) who should pay for these resources and (2) how they should do it.

Discussion and Conclusion

To summarize, our findings revealed four main themes. First, though our participants had limited and sometimes inaccurate understandings of OER, they expressed at least initial interest and motivation to adopt and create them to reduce student costs and to improve learning. Second, when selecting content for their classes, participants operated on non-explicit assumptions of quality (that seemed to focus on accuracy) and were influenced in their decision-making by fears associated with limited copyright knowledge. Third, when they actually engaged in the process of finding, remixing, and creating OER, they met with a variety of unexpected technical barriers that slowed, discouraged, or altogether stopped them. And fourth, participants seemed to struggle with how to sustain OER in their classes and departments without resources they viewed to be necessary (namely, time and money). We will now unpack each of these themes a bit more to provide some suggestions for how OER can move forward in institutions similar to this one (e.g., that value both research and teaching).

First, various studies have shown that faculty generally support the ambition to shift to OER (e.g., Seaman & Seaman, 2018), but the two motivators that resonated most with our faculty focused on financial and learning benefits for students. Much of the current work progressing with OER synergizes with parallel research on cost impacts on students, and as faculty become more aware of how driving down costs for students can improve student well-being (such as by allowing them to overcome food insecurity, cf., Payne-Sturges, Tjaden, Caldeira, Vincent, & Arria, 2017) we can expect this to motivate faculty to move to OER. Beyond this, though, there seems to be clear power in moving the narrative surrounding OER away from mere cost savings to actual learning benefits, which again, current research in this realm is moving forward (cf., Hilton, 2016). Yet, for this to happen, it seems that some fundamental education of the meaning of OER is necessary for faculty generally. If, for instance, faculty are interpreting “open” as merely “digital” or “no cost,” then the pedagogical benefits of these resources will not be apparent to them. That is, for the pedagogical argument to carry weight, it seems that faculty must understand the flexibility and potentials afforded by open licensing that are unique and different from other “digital” or even “no cost” solutions.

Second, though the persistence of the textbook as an academic artifact for the past few decades makes this point counter-intuitive, almost no research has been done to identify or systematize textbook quality indicators (cf. Woodward, Lloyd, & Kimmons, 2017). Though our faculty seemed to lack clear or robust understandings of what makes a textbook high-quality, this actually reflects the state of the literature, where textbook quality generally seems to be interpreted merely as content accuracy. Within such a situation, it is no surprise that faculty may often rely upon commercial publisher recommendations and perceived production value as proxies for quality and why open alternatives are viewed as being lesser. If we furthermore factor in the messiness of copyright
considerations, then it is not surprising that faculty choose commercial textbooks over OER, because it is easier to trust the publisher for establishing quality and following legal considerations than it is to navigate these uncertain spaces oneself. For OER to diffuse, then, we need to seriously rethink what constitutes quality in our resources (cf., Clements & Pawlowski, 2011) and train faculty to identify quality and more bravely navigate copyright on their own.

Third, shifts to open take work, and most faculty will struggle with the technical requirements of the shift. Technologies supporting these shifts are constantly evolving and improving, such as through the development of usage rights filtering in Google Image searches, the creation of ever more-robust OER repositories like OER Commons or the BC Campus Open Textbook Library, and the emergence of ever more user-friendly open publishing platforms like CK-12, PressBooks, LibreTexts, and EdTech Books, but this is still an area that needs improvement and upon which institutions can make an impact. In particular, the open community’s over-reliance on PDFs has, on the one hand, helped to increase access to open resources (cf., Brandle et al., 2019) by making them more universally accessible (at least as long as users have a reasonably large screen), but it has simultaneously stymied the remixability and value proposition associated with reuse of these resources by making them virtually impossible for most faculty to edit and reorganize. Very little research exists on the usability and accessibility of OER, and there seems to be an unstated, faulty assumption that if educators just really cared enough about driving down costs for their students then they would be able to make OER work in their classes. For this reason, ongoing efforts should focus heavily upon improving user experience, remixability, and universal access (e.g., mobile-friendliness) of these resources. Continuous improvement processes via A/B testing and other procedures, like those used by CourseKata and EdTech Books, are especially promising in this vein, because they can leverage the perpetual updatability of these resources as a vehicle for constant, iterative improvement.

