# Factors Impacting Student Perception of Open Educational Resources

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## Abstract

*This research investigates **the factors that impact students' perception**s of Open Educational Resources (OER) in Higher Education. This study examines the factors that impact the student perception of these materials to add to the pedagogical discussion surrounding the increased use of OER resources as a method of improving student access to education. This study looked at factors regarding student, course and university characteristics. The results suggest that feelings of connectivity to the course, a preference for lower costs of education, likelihood to rate faculty members higher, and preferences for online courses contribute to positive student perceptions of open educational course materials, however factors such as income or perceptions of monetary benefit show little effect.*

Key words*: open education resources; OER; open textbooks; cost of education.*

## Introduction

The term open education resource (OER) was first adopted in 2002 by UNESCO at a forum discussing the Impact of Open Courseware for Higher Education in Developing Countries (Vojtech & Grissett, 2017). Open educational resources are **defined by the Hewlett Foundation as "teaching, learning and research materials in any** medium – digital or otherwise – that resides 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" (Hewlett Foundation 2018). As a result of the** open license, proponents of OERs claim that their use can provide significant cost savings for university students if they displace traditional textbooks (Wiley, Hilton, Ellington, & Hall, 2012). Higher education is a very large investment for students to undertake both in time and money. As the cost of education rises, education may be disproportionately limited to affluent populations, thus perpetuating an intergenerational cycle of poverty that fuels both student underperformance and their lack of attendance. Low-quality education leads to low income, which in turn perpetuates poverty and can affect economic growth through low labor productivity (Verner, 2004). Bringing down the prices for academic materials, may be one factor in addressing this cycle and increasing access to education.

OERs are increasing in usage among higher education institutions. CNN reports that OERs from OpenStax are now used by about 140,000 students at more than 850 institutions (Grinberg, 2014). They are also increasing in support as broader governmental commitments, such as the European Univers**ities' Charter on Lifelong** Learning, pushes for expanding educational access to diverse populations (Lane & Van-Dorp, 2011). OERs also provide instructors with flexibility in the materials they are using to teach their students and allow them to customize the course material to match their teaching preferences (VTLibraries, 2016). These materials provide students with easier access to course materials and flexibility in where and when they access them (Cooney, 2016). Although, there are benefits to using OERs, unless they are adopted by more institutions, their potential to address educational expenses will remain limited. Students continue to raise concerns that the benefits of OERs can only be maximized if the number of professors adopting it increases (Lane & Van-Dorp, 2011). The OER Evidence Report 2013-2014 published by the OER Research Hub suggests that student perceptions of OER also increase overall satisfaction with the learning experience and increase academic performance (De los Arcos et al, 2014).

## Literature Review

Much of the research on adoption of OERs focuses on drivers of faculty decisions in adopting OERs as part of their courses. Jokiaho et al (2018) identified institutional and cultural factors that have impacted adoption of eLearning by faculty members. Identified within these barriers are perceptions of a lack of organizational support, knowledge and skills in using learning resources, and rewards. Mishra et al. (2016) developed the Attitude towards Open Educational Resources (ATOER) scale identifying the factors of sharing and adaptation as critical in shaping faculty attitude of OER materials. Notable in the validation of this scale, Mishra et al. (2016) highlight the need to collect control variables of age and gender with future adaptation of this scale. These faculty-related factors provide useful context to contemplate potential student-level factors that might influence perception and use of OERs.

The Open Education Group has also established the COUP framework to understand the impacts of OERs and open pedagogy. (The COUP Framework – Open Education Group, n.d.) This framework consists of the core factors of cost, outcomes, use, and perceptions of OER materials. Since the cost of OER resources are either cheap

or free, they increase convenience and access for students who not only can limit expenses but retain access following the course. (Atkins et al 2007). Outcomes of OERs have been shown to benefit both students and professors. According to Atkins et al (2007), studies show that after preparing for classes with OER, students gain more knowledge in the area, this effect is related to OER's low availability. OER's availability affects students will to study, which makes them in turn want to put more effort into the class. Professors benefit for the same reason (Atkins et al, 2007). OER usage is not just as a mere replacement for textbooks. OERs allow professors to adapt instructional resources to the individual needs of their students, to ensure that instructional materials are up to date, and that cost is not a barrier (Levin, 2010). The open license of OER materials provides professors and students with an ability to change or edit material online, while professors can adopt new course assignments built around the 5R framework - Retain, Reuse, Revise, Remix, and Redistribute (Levin, 2010). Finally, student perceptions of both a course and university can be impacted by the use of OERs. According to Hilton et al (2016), 78 percent of students thought that OERs provided information that was more up-to-date than print textbooks and materials and roughly two-thirds of the respondents preferred digital OER, saying they were overall more useful that traditional textbooks. These types of positive perceptions are what cause students to prefer courses that support OER over those that do not.

Design of courses themselves may also play a role. Instructional design theory offers explicit information to help people learn including cognitive, emotional, social, physical, and spiritual development (Reigeluth, 1999). Some of the methods applied in this theory are identifying goals for the students, giving abundant examples of the concepts, demonstrating, and linking old concepts with new elements. By removing the obstacles, and understanding the information being provided incentives emerge and allow the older notions to become a new proposition and allow learning in a different way (Atkins et al 2007). There are many different ways for instructors to implement OER into their classrooms. OERs can be implemented through vertical or horizontal classroom integration. An example shown by Karunanayaka et al (2015), which used an online classroom created in Moodle, vertical integration was done by starting with simple activities in the first module, which only required OER reuse, and then gradually move to more complex activities that required redistribution, revision, and remixing the OER. In comparison, the same online classroom integrated OER horizontally by linking all 5Rs among different assignments in a single module (Karunanayaka, et al. 2015). Many students say when they are asked to help contribute to OER it is easier to avoid **"disposable assignments" in which assignments are graded but they don't add any new** value to the world (Hendricks, 2017).

The implementation of OERs may not always be a smooth introduction however. Lane & Van-Dorp (2011) suggest there is evidence to show that when OERs are adopted in e-learning environments that there may be a negative result for students as some may be technically inexperienced or require considerable effort to use them. Petrides et al (2011) reported that the online students they studied with previous online and OER experience reported greater comfort with the use of OER materials. Students may also question the reliability of the information provided in OERs. Generally, perceptions of OERs are positive but there are pockets of dissent by students. In one study, three percent of students surveyed said that they found OER to be worse than traditional textbooks (Belikov & Bodily, 2016). Bliss et al (2013) noted in another study, that of 490 students using OERs 7 percent of the students felt that information was presented poorly, and/or experienced technology issues (Bliss et. al 2013).

For students that attend classes, some may argue that having a physical book or course material in front of them benefits them more than having to wait to be in front of a computer (Hylén, 2007). When Venegas Muggli and Westermann (2017) studied the introduction of OER texts into math classes in Santiago, Chile, they found that attendance in those classes actually declined. This is despite the fact that 94% of

students believe that not having access to the textbook negatively impacts their course performance (U.S. PIRG, 2014). Presumably, not having access to the text would be driven by lack of funds to acquire it. One study found that 48 percent of students had taken fewer courses, 26 percent had dropped a course, and 21 percent had withdrawn from a course, all due to high textbook cost (Jhangiani et al 2018). This reaction may not be consistent across universities. Schaffhauser (2016) notes that when the Excelsior's School of Business & Technology implemented OERs they saw little difference in drops and course completion, but saw enrollment growing significantly in the OER classes compared to those that used a traditional textbook.

This begs the question as to whether the monetary benefit to students is the driver of enrollment, completion, and performance or whether there is a broader perception or positive attitudes of connectedness to courses that implement OER. One format of courses that do tend to implement OER in a great proportion are Massive Open Online Courses (MOOCs). Indeed, new educational services firms such as Top Hat even recruit faculty to write OER textbooks and build low-cost open access courses on their platform (McKenzie, 2018). Kizilcec (2013) found that student engagement in Massive Open Online Courses (MOOCs) does not necessarily vary by gender, but completion of these courses may be less likely for females. Similarly, age did not appear to be a factor for completion of these types of courses, apart from a lower completion rate in the 65+ age category (Kizilcec, 2013).

