



The Role of Open Education and Faculty Gender in Shaping Student Perceptions

RESEARCH ARTICLE

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ABSTRACT

Student perceptions of open education, both open educational resources (OER) and open pedagogy, are typically reported as positive in research studies. However, there is a need for controlled research to better understand the specific effects of open education. Furthermore, it is not understood how faculty gender, often noted to be influential in student perceptions of courses, interacts with open education. The current study addressed these issues in a controlled experiment in which college students (N = 413) were randomly assigned to read vignettes of course descriptions that varied based on textbook type (OER or commercial), pedagogy (open or closed), and faculty gender (woman or man). Students who read vignettes with OER reported higher expectancy for success in the course, inherent interest and enjoyment in the course, and personal relevance for the course than those with commercial textbooks. Furthermore, task effort was perceived as lower in courses with OER compared to commercial textbooks. In the vignettes, faculty who used OER were perceived as warmer and more competent than faculty who used commercial textbooks. Students indicated the course would incur greater emotional cost (e.g., stress, anxiety) when it had a professor described as a woman using a commercial textbook compared to an OER. No such difference was noted for the professor described as a man. Overall, the findings indicated that students noticed and perceived the type of textbook (OER or commercial) as an important factor for motivation and professor warmth and competence.

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INTRODUCTION

Open education has grown as a field, and numerous studies have examined student perceptions of both open educational resources (OER; teaching and learning resources that are available without access fees due to licensing) and open pedagogy (students creating and editing openly-licensed materials for others to use (see Clinton-Lisell, 2021; Hilton, 2020; Mullens & Hoffman, 2023; for reviews). Surveys and interviews have provided valuable insights into student perceptions but lack controlled comparisons that support cause-and-effect inferences. In other words, without random assignment and comparison group, it is unknown whether students view courses and faculty differently when open education (i.e., OER and open pedagogy projects) is involved (Clinton-Lisell, 2021; Hilton, 2020; Mullens & Hoffman, 2023). Given the importance of student course evaluations in retention and promotion decisions for faculty (Wang & Williamson, 2022), better understanding of these issues is needed. The intersection of gender with open education also needs to be considered. Student evaluations of faculty are known to be biased against women (Kreitzer & Sweet-Cushman, 2022). If open education practices, namely adopting OER or open pedagogy projects, would mitigate or exacerbate that bias, that knowledge would be useful for interpreting course evaluations. The purpose of this study is to examine student perceptions of faculty and the courses they teach based on the textbook used (OER or commercial), pedagogical approach (open or closed), and gender of the professor (woman or man).

LITERATURE REVIEW

OPEN EDUCATIONAL RESOURCES

Open educational resources are defined as “teaching, learning, and research resources that are free of cost and access barriers, and which also carry legal permission for open use.” (SPARC, 2024, para. 6). This licensing allows for OER to be available to students without fees to access unlike the majority of commercial materials (see Green, 2017, for a description of licensing affordances). Studies using surveys and interviews indicate that college students in a variety of disciplines appreciate the cost savings of OER and view them as comparable in quality (e.g., Angelopoulou et al., 2022; Clinton, 2018; Kersey, 2019; Fischer et al., 2020; Lin, 2019; Magro & Tabaei, 2020; Sanchez et al., 2022; Wynants & Dennis, 2022; Zulaiha & Triana, 2023). Although perceptions from both students and faculty tend to focus on the cost savings of OER (Lantrip & Ray, 2021; Magro & Tabaei, 2020; Mullens & Hoffman, 2023), additional benefits to open licensing include being able to edit and remix OER to customize for student needs (Green, 2017). Many faculty take advantage of this licensing to adapt OER to their courses and appreciate being able to have agency over the content in their courses (Lantrip & Ray, 2021).

The majority of studies on student perceptions of OER incorporate descriptive methods such as surveys and interviews without a direct comparison or control group (Mullens & Hoffman, 2023); however, there are notable exceptions. For example, quasi-experiments have compared perceptions of students in courses with OER to those in courses with commercial materials (e.g., Clinton, 2018; Cuttler, 2019; Grissett & Huffman, 2019; Jhangiani et al., 2018). Findings from these studies tend to show similar or better perceptions of quality between OER and commercial materials. Moreover, students are more likely to perceive OER as comparable or better in quality to commercial materials after taking a course in which they learned from an OER (Finlayson, 2020). In addition, randomized experiments have had students view excerpts of OER textbook and commercial textbook content while naive to the financial cost of the textbooks (Clinton et al., 2019; Howard & Whitmore, 2020; Sheu & Grissett, 2020). In a study where students only viewed either the open or commercial textbooks, quality findings were mixed, with some indications of the OER as better quality and some of the commercial textbook as better quality (Clinton et al., 2019). When asked whether they would prefer OER or commercial textbooks based on these excerpts and naive to the cost, students were more likely to indicate they would prefer the commercial textbook (Howard & Whitmore, 2020; Sheu & Grissett, 2020). However, when students were informed of the price of the textbook, students often changed their preference to the OER over the commercial textbook due to the cost (Sheu & Grissett, 2020). Taken together, these findings indicate that cost is a key priority for students in terms of course materials.