And fourth, it seems that sustaining OER in our institutions cannot occur by merely providing seed monies or other initiatives to promote faculty in their initial adoption or creation but that institutions must fundamentally rethink the roles that faculty play in their institutions and how their efforts are evaluated, particularly in the areas of tenure and promotion. In our current climate, a world-renowned expert might devote thousands of hours to creating the best educational resource available on a given subject, only to have the resource unused and the efforts interpreted as non-scholarly to a tenure committee. If faculty efforts toward creating and using OER are not interpreted as positive scholarly contributions, then faculty will never feel that they have time for these efforts, because “it’s [tenure] first … nothing else matters … until [we] achieve [tenure].” On the other end of the spectrum, the increasing adjunctification of higher education, wherein instructors are given higher teaching loads with less pay and supports, may have similar stifling effects on OER by deprofessionalizing faculty and reducing resource access. Taken together, this means that institutions need to engage in serious rethinking of the impacts that they want their scholars to have on society and to calibrate their tenure and promotion procedures to reflect this.

As a closing anecdote, the lead author is currently a doctoral student, while the second author is a pre-tenure faculty member at a high-research-activity university who engages in both traditional research publishing activities and also the creation of open textbooks and free educational videos. To date, the second author’s most-influential research article has been cited around 200 times and is estimated to have been read less than 300 times. In contrast, his most-read open textbook has been downloaded over 3,500 times, and his most-watched educational video has been viewed over 43,000 times, a rate that is 10-to-100-times higher than the research article. If sheer number of views or reads is any indicator of impact on the world, then current tenure and promotion practices will undoubtedly discourage such comparatively high-impact efforts of OER creation in favor

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of comparatively lower-impact efforts of traditional publishing. This is not to say that traditional publishing has no place but merely to point out that we must find ways for our institutions to value and celebrate the role that OER play in driving down student costs, improving learning, and empowering faculty to emerge as positive change agents and recognized experts who are having real, tangible impacts on the world outside of the heavily cloistered publishing and communication venues that academics have historically frequented.

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Design of a chatbot as a distance learning assistant

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Abstract
Within the process of progressive digitization of materials and tools for teaching and distance learning of a subject of introduction to Microeconomics (quarterly, in year three of the Degree in Social Work), taught by the authors at the National University of Distance Education (UNED), a virtual assistant in the form of chatbot, or conversational robot, called EconBot, has been designed and made available to students from 2017. This paper presents the reasons that led to its adoption, the process of its development, differentiating two phases, its characteristics and functions, the assessment of its usefulness and the role of teachers in the implementation of this type of technological innovation.

Keywords: Distance learning, Online learning, Artificial Intelligence, Chatbot

Introduction
For decades, the face-to-face teaching of Economics, at any of its levels, has slowly incorporated, when it has not rejected, the new communication technologies (Becker & Watts, 1996). This trend began to change in the last decade of the last century, with the generalization of the use of electronic mail and the web (Goffe & Sosin, 2005). However, distance learning, online or any of the modalities of e-learning or m-learning, has become more inclined towards the use of novelties produced in this field, due to the need to make more effective the interaction between students, and between students and teachers.

In recent years we have been witnessing an explosion of developments related to Artificial Intelligence (AI), with applications in all sectors of society: economy, health, work, leisure, security. Besides, very attractive applications have been pointed out in the generic field of education (Seldon, 2018; Holmes, Bialik & Fadel, 2019). Although the expectations of the application of AI are still far from being fulfilled, and its use in teaching and learning activities still generates some skepticism (Sharkey, 2016; Clark, 2018a), some of its materializations are progressively being used. These include the possibility of incorporating robots or virtual assistants that collaborate with teachers — when they do not completely replace them in certain tasks—, and with educational institutions.