University level factors may also play a role, such as the overall cost of education. With so much to pay for as a college student, the price continues to rise. There are very few options for students to reduce their costs with new textbooks that come out each year, rising tuition, and living expenses. According to Siegel (2016), tuition at many universities now exceeds $40,000 per year and average student educational debt approaches upwards of six figures. As of 2009, higher education costs had risen over 538% since 1985 (Belikov & Bodily, 2016).

The price of textbooks can range from $30-$200 per book which could cost students $500-$1000 per semester. The average student spends $1,250 per year on textbooks (Filler-Corn, 2018). Mui and Kinzie (2008) found that, according to reports by the Government Accountability Office, between 1986 and 2004, the price of textbooks nearly tripled, rising an average of 6 percent a year. As a result, several states, municipalities or universities are taking action to curb textbook expenses in order to lower overall costs of education. In New York City alone the prediction is that for 50,000 students, using alternative open educational resources will save $4.5 million in textbook fees for one year (Brody, 2017). CUNY schools and the State University of New York are adopting the national effort to support low-cost digital options in the place of high-cost textbooks. To help support the transition, New York State allocated $4 million to each institution to transition to these online resources (Brody, 2017). The University of Georgia conducted a study on the cost of books. The researchers found that since 2013, more than 35,985 students have been enrolled in courses that use OER materials at UGA, saving students $3,266,930 (McKenzie 2018). In the state of Washington for example, OERs are made available to its students. Since the start of Open Course Library, a resource available within the state, it has saved students a total of $5.5 million in both textbook and educational resource costs (Success Stories, n.d.).

Another potential factor in usage and perceptions of OERs may be the student perceptions of faculty. Faculty may be hesitant to adopt OER, but part of the reasons may also be a lack of awareness or that converting courses to OER can be very daunting (Schaffhauser, 2016). The level of university support for OER initiatives and its visibility to student may play a role. Downes (2007) identifies several funding and support **models to produce OERs citing the example of MIT's OpenCou**rseWare project as the model for how institutions can systemically support OER into regular, not specialized, programs.

Petrides et al (2011) note that there may be an increase in course engagement by faculty members when they move beyond simple use of an OER textbook and expand their classes to implement online collaborative assignments remixing or reusing OER materials. Petrides et al (2011) found in their study that faculty members reported deeper feelings of responsibility for student success and reducing class friction as students traditionally struggle via various means to acquire paid, commercial textbooks. Indeed this same study found that students preferred courses with OERs and that faculty members with more experience using OERs reported more frequency of using collaborative assignments with the OER materials (Petrides et al., 2011) This begs the question as to whether this investment of time on pedagogical changes to the course is visible to the students and therefore affects their ratings of satisfaction with faculty members or their assessment of teaching effectiveness.

Finally, Knapp et al (2017) examines person-environment fit (PE fit) between university students, their university, instructors and classmates. They found that need-based forms of fit which fulfill psychological needs between the student and the university or their classmates predicted the likelihood to recommend the university to others (Knapp et al, 2017). Given the intermingling of student perceptions of course materials, faculty, and the courses themselves, it is possible that the psychological role of faculty effort to reduce educational expenses may also play a role in student perception of OER.

These previous findings of perceptions and behaviors of both faculty and students present evidence for several factors that may drive student perceptions of OER materials stemming from factors specific to the student, to the course or to their overall connection to the university. There is utility in studying this potential connection to better understand both the effect and other cyclical drivers of OER implementation especially given previous mixed empirical evidence regarding enrollment, attendance, and student preference.

## Method

### Sample and Data Collection

Research examining this potential construct of student, course and university factors impacting OER perception was conducted using an online Qualtrics survey distributed to college-aged students from over eight universities in the Eastern United States. The survey consisted of approximately 380 usable surveys with data regarding the measured variables. Control questions presented included factors such as age, income, and gender. When including these responses, and survey entries with a lack of responses to other questions the total sample size is further reduced to 325 (n = 325). Listwise deletion was use in variable analysis. The majority of respondents were between the ages of 18-25 with 64.9 percent coming from the 18-21 age group and 25.8 percent coming from the 22-25 age group and 58.6 percent of the respondents were female. Annual household income was very evenly distributed amongst respondents, however 16.2 percent preferred not to answer the question; these were coded as a 0.

Table 1:
*Respondents by annual household income*

| | Frequency | Percent |
|---|---|---|
| Valid | 3 | .9 |
| 5,001-15,000 | 9 | 2.6 |
| Less than 5,000 | 12 | 3.5 |
| 125,001-150,000 | 22 | 6.4 |
| 15,001-25,000 | 26 | 7.5 |
| 75,001-100,000 | 37 | 10.7 |
| More than 150,000 | 38 | 11.0 |
| 100,001-125,000 | 47 | 13.6 |
| 50,001-75,000 | 47 | 13.6 |
| 25,001-50,000 | 48 | 13.9 |
| I would prefer not to answer | 56 | 16.2 |
| Total | 345 | 100.0 |

Table 2:
*Respondent Age Ranges*

| | Frequency | Percent |
|---|---|---|
| Valid | 9 | 2.6 |
| 18-21 | 224 | 64.9 |
| 22-25 | 89 | 25.8 |
| 26-30 | 8 | 2.3 |
| 31-35 | 12 | 3.5 |
| 36-40 | 1 | .3 |
| 41-45 | 1 | .3 |
| 46-54 | 1 | .3 |
| Total | 345 | 100.0 |

Table 3:
*Respondent Gender Distribution. (Coded as Female = 1, Male = 0)*

| | | Frequency | Percent |
|---|---|---|---|
| Valid | 0 | 136 | 39.4 |
| | 1 | 202 | 58.6 |
| | Total | 338 | 98.0 |
| Missing | System | 7 | 2.0 |
| Total | | 345 | 100.0 |

Measures

The literature presented is mixed with variability in student outcomes and perceptions of OERs. In some cases, students have difficulty (Belikov & Bodily, 2016; Bliss et al, 2013; Lane & Van-Dorp, 2001) or reduce their attendance (Venegas Muggli & Westermann, 2017) in courses that use OER. In other cases, students with previous experience using OERs have positive perceptions of them (Hilton et al, 2016; Petrides et al, 2011) and the use of OER materials has driven enrollment in courses to exceed sections that use traditional course materials (Schaffhauser, 2016). Therefore, this study attempts to examine areas that might serve as an antecedent to perceptions of OERs.

*Student perceptions of OER*

Student perception of OERs is the dependent variable of focus in this study. Measures for this scale were adapted from the Attitude Towards Open Educational Resources (ATOER) scale by Mishra et al (2016) which originally gauged faculty attitudes towards OERs. The response format for this study was standardized with a five-point Likert scale (Strongly Disagree to Strongly Agree). **Cronbach's alpha for this** scale was .812 ($\alpha = .812$).

Table 4:
*Dependent variable question scale adapted from Mishra et al (2016)*

| Variable | Question |
|---|---|
| DV1 | I have experience using free or reduced cost course materials (under $40). |
| DV2 | I am familiar with free or discounted course materials (under $40). |
| DV3 | I would prefer to take a course that offers free or reduced cost materials (under $40), rather than traditional high cost courses. |
| DV4 | I believe that the content provided by free or reduced cost materials are LESS trustworthy than that of traditional high cost courses. |
| DV5 | Free or reduced cost materials increase my OVERALL MOTIVATION to learn. |
| DV6 | I believe that free or reduced cost materials promote life-long learning. |
| DV7 | The USE of free or discounted educational resources enhances my overall educational experience. |
| DV8 | I feel more connected to my classmates in a course that uses free or discounted materials rather than traditional high cost courses. |
| DV9 | I have had a positive experience with free or reduced cost materials in a past course. |
| DV10 | The use of free/reduced cost materials increases my likelihood of studying/using required course materials to study. |

*Overall reliability $\alpha = .812$*

*Student characteristics*

In the development of their faculty OER attitude scale, Mishra et al (2016) found significant variability based on control variables such as age and gender. Nearly all of the literature identified cost as the number one benefit to students and Kizilcec (2013) found that engagement, or **what could be called "connectivity" to the course**, may be insulated from these types of control variables while completion rates may be impacted by being female. This combination of age, gender, income, perception of the perceived monetary benefits, and perceived connectivity (a measure of engagement) to the course present variables to study as student-driven impacts on OER perception.