The authors teach the subject Economy: Fundamentals of Microeconomics during the first four-month period of third year in the Degree in Social Work, an introductory economics course with usually just over six hundred students. The profile of the student of this subject is very varied, although from the experience of the teachers some common characteristics can be pointed out: little or no previous training in Economics; the consideration of the subject as foreign to its formative plan; and the attribution of a degree of complexity that does not correspond to reality (use of mathematics and difficulties in reading graphics, among others). On top of that, the characteristics of the teaching and distance learning processes, which require support or accompaniment for the student, must be added.
To this end, and as part of the process of generating support materials, preferably in digital format, developed by the authors, the creation of a new tool based on AI was tackled in 2017, on an experimental basis, which would serve to increase existing communication and support options: a chatbot called EconBot¹.

What a chatbot is and how it can be used in education

A chatbot or conversational robot is a computer program capable of interacting with people using natural language. Its main function is to simulate a coherent human conversation—Garcia Brustenga, Fuertes-Alpiste & Molas-Castells (2018), expose in detail what chatbots are, and their modalities, along with some experiences of use in education.

Although the first designs of conversational robots date back to the seventies of the past century, the closest antecedents in the use of this type of assistants as learning support elements are found in the early years of this century. It is in recent years, with new developments in IA (Heller, Procter, Mac, Jewell, Lisa & Cheung, 2005), with chatbots such as Ada, and Freudbot, (the last one accessible from https://psych.athabascau.ca/html/Freudbot/Freudbot.html), when they have become present in everyday environments with virtual assistants deployed by Apple, Google, Facebook, or Microsoft (Holmes et al., 2019). In this context, Singh (2018) and Clark (2018b) have noted very comprehensively the roles that conversational assistants can play in teaching/learning processes:

- **Intelligent tutoring systems**: a function already available in the eighties of the past century, and which can now be enriched with the possibility of customizing learning environments for each student, based on the analysis of their responses and their browsing trail through the digitized content.
- **Improve student participation**: the aim is to take advantage of the tendency to use instant messaging systems through a chatbot that acts as a communication platform.
- **Intelligent feedback**: on the design of the course, the subject, the operation of tutorials, and on information that once collected by the chatbot is sent to the teacher or the institution for analysis.
- **Teaching assistants**: a chatbot can assist the teacher in performing the most repetitive tasks, follow the student’s progress, or provide personalized feedback.
- **Immediate help for the student**: it allows to automate and provide in an immediate way habitual answers, both of administrative character and related to the contents of the subject.
- **Alternative to Learning Management Systems (LMS)**: chatbot can perform functions traditionally integrated into LMS more dynamically, by providing access to materials in different formats, external links, doubt sections, messaging, etc.
- **Mentoring functions**: not only providing the students with information, but also guiding them in the search for it, for example through problem solving.
- **Skills practice**: the chatbot can assume the role of patient, consumer, client, or citizen with whom students can practice the skills and techniques they have learnt in the subject.

Reasons to design EconBot

The context that explains the decision to design and implement a conversational robot in the teaching and learning of an introductory subject to Economics, was determined by four simultaneous circumstances: the previous work of the teaching team providing students educational technologies

¹ To use EconBot you need to have a Facebook account. EconBot can be accessed from its Facebook page https://www.facebook.com/econbotUNED/ There you can scan the code on the cover with the Messenger application for mobile, or start chatting with the chatbot from the chat option included on the same page.
that link them more actively in their learning process; the persistence in the National University of Distance Education (UNED) of recovery exams in September (extraordinary call, in the terminology of the University), without attention to the student during the month of August; the observed prevalence of the use of mobile instant messaging applications by students, to the detriment of those available within LMS; and the emergence and popularization of new options for the design and implementation of chatbots, fundamentally from 2016.