*Proposed hypotheses:*
    *Hypothesis 1:* Student perceptions of OER will be greater for younger students.

    *Hypothesis 2:* The student perceptions of OER will vary by gender. Specifically, student perception of OER will be negatively related to identification as being female.

*Hypothesis 3:* Student perceptions of OER will be greater for lower income students.

*Hypothesis 4:* Student perceptions of OER will be enhanced by their perceived monetary benefit.

*Hypothesis 5:* The relationship between student perceptions of OER will be positively related to feelings of "connectivity" to the course using OER materials.

Respondents were asked to identify their age in a variety of ranges (See Table 2). Age was then coded as a numerical variable (range 1 through 6) to facilitate correlation and regression analysis. Respondents were asked to identify their gender based on the statement "Select the gender with which you most closely identify." Due to the low volume of "prefer not to answer" or "nonbinary" responses, those other than female or male were deleted from analyzed surveys. The remaining responses were coded as dummy variables with 1=female, and 0=male. Respondents were also asked to identify their annual household income in ranges (see Table 1) and, like the age question, responses were coded as a numerical variable (range 1 through 9).

Student perceptions of their monetary benefit of using OERs was measured using four questions to understand their need for faculty concern over finances, alleviating financial stress, and where funds could otherwise be directed ($\alpha$ = .889). Feelings of "connectivity to course" were measured separately verses paid textbooks, use of access codes, and use of simulations that exceeded $40. ($\alpha$ = .932). The response format was standardized with a five-point Likert scale (Strongly Disagree to Strongly Agree).

Table 5:
*Scales to measure variables of student perceptions of monetary benefit of OERs ($\alpha$ = .889) and course connectivity ($\alpha$ = .932)*

| Variable | Question # | Question |
|---|---|---|
| Monetary Benefit | 1 | When my professor uses free or discounted materials I feel that they care about my financial position as a student. |
| | 2 | I feel that free or reduced costs materials would help alleviate some of my financial stress. |
| | 3 | The money I would save if more courses utilized free or reduced cost materials, would allow me to invest more into my education. |
| | 4 | The money I would save if more courses utilized free or reduced cost materials, would allow me to work less hours at my full/part-time job. |
| Connectivity to course | 1 | I feel more connected to the COURSE when free or reduced cost materials are used rather than PAID textbooks (Exceeding $40). |
| | 2 | I feel more connected to the COURSE when free or reduced cost materials are used rather than access codes (MindTap, Connect, MyLab) which exceed $40. |
| | 3 | I feel more connected to the COURSE when free or reduced cost materials are used rather than simulations (exceeding $40). |

*Course characteristics*

The textbook is only one cost of a course. Differences in format and pedagogical techniques used in a class that provide enhanced or more meaningful assignments (Hendricks, 2017; Karunanayaka et al, 2015; Levin, 2010) may provide more positive perceptions of the course that could correlate with attitudes about OER. It is also not known if student perceptions of OERs are a phenomenon more positively related to preferences for online classes, or if the lack of face to face interaction hinders OER experiences, and thus their perception, because they require more instruction or faculty interaction (Lane & Van-Dorp, 2011). Therefore, examining perceptions around overall

course materials, attitudes towards traditional versus non-traditional course activities, and attitudes about course delivery format (online verses in-person) could explain more variability in student perceptions of OERs.

*Proposed hypotheses*:
    *Hypothesis 6:* Student perceptions of OERs will be positively related to student perceptions that course costs can be lowered.

    *Hypothesis 7:* Student perceptions of OERs will be positively related to preferences for innovative and engaging class activities.

    *Hypothesis 8*: Student perceptions of OERs will be negatively related to preferences for traditional course delivery, that is courses that are not online or in mixed/ hybrid modality.

Student perceptions of course cost was measured using four questions related to expenses of the course ($\alpha$ = .477). Four questions were also asked to identify **preferences for different types of course activities. Initial Cronbach's alpha was .536.** Item anal**ysis revealed that dropping question 2 "I prefer traditional courses…" would** significantly improve the reliability score and therefore it was dropped from the scale ($\alpha$ = .744). Six questions were asked regarding student preferences for traditional, online or mixed approach courses. ($\alpha$ = .749). The response format for all of these questions was standardized with a five-point Likert scale (Strongly Disagree to Strongly Agree).

Table 6:
*Scales to measure course characteristics of course cost ($\alpha$ = .477), course activities ($\alpha$ = .744), and course delivery ($\alpha$ = .749)*

| Variable | Question # | Question |
|---|---|---|
| Course cost | 1 | I feel course materials (books, access codes, simulations, etc.) on average are affordable. |
| | 2 | I feel that there are less expensive, high quality alternative course materials than those typically selected by faculty in my courses. |
| | 3 | I think professors should consider less expensive course materials. |
| | 4 | I feel there are currently enough options to cover costs of course (rent materials, borrow, free online info). |
| Type of Course Activity | 1 | I prefer courses that utilize activities such as cases, simulations, projects, presentations, etc. |
| | 2 | I prefer traditional courses (lectures/exams) vs experiential learning activities. |
| | 3 | I prefer instructors that use multiple different learning activities. |
| | 4 | I prefer courses that utilize games to review. |
| Type of Course Delivery | 1 | I prefer courses that are in a traditional learning setting. |
| | 2 | I prefer courses that are online. |
| | 3 | I prefer courses that are a split between online and traditional, face-to-face (hybrid format). |
| | 4 | I feel as though open/free textbooks would benefit traditional learning settings. |
| | 5 | I feel as though open/free textbooks would benefit online courses. |
| | 6 | I feel as open/free textbooks would benefit mixed/hybrid learning settings. |

*Item dropped from the scale due to low reliability

*University characteristics*

University characteristics may have an influence on student perceptions of the value of their education as well as the overall experience of their education. With the cost of education rising (Belikov & Bodily, 2016; Siegel, 2016) there are university-wide initiatives to implement OER that are visible to students (Downes 2007; Schaffhauser, 2016) and therefore influence students' perception of their costs and actions taken by faculty and university administration. But these initiatives don't exist without relationship to other factors of the educational or service experience. It is therefore important to measure overall satisfaction with the university and its support to students, as well as the student's likelihood to recommend the university which may be influenced by this deeper meeting of psychological needs related to feeling supported (Knapp et al, 2017).

*Proposed hypotheses*:
> *Hypothesis 9:* Student perceptions of OERs will be positively related to student preferences for lower costs of education.
>
> *Hypothesis 10:* Student perceptions of OERs will be positively related to satisfaction with faculty.
>
> Hypothesis 11: Student perceptions of OERs will be positive related to student evaluations of faculty teaching effectiveness.
>
> Hypothesis 12: Student perceptions of OERs will be positively related to the student's perceived level of satisfaction with the support services at their university.
>
> Hypothesis 13: Student perceptions of OERs will be positively related to the student's self-reported loyalty to the university.

Student perceptions of the costs of their education were measured by nine questions that examined statements regarding their general educational expenses and impacts to the student such as an increased need to work or increased stress ($\alpha$ =.783). Faculty satisfaction was rated across four questions designed to judge impact of use of OER on the student's overall level of future satisfactory ratings of faculty/course ($\alpha$ =.879). Student ratings of teaching effectiveness were measured across seven questions regarding knowledge, respect, communication, and experimentation with learning styles ($\alpha$ =.925). Student satisfaction with the current level of university support they received was measured across four questions exploring satisfaction with support services, their rating of overall satisfaction with the university, addressing learning needs, and providing a "grade" to the University itself ($\alpha$ =.824). The application of a grade for the university was asked as a letter grade and then converted to a numeric code (1 through 5, with 5 being A, 4 (B), etc.). Finally, student loyalty to the university was measured by questions regarding their likelihood to enroll again or recommend the university ($\alpha$ =.892). The response format for all of these questions was standardized with a five-point Likert scale (Strongly Disagree to Strongly Agree).

Table 7:
*Scales to measure university characteristics of course of education (α =.783), faculty satisfaction (α =.879), teaching effectiveness (α =.925), university support (α =.824), and loyalty (α =.892)*

| Variable | Question # | Question |
|---|---|---|
| Cost of Education | 1 | My instructors allow me the option to NOT purchase the book on most occasions. |
| | 2 | I have to work more to pay off my textbooks and other course materials (access codes). |
| | 3 | I would be more involved on campus if I had less expenses. |
| | 4 | I would rather have professors use online resources than textbooks. |
| | 5 | My professors always use the latest edition for hard copy textbooks. |
| | 6 | Increased use of free/reduced cost course materials, would cause less stress in my life. |
| | 7 | I feel college course materials are a good value for the money. |
| | 8 | I feel course materials are expensive. |
| | 9 | I want my professors to use free/low cost textbooks/resources more frequently. |
| Faculty Satisfaction | 1 | I feel that it is **my professor's responsibility to seek out free or low** cost course materials. |
| | 2 | I feel more satisfied when a professor utilizes free or reduced cost course materials (under $40). |
| | 3 | My evaluation of FACULTY PERFORMANCE would be POSITIVELY influenced by their utilization of free or reduced cost materials (under $40). |
| | 4 | My evaluation of COURSE SATISFACTION would be POSITIVELY influenced by their utilization of free or reduced cost materials (under $40). |
| Teaching Effectiveness | 1 | My instructors have thorough knowledge of the subject content. |
| | 2 | My instructors provide opportunities to ask questions. |
| | 3 | My instructors treat me with respect. |
| | 4 | My instructors understood my learning needs. |
| | 5 | My instructors communicate the subject effectively. |
| | 6 | My instructors make the subject as interesting as possible. |
| | 7 | My instructors are open to new learning styles. |
| University Support | 1 | I am satisfied with my university's student SUPPORT services. |
| | 2 | Overall, I am satisfied with my current University. |
| | 3 | I feel my current university understands my learning needs. |
| | 4 | What grade would you give your current University? |
| Loyalty | 1 | How likely would you be to choose your current university if you had the opportunity to enroll again. |
| | 2 | How likely would you be to recommend my current university to a close friend or family member. |

## Results

Table 8 provides descriptive statistics, including mean values, standard deviations, minimums and maximums, for the measurement scales. The mean value for the dependent variable, the student perception of OER, ($\mu$ = 3.528) denotes a positive impact. The majority of the respondents reported spending $80-120 on materials for a single course (Figure 1). Twenty percent say they spend $300-$400 per semester on materials and, when looking at all reportable scores, 54.8 percent spend over $800 per year.  The highest mean of the measures, outside of coded control variables, was in the

level of monetary benefit students perceive of OERs ($\mu$ = 4.179). The greatest standard deviation in responses was seen in the income variable ($\sigma$ = 2.877).

Table 8:
*Descriptive Statistics of Responses*

Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Student Perceptions of OER (DV) | 345 | 1.000 | 5.000 | 3.528 | .688 |
| AGE | 336 | 1.000 | 7.000 | 1.464 | .835 |
| Gender | 338 | .000 | 1.000 | .598 | .491 |
| INCOME | 342 | .000 | 9.000 | 4.690 | 2.877 |
| Monetary Benefit | 345 | .000 | 5.000 | 4.179 | .935 |
| Connectivity | 345 | .000 | 5.000 | 3.593 | 1.029 |
| Course Cost | 345 | .000 | 5.000 | 3.344 | .779 |
| Type of Course Activity | 341 | 1.000 | 5.000 | 3.792 | .802 |
| Type of Course Delivery | 345 | .000 | 5.000 | 3.682 | .746 |
| Cost of Education | 345 | .000 | 5.000 | 3.605 | .702 |
| Faculty Satisfaction | 345 | .000 | 5.000 | 3.967 | .871 |
| Teaching Effectiveness | 345 | .000 | 5.000 | 3.746 | .827 |
| University Support | 345 | .000 | 5.000 | 3.772 | .785 |
| Loyalty | 345 | .000 | 5.000 | 3.830 | 1.087 |
| Valid N (listwise) | 325 | | | | |

Figure 1:
*Student reports of expenses per course. 33.3% reported they spend between $81-$120 per course*
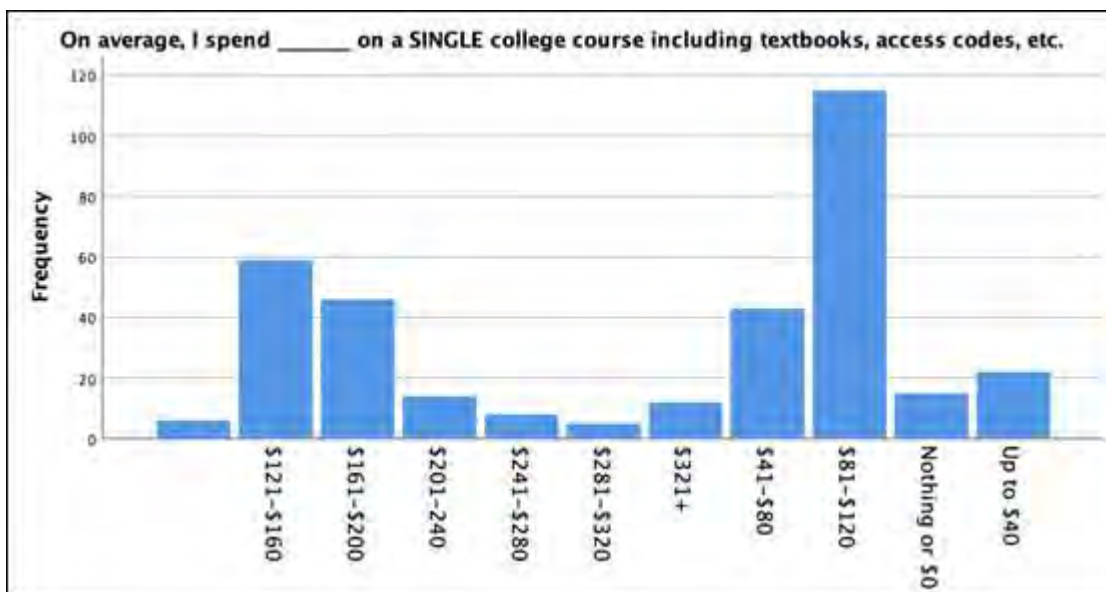
Means of each scale were computed. Table 9 displays the Pearson Correlation coefficients between all variables. The *dependent variable* (student perceptions of OERs) was found to correlate significantly with virtual every independent variable, except gender and income. The dependent variable had the highest correlation with connectivity to the course 0.619, followed by faculty satisfaction (.568), cost of education (.560), perceptions of student monetary benefits (.525), and type of course delivery (.502).

Control variables such as age and income that were *student characteristic* predictors in the model were found to have little correlation with the dependent variable or other independent variables. Age only significantly correlated with the dependent variable (student perceptions of OERs). Income did not correlate with the dependent variable nor any of the independent variables measured. It is notable that in all areas that measure perceptions of cost, except perception of student monetary benefits of OER, the correlation with income was negative. While it did not correlate significantly with the dependent variable, gender did significantly correlate with several other independent variables including other student characteristics: perceptions of student monetary benefits of OER and connectivity to the course; course characteristics: type of course activity and type of course delivery; and university characteristics: faculty satisfaction and loyalty to the university. Notably, gender did not correlate to the cost measures (course cost, cost of education).

The other *student characteristic* independent variables of perceived monetary benefit and course connectivity had significant correlations with the dependent variable as well as other independent variables. Perceived monetary benefit (of OERs) correlated significantly with all other independent variables, accept age and income, with the highest correlation being with faculty satisfaction (.645). Connectivity to course correlated significantly with all but age, income, and loyalty to the university. The highest correlations for connectivity were with the dependent variable (.619), faculty satisfaction (.601), and perceived monetary benefits (.597).