**September exams are still being held**

The UNED maintains the realization of recovery tests in the month of September of each academic year. During the period between the end of the teaching activity—which includes attention to the student through the communication tools of the LMS implanted in the UNED—and the implementation of those tests, there is no scheme of attention to the student. During August, the time students spend preparing the recovery tests, faculty are no longer available to solve their doubts, or to support and reinforce their learning. This is the longest period of time in which there is no type of relationship with the teaching team of the subject.

**Prevalence of the use of instant messaging applications**

The decision to experiment with the design of a virtual assistant was reinforced by the authors’ experience of the new communication habits observed in the students. In most recent academic years, the progressive abandonment of the communication tools that form part of the LMS—fundamentally the forums of doubts and discussion boards—has been verified. Simultaneously, students are showing an increasing use of instant messaging applications available for smartphones, mainly WhatsApp, Telegram and Messenger, to create study or support groups for each subject.

This consideration from the experience of the authors is consistent with available data on mobile device usage. According to the report *Digital Society in Spain 2017* (Fundación Telefónica, 2018), 86% of young people have a mobile device with network access (smartphone), and use it for: instant messaging (81.7%), access to social networks (77.5%), music consumption (65.2%), and streaming video consumption (52.2%). The forecast is that 50% of young people will be mobile first, i.e. between 90% and 100% of their network consumption will take place on a mobile screen.

This pattern of use of messaging applications is not exclusive to the youngest, a profile that is not the majority in the UNED. According to the same report, in the 30-39 age group, the use to send and receive messages instantly amounts 80.6%. For users between the ages of 40 and 55, this application accounts for 73.3% of their use.

This trend has continued in the last year, according to the report *Digital Society in Spain 2018* (Fundación Telefónica, 2019): instant messaging represented 94.3% of the use of smart mobile phones.

**Technical possibilities for the development of a chatbot**

In 2016, chatbots or conversational robots broke in, largely driven by Facebook’s decision to allow the incorporation of such functionality into its Messenger messaging platform. From that moment on, specific commercial applications and platforms began to be developed in order to design and implement chatbots, both for the main instant messaging applications and for websites.

Although their initial capacities were directed towards commerce, their possibilities for other environments such as education were soon discovered, especially within programs that are taught in the form of e-learning. That same year, Ashok Goel, a professor at the Georgia Institute of Technology, reported that
he had been using a chatbot based on IBM’s Watson tool (Goel et al., 2016) as an assistant in his course on artificial intelligence without students perceiving that it was not human (TEDx Talks, 2016).

**Design and use of EconBot**

The process of creating the chatbot and putting it into operation has gone through two stages which, although cumulative in nature, differ in terms of the objectives pursued and the type of content provided in each of them. The first one, in which it was decided to experiment with this type of interaction tools, had the main objective of accompanying the student in the preparation of the exam of the subject in the call of September 2017. At this stage, the secondary objective was to begin a process of reviewing the contents of the course, as well as evaluating the materials used for teaching, an objective that was postponed until the next academic year.

The second stage, which is still in process, began in 2018. Now it is a question of not only having a way of interacting with students during the time in which the other ways cease to be used, but also of having a virtual and permanent assistant of the subject. After evaluating the use of chatbot in August 2017, and presenting it in some internal seminars dedicated to innovation in educational technology, work continues to be done in order to complete and enrich the knowledge module dedicated to the basic contents of the subject.

**First stage: EconBot to support the preparation of “catch-up” exams**

The chatbot design options were largely limited by the technical capabilities and skills of the teaching team, with little experience in the programming languages usually used to create bots, and none in the Natural Language Processing on which these tools are based. For these reasons, it was decided to use some of the existing commercial applications for the creation and deployment of conversational robots. After reviewing the options available, and analyzing the degree of difficulty for amateur users, the free option of a commercial platform was chosen.

It was at this stage when the different support options that the chatbot should have in order to help students were decided. Thus, the content that was provided to the chatbot in the first stage was the following:

- **Trivial conversation module (small talk):** the chatbot was provided with a minimum content that would allow it to maintain a basic level of occasional or trivial conversation, such as greeting, responding to the greeting, saying goodbye, and recognizing its lack of knowledge, among other possibilities. It is in this module that the personality of the bot is most clearly constructed.
- **Subscription form to the notifications planned for August 2017:** in his first conversation with the chatbot, and permanently in its main menu, the student could subscribe through a simple menu of two options (accept the subscription, or leave it for later), to receive messages of support and review the content of the subject scheduled for the month of August. In turn, the student could cancel such a subscription at any time, through the main chatbot menu.
- **Support and review content for the month of August 2017:** through the programming options available on the platform used, review messages to be sent to previously subscribed students were prepared in different formats (multiple choice exercises, see Figure 1; reminder of the importance of some concepts and relationships, see Figure 2; messages of encouragement to the student), as well as messages with explanatory content to be received by students who did not respond correctly to the proposed exercises.
- **Links to digital content of the subject:** the student was offered a menu of options, limited by the possibilities of the platform used, with links to digital format learning tools existing in the subject that, in the opinion of the teaching team, could be particularly useful in that period of study.
More specifically, it was linked to the Course available in iTunes, to the subject’s webapp, and to the dedicated channel on YouTube.

In EconBot’s design, and especially regarding its personality expressed through the answers provided for the terms integrated in its conversational modules, one of the principles of multimedia design proposed by Mayer (2009; 2014) has been applied, suggesting the use of an informal and friendly tone, without falling into exaggeration. For example, the user is addressed by the name under which she participates in Facebook.

The availability of the chatbot, and the way to access it, was communicated to the students by means of an email message. It informed them of what EconBot was, how it would be used during August 2017, and the functionalities it had at that time. Basically, they were explained that those who subscribed would receive periodic notifications prepared by the teaching team specifically to guide their study during that month, and would also receive support during that time.

From August 2th, the day on which the first message was sent, until the last message was sent on September 11th, coinciding with the end of the extraordinary period of examinations, twenty-four messages were sent at an approximate interval of one every two days (Figure 3). Besides, students received a final message after the subject exam had already been taken in September, in which they were informed on the availability of the most correct answers for the different examination models used. When the content of the message was a multiple choice question, a second explanatory message about the most correct answer was sent to students who had incorrectly answered the former one.
Figure 2: Image of the first message sent by EconBot with a reminder of important concepts and relationships of the first topic of the course (in Spanish).

Figure 3: Daily message readings: August 2 - September 11, 2017.
The chatbot offer was well received by the students, but the impossibility of connecting it to the LMS used by the University did not provide us with usage data. They also did not use in EconBot the same identifier they use as students at the University. This disconnection made it impossible to approach learning analytics, such as those regarding the use of chatbot with the score obtained in the September exams.

Second stage: EconBot as a permanent virtual assistant

Once the initial objective of this digitization project had been achieved, it was decided to incorporate it into the virtual course as a permanent virtual assistant, although still under an experimental mode. Now EconBot has been enriched by expanding its content on:

- **Administrative knowledge**: specific modules were built with content on administrative issues, and the operation of the subject: ways to contact the teaching team, office hours, exam dates, ways to file complaints about grades, etc. The aim was to progressively replicate part of the non-teaching content collected on the University’s website for the subject, so as to facilitate its search by locating it into a mobile tool such as chatbot.

- **Basic concepts of Microeconomics**: at this point, we have chosen to use different formats for the presentation of the contents, once the concepts to be included from the experience of the teachers have been selected. On the one hand, there are links to other materials already available, such as those already collected in the webapp of the subject. And on the other hand, specific responses are built, in text or chatbot response message format. In order to increase the effectiveness of the presentation of some concepts (Vazquez & Chiang, 2014) considered of special relevance as learning objectives by the teaching team, it was decided to enrich the visual content of the chatbot with the elaboration of specific images, and short videos in various formats (mp4, GIF). They were especially adapted to the format of the messaging application, and to the evidence available on the use of mobile devices.