All *course characteristic* independent variables were significantly correlated with the dependent variable as well as the other independent variables, excluding age, gender, and income. Type of course activity and type of course delivery was however found to correlate significantly with gender. Most of the *university characteristic* independent variables were significantly correlated with the dependent variable and other independent variables, excluding age, income and gender. Gender was only found to correlate significantly with faculty satisfaction (.181) and loyalty (.131). Notably, while loyalty to the university correlated with most of the independent variables, it did not correlate with course connectivity.

Given the high correlations between the dependent and independent variables, excluding age, gender and income which were not found to have consistent correlations, a test for multicollinearity was run (Table 10). VIF scores for the independent variables that had significant correlations with the dependent variable were not found to have multicollinearity (VIF < 3).

## Table 9:
*Correlation Matrix*

Correlations [c]

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Stud Perc. OER (DV) | Corr | 1 | | | | | | | | | | | | | |
| | Sig. | | | | | | | | | | | | | | |
| 2. AGE | Corr | .129* | 1 | | | | | | | | | | | | |
| | Sig. | .020 | | | | | | | | | | | | | |
| 3. Gender | Corr | -.018 | -.102 | 1 | | | | | | | | | | | |
| | Sig. | .750 | .067 | | | | | | | | | | | | |
| 4. INCOME | Corr | -.048 | .002 | -.044 | 1 | | | | | | | | | | |
| | Sig. | .385 | .978 | .428 | | | | | | | | | | | |
| 5. Monetary Benefit | Corr | .525** | .042 | .262** | .017 | 1 | | | | | | | | | |
| | Sig. | .000 | .451 | .000 | .760 | | | | | | | | | | |
| 6. Connectivity | Corr | .619** | .013 | .115* | -.053 | .597** | 1 | | | | | | | | |
| | Sig. | .000 | .819 | .039 | .341 | .000 | | | | | | | | | |
| 7. Course Cost | Corr | .434** | .044 | -.085 | -.033 | .245** | .295** | 1 | | | | | | | |
| | Sig. | .000 | .428 | .126 | .553 | .000 | .000 | | | | | | | | |
| 8. Course Activity | Corr | .412** | .078 | .164** | -.027 | .457** | .360** | .366** | 1 | | | | | | |
| | Sig. | .000 | .159 | .003 | .633 | .000 | .000 | .000 | | | | | | | |
| 9. Course Delivery | Corr | .502** | .050 | .159** | -.071 | .532** | .480** | .482** | .549** | 1 | | | | | |
| | Sig. | .000 | .373 | .004 | .201 | .000 | .000 | .000 | .000 | | | | | | |
| 10. Cost of Education | Corr | .560** | .047 | .020 | -.032 | .516** | .458** | .387** | .455** | .544** | 1 | | | | |
| | Sig. | .000 | .399 | .715 | .560 | .000 | .000 | .000 | .000 | .000 | | | | | |
| 11. Faculty Satisfaction | Corr | .568** | .021 | .181** | .018 | .645** | .601** | .223** | .452** | .478** | .479** | 1 | | | |
| | Sig. | .000 | .701 | .001 | .751 | .000 | .000 | .000 | .000 | .000 | .000 | | | | |
| 12. Teaching Effectiveness | Corr | .383** | .102 | .052 | -.020 | .371** | .205** | .400** | .398** | .413** | .311** | .275** | 1 | | |
| | Sig. | .000 | .067 | .352 | .714 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | | | |
| 13. University Support | Corr | .301** | .030 | .088 | .074 | .332** | .120* | .238** | .286** | .353** | .212** | .243** | .553** | 1 | |
| | Sig. | .000 | .585 | .113 | .183 | .000 | .031 | .000 | .000 | .000 | .000 | .000 | .000 | | |
| 14. Loyalty | Corr | .181** | .051 | .131* | .082 | .252** | .104 | .144** | .165** | .212** | .250** | .157** | .324** | .557** | 1 |
| | Sig. | .001 | .363 | .018 | .142 | .000 | .062 | .009 | .003 | .000 | .000 | .005 | .000 | .000 | |

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).
c. Listwise N=325

Table 10:
*Test of Multicollinearity Coefficients [a]*

| Model | | Collinearity Statistics | |
|---|---|---|---|
| | | Tolerance | VIF |
| 1 | Monetary Benefit | .409 | 2.446 |
| | Connectivity | .541 | 1.849 |
| | Course Cost | .684 | 1.462 |
| | Type of Course Activity | .569 | 1.758 |
| | Type of Course Delivery | .434 | 2.304 |
| | Cost of Education | .520 | 1.924 |
| | Faculty Satisfaction | .531 | 1.881 |
| | Teaching Effectiveness | .562 | 1.779 |
| | University Support | .510 | 1.960 |
| | Loyalty | .650 | 1.538 |

a.  Dependent Variable: Student Perceptions of OER

The results of multiple regression analysis between the dependent variable of student perception of OERs with all independent variables shows several areas of strong significance (Table 11). The test of the overall model is F=32.725, p<0.000. Variables with the strongest significance include student feelings of connectivity to courses that use free or reduced-cost materials ($\beta$=.334,p=.000), student's statements that prefer lowering costs of education ($\beta$=.207,p=.000), and student's statements on increased faculty satisfaction ratings when they adopt free or reduced-cost materials ($\beta$=.195,p=.000).

Table 11:
*Multiple Regression Analysis*

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | .215 | .202 | | 1.062 | .289 |
| | Age | .069 | .030 | .086 | 2.291 | .023 |
| | Gender | -.124 | .055 | -.091 | -2.258 | .025 |
| | Income | -.007 | .009 | -.031 | -.827 | .409 |
| | Monetary Benefit | .019 | .044 | .024 | .425 | .671 |
| | Connectivity | .218 | .034 | .334 | 6.501 | .000 |
| | Course Cost | .136 | .043 | .143 | 3.159 | .002 |
| | Type of Course Activity | -.004 | .042 | -.004 | -.091 | .928 |
| | Type of Course Delivery | .000 | .057 | .000 | .005 | .996 |
| | Cost of Education | .229 | .055 | .207 | 4.156 | .000 |
| | Faculty Satisfaction | .158 | .043 | .195 | 3.650 | .000 |
| | Teaching Effectiveness | .067 | .043 | .076 | 1.552 | .122 |
| | University Support | .109 | .048 | .119 | 2.283 | .023 |
| | Loyalty | -.028 | .030 | -.043 | -.944 | .346 |

$R^2$ = .578, Adjusted $R^2$ = .560, F-statistic=32.725, Significance =.000, n=324

*Student characteristics*

Age: Hypothesis 1 predicted that student perceptions of OER will be greater for younger students, that is, the relationship between perception of OER (DV) and age was expected to be negative. While the relationship was found to be significant (p=.023), it was not negative ($\beta$=.086) and therefore there is a lack of support for this hypothesis. This low level, positive beta may indicate that perceptions of OER actually increase with age, but that there is only a marginal impact.

Gender: Hypothesis 2 predicted that student perceptions of OER will vary by gender. Specifically, student perception of OER will be negatively related to **identification as being female. This prediction was based upon Kizilcec's (2013) findings** that females were less likely to complete MOOC courses. Gender data for this variable was coded as male=0, female=1 and was found to be significant (p=.025) and the beta was negatively sloped ($\beta$= -.091). However, the previous correlation analysis showed that gender was not correlated to the dependent variable. A single regression test of gender on the dependent variable shows p=.917, $\beta$= -.006, showing that gender on its own is not a significant predictor of student perceptions of OER, and in fact acts as a suppressor variable. Therefore, there is a lack of support for this hypothesis.

Income: Hypothesis 3 predicted that student perceptions of OER will be greater for lower income students, that is the relationship between perception of OER and annual household income is expected to be negative. There was not found to be a significant relationship between the dependent variable and income, and therefore there is a lack of support for this hypothesis.