**EconBot Usage assessment**

The design and implementation of the chatbot has served to enrich the teaching and learning environment of the subject, by providing students with a new communication tool adapted to their new habits, based on the use of mobile messaging applications. The experience of its use has proved the great potential that IA-based tools offer for teaching, and more specifically to assist and support the student in autonomous learning modalities, such as that of the University in which the authors develop their activity. The usefulness of conversational bots has been proven to make up for the absence of student care functions in periods such as vacations, as it happens during the month of August, as long as the extraordinary examinations are maintained in the month of September.

This initiative has also acted as a lever to promote the revision of the content of the subject, by having to select the most relevant economic concepts and relationships for inclusion in the content module. Thus, it has forced to adjust the expression of the teaching activity to the requirements of the use of mobile applications, simplifying the explanations. It has also led to an assessment of the need to generate a conceptual map of ideas the teaching and learning of which can be understood as basic in an introductory course to Economics in non-economic Grades. And it has shown the convenience of extending the module of contents with those corresponding to the continuation subject of the one referred to here, Economy: Macroeconomic Fundamentals.

On the other hand, it has been proven that the development of this type of tools by instructors without previous experience or training, opens the door to risks inherent to amateur dedication in
terms of design. And has, in any case, a high opportunity cost in terms of the tasks of university professors.

In addition, having to use a commercial application means introducing serious limitations to the project. Although it has served the basic purposes pursued, its commercial nature makes the final product dependent on the changes introduced in the application in terms of data traffic allowed by the company owner, available features, number of users that can be reached, etc.

Together with the above, the use of applications such as the one chosen, disconnected from the LMS of the subject, hinders the availability of usage data that allow an elemental approach from the analytical learning.

Chatbots models such as EconBot have, by their own design, shortcomings that need to be overcome. For example, it does not allow students to customize their learning beyond the feedback possibilities shown. Nor does it allow us to offer contextualized answers. Limitations that could be resolved with a specific programming from the beginning, carried out by professionals. It seems necessary to have a department dedicated to technological development, working together with faculty, specialized in the design and implementation of this type of tools. It would also be necessary to look for programming languages that facilitate a design without the limitations of commercial applications, and to have support to extract valuable information on patterns of use and learning.

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Book Review of *Transactional Distance and Adaptive Learning: Planning for the Future of Higher Education*


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Introduction

The book is based upon one of the foundational theories of distance education: Michael G. Moore’s theory of transactional distance (TTD). The theory, appropriate for all forms of education, proposes that learners’ education experience (in the form of transactional distance) is determined by three factors: dialogue (reciprocity between teacher and learner), structure (flexibility to individual learners’ needs) and autonomy (learner choice as to what, how and how much to learn). According to an insert on the book’s opening page, the theory “provides a distinct analytical and planning foundation” for “transitioning from mass instructional and management systems in higher education to dynamic and transformational futures that focus on each individual learner”.

The book is written for senior managers/administrators at all levels, though distance and online education theorists and practitioners will also do well to engage with this title for reasons explained below. Importantly, readers are advised in the forward (by Michael G. Moore) to consider the learner as an individual, and to put aside any assumptions about ‘distance’ referring solely to geographic separation. The book describes education not as it is but as it might be, drawing on reviewed literature and a systems view.

Structure and content

The book consists of 13 chapters and an appendix. While most cited sources date from the mid-2010s and earlier, it is clear that the authors have a broad and well-informed perspective on the TTD and how it might be applied to education today.