Student Monetary Benefit: Hypothesis 4 predicted that student perceptions of OER will be enhanced by their perceived monetary benefit. That is, those who perceive greater financial, or monetary, benefit will be positive would be more likely to report favorable perceptions of OER. While the previous correlation analysis did show correlation between this variable and the dependent variable, the regression analysis did not show a relationship (p=.671, $\beta$=.024). So, while student ratings of these factors may be related, the perception of a monetary benefit is not predictive of overall higher perceptions of OER materials. Therefore, there is also a lack of support for this hypothesis.

Connectivity: Hypothesis 5 predicted that the relationship between student **perceptions of OER will be positively related to feelings of "connectivity" to the course** using OER materials. This relationship was found be significant (p=.000) and had the strongest beta value of the independent variables tested ($\beta$=.334) and therefore there is strong support for this hypothesis.

*Course characteristics*

Course costs: Hypothesis 6 predicted that student perceptions of OERs will be positively related to student perceptions that course costs can be lowered. This relationship was found to be significant (p=.002, $\beta$=.143) and therefore there is strong support for this hypothesis.

Course activities: Hypothesis 7 predicted that student perceptions of OERs will be positively related to preferences for innovative and engaging class activities. This variable was formulated based on the fundamental purpose of OERs using the 5R framework – Retain, Reuse, Revise, Remix, and Redistribute (Levin, 2010) and previous student attitu**des against "disposable assignments" (Hendricks, 2017). There was no**

significant relationship found and indeed, the beta was negative (p=.928, $\beta$=-.004). Investigating further, mean values for each scale question were found to still be high, between 3.64 - 3.93, with each question having a median response of 4.0. This may indicate that the previously found correlation between course activities and the dependent variable is spurious, and therefore there is a lack of support for this hypothesis.

Course Delivery Format: Hypothesis 8 predicted that student perceptions of OERs will be negatively related to preferences for traditional course delivery, that is courses that are not online or in mixed/ hybrid modality. This assumption was based upon research from Petrides (2011) that found many online students had greater comfort with using OERs. When viewing the result for the entire variable mean, a significant relationship was not found. The overall scale was further broken into sub-variables (questions 1 and 4 = preference for traditional courses, questions 2 and 5 = preference for online courses, questions 3 and 6 = preference for hybrid courses). Table 12 examines the multiple regression for these new independent variables. Preference for both online (p=.000, $\beta$=.310) and traditional (p=.007, $\beta$=.161) courses was found to be significant. Preference for hybrid courses was barely significant (p=.041). Examining course delivery format in this way results in online delivery formats being among the most significant relationships of the independent variables. Given these results the original hypothesis cannot be supported in its entirety. Students who have preferences for online and traditional courses show a significant relationship with positive perceptions of OER. It is students who prefer hybrid courses that cannot be said to have a greater likelihood of positive perceptions of OERs.

Table 12:
*Multiple Regression Analysis of Course Delivery Format*

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | 1.509 | .184 | | 8.200 | .000 |
| | Course Delivery ONLINE | .267 | .055 | .310 | 4.836 | .000 |
| | Course Delivery TRADITIONAL | .153 | .056 | .161 | 2.725 | .007 |
| | Course Delivery HYBRID | .125 | .061 | .142 | 2.046 | .041 |

*$R^2$ = .282, Adjusted $R^2$ = .276, F-statistic = 44.111, Significance=.000*

University characteristics

*Cost of education:* This questions in the scale were designed to measure student agreement to statements lending support for lowering costs of education such as **"I have to work more to pay for textbooks..." "reduced cost materials would decrease my stress..." "I would rather use online materials..." Hypothesis 9 predicted that student** perceptions of OERs will be positively related to these student preferences for lower costs of education. This relationship was found be significant (p=.000, $\beta$=.207) and therefore there is support for this hypothesis.

*Faculty satisfaction:* Hypothesis 10 predicted that student perceptions of OERs will be positively related to satisfaction with faculty. These scale questions focused on **the student's likelihood to have higher satisfaction ratings for faculty and their course**

when free or reduced-cost materials were used. This relationship was found be significant (p=.000, $\beta$=.195) and therefore there is support for this hypothesis.

*Teaching effectiveness:* Hypothesis 11 predicted that student perceptions of OERs will be positive related to student evaluations of faculty teaching effectiveness. The questions in this scale asked the student to rate items such as their instructor's domain knowledge, respect, ability to meet their learning objectives etc. This relationship was not significant (p=.122, $\beta$=.076) and therefore there is a lack of support for this hypothesis.

**Student's current level of satisfaction with University support:** This scale asked the student to rate their overall satisfaction with student support services and rating of their University. Hypothesis 12 predicted that student perceptions of OERs will be positively related to the student's perceived level of satisfaction with the support services at their university. This relationship was found be significant (p=.023, $\beta$=.119) and therefore there is support for this hypothesis.

*Loyalty to the University:* Hypothesis 13 predicted that student perceptions of OERs will be positively related to the student's self-reported loyalty to the University. The scale asked them to rate their likelihood to enroll again and likelihood to recommend the university. This relationship between loyalty and the dependent variable was not significant (p=.346, $\beta$= -.043) and therefore this hypothesis also lacks support.

## Conclusion

The overall mean score for respondent answers to the dependent variable scale was 3.528 out of 5, indicating that this sample had generally favorable perceptions of OER materials. As in Mishra et al (2016), this study did find variability based on control variables like age and gender, specifically that gender acts as a suppressor variable when examining student perceptions of OERs.

Going into this study, the assumptions regarding age were that younger individuals would have higher perceptions of OER because of the economic benefits. While age was found to be significant, the positive beta value suggests that as age increases perceptions of OER are also likely to increase. Age did not correlate with any other factor in the proposed model and there is no additional data in the study to offer a direct explanation of this finding.

Surprisingly, income presented no relationship to positive student perceptions of OER and did not correlate with other independent variables proposed. This may indicate that the main argument of cost benefits of OERs, as discussed in the COUP framework, in an of themselves are not the driver of perceptions. This study also did not find considerable evidence that student perceptions of a personal monetary benefit is predictive of positive perceptions of OERs. Instead, overall beliefs that OERs can lower the costs of course materials and or preferences to lower costs of education show a more predictive relationship. Future research may be able to focus on more specific attitudes towards personal benefits at the time of individual materials purchase, perceptions of the overall course expense, and broader reduction of educational costs to better distinguish between cost predictors.

Student feelings of connectivity to courses that use OERs and self-reported intent to increase faculty satisfaction ratings when they adopt these materials were both highly correlated and predictive of positive perceptions of OERs. These variables examine more of the psychological connection students experience with faculty members and their decisions to use OER, and is in line with the needs-based student-university fit

discussed by Knapp et al (2017). As Petrides (2011) noted, there can be an increase in engagement with faculty members who take the extra time to learn how to use OER materials and implement them in creative ways into the classroom. The decision to select free or reduced-cost materials may also demonstrate to the students that the faculty member is conscious of their finances. Curiously, the study shows that student assessment of faculty teaching effectiveness is not a predictor of positive perceptions of OERs. This may be in line with the findings of Knapp et al (2017) which was not able to show a strong instructor-focus by incoming university business students. That is, the instructor is not the primary focus driving student perception, but that the act of selecting the materials may communicate a great deal to the student and positively influence their future perceptions of OERs. Studying the deeper and long-lasting **psychological impacts of the faculty members' decision to** adopt OERs is perhaps one of **the most significant areas of this study's findings that could warrant future research,** esp**ecially to distinguish these from the student's existing positive ratings of their** university and its student support services, which was also found to be predictive.

There was no significant relationship found between preferences for types of interactive course activities and student perceptions of OER, despite that a correlation was found for this variable. This indicates that measuring preferences for types of course activities may be a spurious correlation. This potentially calls into question whether the 5R framework – Retain, Reuse, Revise, Remix, and Redistribute (Levin, 2010) – really plays a significant role for the students in determining positive student perceptions of OER. This is a point that may require further study in the context of students who have had experience which each of the stages of OER use and development. Additionally, it may be helpful to better understand differences in preference for each of these stages by faculty and students to understand which of the five stages provide the greatest impact on student perceptions of OERs.