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After an initial chapter explaining the TTD and the relationships across its variables, the book adopts a systems approach reflected in subsequent chapters. Following subsequent chapters devoted to hardware and software and communications systems, the book introduces adaptive learning systems in the book’s longest and (for me) most intriguing chapter. Saba and Shearer provide an important, optimistic and grounded treatment of adaptive learning system possibilities (Adaptive Hypermedia Systems, Intelligent Tutoring Systems, Adaptive Simulations and Serious Games) in the context of reductivist vs dynamic learner measurement, and cognitive load. The authors include an overview of current technologies and cite various studies attesting to their potential.

Further chapters address telecommunications, instructional, curricular, management, societal and global systems. A final chapter, ‘From theory to practice’, guides the reader toward system dynamics modelling and implementation in terms useful for readers at all levels of leadership.

**Overall impression and relevance to the field of distance education and e-learning**

The book captures the *zeitgeist* of the challenges facing higher education in both its analysis and solution. In response to higher costs, rigid curriculum and mass education techniques the authors propose systems thinking, individualization, and dynamic relationships between learners and universities. The TTD is correctly presented as a useful framework for reconsidering higher education, more than 40 years after the theory was first published.

The book manages to avoid theoretical posturing by including chapters related to instructional design, curriculum and management systems. Case-based, problem-based and project-based methods of instruction are promoted as adaptive learning options, and the authors are careful to explain that such techniques must be based on the aptitude of learners.

Across the book it is easy to discern the theoretical depth and wisdom of the authors, both of whom have a deep experience in distance education and systems thinking. Non-binary thinking and a straightforward treatment of instructional models reveal the confidence of the authors’ educational knowledge; false-dichotomies across various instructional design perspectives are dismissed in preference “for ‘a dynamic balance between autonomy and structure’ rather than ‘a bipolar universe’” (p.104). Pithy, simplistic views and solutions are absent. In their place, readers will find a steady acknowledgement of the various challenges faced by higher education, and a way of thinking about the future that can only give the reader hope and direction. TTD, combined with systems thinking and an intelligent application of technology to instruction, is key to this way of thinking.

One specific aspect of the book that impressed me was the inclusion of curricular, management, societal and global systems alongside those related to instruction. Such elements are often overlooked in books of this kind, where teaching and learning options are presented as isolated as if they are independent of how universities function. Saba and Shearer are of the view that learner–administrator interaction influences transactional distance.

The authors are also adamant that TTD should be considered an individual, rather than collective, means of considering the student experience:

The theory of transactional distance describes how the format of a course or a similar learning program would optimize transactional distance for each individual learner. As such, instructional design models that instructional designers embed in a course or a similar instructional-learning offering enhance or inhibit the ability of the instructor to structure a course commensurate to the aptitude of the learner for autonomy. Similarly, such designs assist or hinder the learner to exercise autonomy in relation to a course’s structure (p. 100)
The link between instructional method and overall instructional context appears to be one of the authors’ frustrations with the way institutions function:

The ability of administrators to shape the learning space for optimizing administrative structure for each learner is limited when academic schedules are predetermined and curricula are fixed. Grounding the learner in a solid foundation that would serve her/him for years to come is difficult if not impossible if the primary intention of the university is to place learners on an assembly line made of courses in which they receive the same standard treatment regardless of their individual differences in mastering immediate learning objectives and reaching future lifelong goals (p. 149).

The importance of systems thinking is clear: methods of instruction, and the transactional distance they give rise to, are inseparable from the administrative – and hence societal and global – contexts in which they are applied. As mentioned, this systems lens is one of the strengths of the book and forms the basis of its structure.

As a final observation, the book makes use of a series of scenarios at the end of key chapters. Some of these are particularly hard-hitting (in fact, some were so realistic I could almost place faces to the names based on my own experience!) All will give pause to a reader intent on considering the role of TTD and systems improvement for their own university context.

The book makes an authoritative contribution to the field, positioning TTD as an enduring and critical theory while also exploring its application to the very real crisis of identity and method universities face today.

Reference