When examining course format preferences, we found a strong relationship between student preference for online courses (p=.000, β=.310) and positive perceptions of OER. What was more surprising was that students who preferred traditional courses (p=.007, β=.161) also had a significant relationship with the positive perceptions of OER, albeit less so. Instead students who expressed a stronger preference for mixed, or hybrid, learning setting had a less significant likelihood to predict positive perceptions of OER (p=.041). The best takeaway from this finding may be that student preference for online courses may be a greater predictor of students who will also have positive perceptions of OERs.

Eliminating the factors that demonstrated little relationship to predicting positive student perceptions of OERs, the resulting model includes a more limited set of variables: student characteristics of age and perceptions of monetary benefit; course characteristics including preferences to lower course costs and preferences for online course delivery; and university characteristics of preferences for lowering the cost of education, likelihood to increase faculty satisfaction ratings of professors who use OERs, and an existing overall positive satisfaction rating with university support services.

Figure 2:
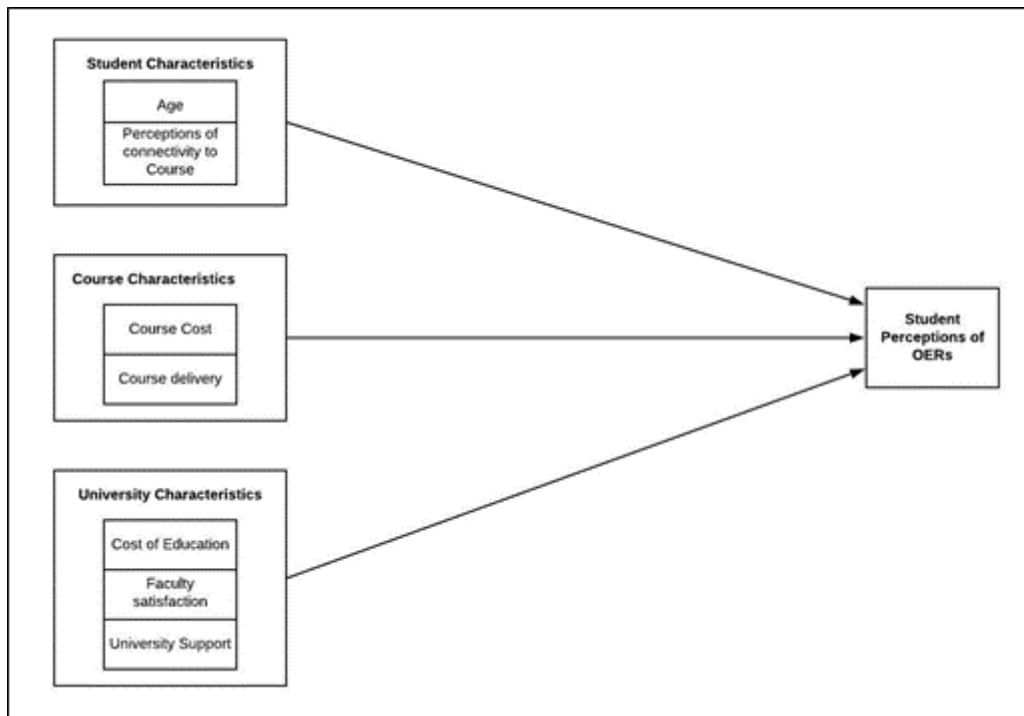*Final model of factors influencing student perceptions of OERs*



Figure 2 depicts the final model of factors influencing student perceptions of OERs. *Student characteristics* includes age and perceptions of connectivity to the course. *Course characteristics* include course cost and course delivery (in-person or online). Finally, *university characteristics* include the overall cost of education, faculty satisfaction, and university support.


## Limitations

A limitation of this study may be that the variable measuring age was measured in age ranges, where the normal student University-aged population (18-21 years old) was coded together in one rating. This does not allow for the ability to distinguish **between the potential year of the student's enrollment as they have more experience** with the university and upper level courses that may have more advanced applications for OER assignments. Although it does allow for analysis between traditional age and non-traditional students. The majority of our respondents (64.9 percent) were in this 18-21 age group. Future, research may choose to reexamine these questions with a more granular age select by year, or by enrollment year.

An additional limitation in the study is that respondents were not asked how many times they have enrolled in courses that used OERs. Therefore, the student ratings of OER perceptions could be skewed by assumptions, rather than experience. This may be particularly relevant for the questions regarding their assumptions about future monetary benefits.

Finally, the 55.3 percent of respondents in the study reported an annual household income above $50,000. The respondents in this study may therefore lack enough economic or ethnic diversity to be representative of all student populations, especially in university settings that primarily serve higher levels of at-risk student populations.

## References

Atkins, D. E., Brown, J. S., & Hammond, A. L. (2007). A review of the open educational resources (OER) movement: Achievements, challenges, and new opportunities (pp. 1-84). Mountain View: Creative common.

Belikov, O. M., & Bodily, R. (September 2016). Incentives and barriers to OER adoption: A Qualitative Analysis of Faculty Perceptions, 8(3), 235-246. Retrieved October 21, 2018.

Bliss, T. J., Hilton III, J., Thanos, K., & Wiley, D. (2013). The cost and quality of open textbooks: Perceptions of community college faculty and students. First Monday, 18(1). http://dx.doi.org/10.5210/fm.v18i1.3972

Bliss, T. J., McEwen, M., & Wiley, D. (2014). Open Educational Resources: a review of the literature. In Handbook of research on educational communications and technology (pp. 781-789). Springer, New York, NY.

Brody, L. **(2017). Free Online Course Materials Help Take Textbooks off N.Y. Students' Shoulders.** Wall Street Journal. 20 July 2017. From https://www.wsj.com/articles/free-online-course-materials-may-help-take-textbooks-off-cuny-students-shoulders-1500589194

Cooney, Cailean (2016), "How Do Open Educational Resources (OERs) Impact Students? A Qualitative Study at New York City College of Technology, CUNY", CUNY Academic Works. Retrieved from https://academicworks.cuny.edu/gc_etds/1347

Creative Commons Australia (2018). About the Licenses. Retrieved from https://creativecommons.org.au/learn/licences/.

De Los Arcos, B., Farrow, R., Perryman, L.-A., Pitt, R. & Weller, M. (2014). OER Evidence Report 2013-2014. OER Research Hub. Available from http://oerresearchhub.org/about-2/reports/

Downes, S. (2007). Models for Sustainable Open Educational Resources. Interdisciplinary Journal of E-Learning and Learning Objects, 3(1), 29-44. Informing Science Institute. Retrieved September 23, 2018 from https://www.learntechlib.org/p/44796/.

Downes, S. (2007). Models for Sustainable Open Educational Resources. Interdisciplinary Journal of E-Learning and Learning Objects, 3(1), 29-44. Informing Science Institute. Retrieved September 23, 2018 from https://www.learntechlib.org/p/44796/.

Ernst, D., Fischer, L., & Mason, S. (2017). Rating the Quality of Open Textbooks: How Reviewer and Text Characteristics Predict Ratings. International Review of Research in Open & Distance Learning, 18(4), 142–154. Retrieved from http://search.ebscohost.com.login.library.coastal.edu:2048/login.aspx?direct=true&db=eft&AN=123906386&site=ehost-live

Filler-Corn, E., & Toscano, J. (2018, September 14). Opinion | An open-source solution for soaring college costs. Retrieved September 29, 2018, from https://www.washingtonpost.com/opinions/an-open-source-solution-for-soaring-college-costs/2018/09/12/9330d670-b6ae-11e8-a2c5-3187f427e253_story.html?utm_term=.7f505121b3fd

Grinberg, E. (2014, September 25). Save money with open-source textbooks. CNN Wire.

Harper, S., Hilton III, J., and Rao, A. (2017). Khan Academy Videos in Chinese: A Case Study in OER Revision. International Review of Research in Open and Distributed Learning, vol. 18, no. 5, pp. 306. Retrieved from http://web.a.ebscohost.com.login.library.coastal.edu:2048/ehost/pdfviewer/pdfviewer?vid=7&sid=c6c348b9-d06b-4eed-8cab-ab30dda43472%40sessionmgr4006.

Helsdingen, A., Janssen, B., & Schuwer, S. (2010). Business models in OER, a Contingency Approach. Paper presented at the Open Ed 2010 Conference, Barcelona, Spain. http://openaccess.uoc.edu/webapps/o2/handle/10609/5039

Hendricks, C. (2017, December 13). Students' Vital Role in OER. Retrieved September 25, 2018, from Inside Higher Ed: https://www.insidehighered.com/digital-learning/views/2017/12/13/students-have-vital-role-creating-and-spreading-oer

Hewlett Foundation, (2018). OER Defined. Retrieved from https://hewlett.org/strategy/open-educational-resources/

**Hilton, I. J., Johnson, A., Stein, J., & Wiley, D. (2010). The four 'R's of** openness and ALMS analysis: frameworks for open educational resources. Open Learning, 25(1), 37–44. https://doi-org.login.library.coastal.edu:8443/10.1080/02680510903482132.

Hylén, J., Dr. (2007). Open Educational Resources: Opportunities and Challenges. Retrieved September 25, 2018, from https://www.researchgate.net/profile/Jan_Hylen/publication/235984502_Open_educational_resources_Opportunities_and_challenges/links/54d321a80cf250179181779b.pdf

Jhangiani, R. S., Dastur, F. N., Grand, R. L., & Penner, K. (2018). As Good or Better than **Commercial Textbooks: Students' Perceptions and Outcomes from Using Open Digital and** Open Print Textbooks. Canadian Journal for the Scholarship of Teaching and Learning,9(1), 1-22. doi:10.5206/cjsotl-rcacea.2018.1.5

Jokiaho, A., May, B., Specht, M. M., & Stoyanov, S. T. (2018). Barriers to using E-Learning in an Advanced Way. International Journal of Advanced Corporate Learning, 11(1), 17-22. https://doi.org/10.3991/ijac.v11i1.9235

Karunanayaka, S.P., Naidu, S., Rajendra, J.C.N., & Ratnayake, H.U.W. (2015). From OER to OEP: shifting practitioner perspectives and practices with innovative learning experience design. Journal of Learning for Development, vol. 7, no. 4, pp. 339-350. Retrieved from https://www.openpraxis.org/index.php/OpenPraxis/article/view/252/183.

Kizilcec, R. F., Piech, C., & Schneider, E. (2013, April 08). Deconstructing Disengagement: Analyzing Learner Subpopulations in Massive Open Online Courses. Retrieved September 25, 2018, from http://rene.kizilcec.com/wp-content/uploads/2013/09/Kizilcec-Piech-Schneider-2013-Deconstructing-Disengagement-Analyzing-Learner-Subpopulations-in-Massive-Open-Online-Courses.pdf

Knapp, J. R., Masterson, S. S., & Kedharnath, U. (2017). Where and How Does Fitting in Matter?

**Examining New Students' Perceived Fit With Their University, Instructors, and Classmates.** *Journal of College Student Retention: Research, Theory & Practice*, 152102511772550. https://doi.org/10.1177/1521025117725502

Lane, A. & Van Dorp, K. J. (2011). Open educational resources and widening participation inhigher education: innovations and lessons from open universities. In: EDULEARN11, the 3rd annual International Conference on Education and New Learning Technologies, 04-05 Jul 2011, Barcelona.

Levin, D., Allen, N., Bonnot, L., Green, C., Jacob, M., & Petrides, L. (2016). FactSheetOERforK-12Educators. Retrieved September 24, 2018,

Manton, M. & White, D. (2011). Open Educational Resources: The value of reuse in higher education. University of Oxford, pp. 4. Retrieved from https://www.webarchive.org.uk/wayback/archive/20140614114921/http:/www.jisc.ac.uk/media/documents/programmes/elearning/oer/OERTheValueOfReuseInHigherEducation.pdf

M**cKenzie (2018) "Seeking a Middle Ground Between Publishers and OER" Inside** Higher Ed. https://www.insidehighered.com/digital-learning/article/2018/08/15/courseware-platform-seeks-middle-ground-between-publishers-and

McMartin, F. (2008). Open Educational Content: Transforming Access to Education. In T. Iiyoshi & M. S. V. Kumar, (Eds.), Opening Up Education (135-148): Cambridge, MA: MIT Press.

Mishra, S., Sharma, M., Sharma, R. C., Singh, A., & Thakur, A. (2016). Development of a Scale to Measure Faculty Attitude towards Open Educational Resources. Open Praxis,8(1). doi:10.5944/openpraxis.8.1.236

Mui, Y. Q., & Kinzie, S. (n.d.). Break on Cost Of Textbooks Unlikely Before Last Bell, 2010. Break on Cost Of Textbooks Unlikely Before Last Bell, 2010, 3. Retrieved September 23, 2018

OER Commons. (2018). Introduction to OER. Retrieved September 24, 2018, from https://www.oercommons.org/

Open Education consortium. (2016). Why Open Education? Retrieved October 1, 2018, from https://www.cccoer.org/learn/

Open Educational Resources: Opportunities and Challenges. Retrieved September 25, 2018, from https://www.researchgate.net/profile/Jan_Hylen/publication/235984502_Open_education al_resources_Opportunities_and_challenges/links/54d321a80cf250179181779b.pdf

Petrides, L., Jimes, C., Middleton-Detzner, C., Walling, J., & Weiss, S. (2011). Open textbook adoption and use: Implications for teachers and learners. *Open Learning*, *26*(1), 39–49. https://doi.org/10.1080/02680513.2011.538563

Reigeluth, C. M. (1999). (Ed.), Instructional-design theories and models: An new paradigm of instructional theory, Volume II. Mahwah, NJ: Lawrence Erlbaum Associates.

Schaffhauser, D. (2016, November 9). Why the Switch to OER Is Easier Than You Think. Retrieved September 25, 2018, from Campus Technology: https://campustechnology.com/articles/2016/11/09/why-the-switch-to-oer-is-easier-than-you-think.aspx

Siegel, E. (2016, March 01). Why College Is So Expensive, And How To Fix It. Forbes Retrieved November 05, 2017, https://www.forbes.com/sites/startswithabang/2016/03/01/why-college-is-so-expensive-and-how-to-fix-it/#4392c5b1252f

Silveira, I.F. (2016). OER and MOOC: The Needs for Openness. Issues in Informing Science and Information Technology, vol. 13, pp. 211. Retrieved from http://iisit.org/Vol13/IISITv13p209-223Silveira2614.pdf.

Success Stories. (n.d.). Retrieved 2018, from Open Course Library: http://opencourselibrary.org/success-stories/

*The COUP Framework – Open Education Group.* (n.d.). Retrieved February 29, 2020, from https://openedgroup.org/coup

Venegas Muggli, J. I. & Westermann, W. (2017). Effectiveness of OER use in first-year higher education **students' mathematical course performance: A case study. In C. Hodgkinson**-Williams & P. B. Arinto (Eds.), Adoption and impact of OER in the Global South. Chapter 6 advance publication. DOI: 10.5281/zenodo.161278.

Verner, D. (2004, May) Education and its Poverty-Reducing Effects: The case of Paraiba, Brazil. https://doi.org/10.1596/1813-9450-3321

Vojtech, G. &. Grisett (2017). Student Perceptions of College Faculty Who Use OER. (D. Conrad, & R. McGreal, Eds.) The International Review Of Research In Open And Distributed Learning, 18(4). doi:http://dx.doi.org/10.19173/irrodl.v18i4.3032

VTLibraries. (2016, March 11). What are open educational resources? How can they make college more affordable? [Video file]. Retrieved from https://www.youtube.com/watch?v=Jq1sw9xUnXA&feature=youtu.be.

Wiley, D., Hilton, J., Ellington, S. & Hall, T. (2012). A preliminary examination of the cost savings and learning impacts of using ope**n textbooks in high school science classes,"** International Review of Research in Open and Distance Learning, 13(3), at http://hdl.handle.net/10515/sy5707x40