Although the inquiry into student perceptions of OER primarily focuses on materials, some studies examined how incorporating OER relates to student perceptions of courses and faculty. These key studies indicate that students generally prefer courses with OER and have more positive perceptions of faculty who adopt OER. For example, when given course descriptions that included textbook costs, students indicated they would be more likely to enroll in a course with an OER than the same course description with a commercial textbook (Nusbaum & Cuttler, 2020). Moreover, college students rated instructors who used OER more favorably than their peers who had instructors who used commercial textbooks in introduction to psychology courses (Nusbaum & Cuttler, 2020). A controlled vignette study further found that instructors described as using OER were rated as more kind, encouraging, and creative than instructors in descriptions that were similar except for using commercial textbooks (Vojtech & Grissett, 2017). Moreover, students indicated they were more likely to enroll in a course taught by the instructor described as using an OER, with the costs of the materials often mentioned in their explanations for why they would or would not enroll in the course (Vojtech & Grissett, 2017).

OPEN PEDAGOGY

The open licensing central to OER not only allows access without financial barriers but also provides opportunities for innovative pedagogy (Wiley & Hilton, 2018). The licensing in open education fosters opportunities for students and faculty to edit and create OER for others to use (DeRosa & Robinson, 2017). This approach to instruction is often referred to as open pedagogy, with other terms including OER-enabled pedagogy, open education pedagogy, and open educational practices (Witt, 2020). Examples of open pedagogy projects include creating websites, editing Wikipedia, sharing photographs and creating visuals about the course content, updating OER, and creating course resources for future students (e.g., Biddle & Clinton-Lisell, 2023; McKenney et al., 2024; Schultz & Azadbakht, 2023). In short, open pedagogy projects provide students with opportunities to showcase their knowledge beyond their class (Short et al., 2024; Werth & Williams, 2021).

Students generally report positive perceptions of open pedagogy in their courses. In particular, contributing to an OER fosters student motivation to learn course content (Trust et al., 2023) and higher motivation for open pedagogy assignments than traditional assignments (Clinton-Lisell & Gwozdz, 2023). Students have also shared that they experience a greater sense of agency with open pedagogy and that it fosters pride (Baran & Al Zoubi, 2020), possibly because they have the opportunity to contribute to content customization and creation. The public sharing aspect of open pedagogy may also encourage more effort from students to ensure content quality (Chen & Hendricks, 2023). In terms of academic performance, a quasi-experimental study comparing students in a course section with open pedagogy (contributing to a course OER) to students in a different section of the same course without open pedagogy indicated that grades were similar in the two sections, but students generally had positive experiences with open pedagogy (Tillinghast et al., 2020). Given these findings, it is not surprising that students often indicate they would recommend open pedagogy projects to their peers (Williams, 2022). However, it is unclear how students perceive faculty who incorporate open pedagogy into their courses or how open pedagogy affects attitudes toward courses overall.

Similar to OER, most of the research on perceptions of open pedagogy is based on surveys and interviews without a comparison or control group (Clinton-Lisell, 2021). While these methods are informative for describing how open educational practices relate to student perceptions, they may be influenced by variables that often co-occur with open educational practices (Turner et al., 2013). For example, faculty who embrace open educational practices may have characteristics such as being more innovative or student-focused, which would contribute to students' perceptions of faculty (Coleman-Prisco, 2017; Lazzara, 2023). In addition, since students typically self-enroll in courses, those choosing courses with OER and open pedagogy may have different characteristics than their peers who choose other courses (Nusbaum & Cuttler, 2020). In order to isolate the effects of open educational practices on student perceptions, a controlled experimental approach is necessary (see Sheringham et al., 2021, for a discussion of experimental methods). A controlled experimental approach involves random assignment, which should evenly distribute student characteristics across conditions (Krishnan, 2024). Furthermore, it is not clear how students may perceive the combined approach of both OER and open pedagogy in a class. An experimental approach allows for the interactive effects (a combination of both OER and open pedagogy) to be examined.

Only one known study has indirectly addressed instructor gender and students' perceptions of faculty that adopt OER or commercial textbooks (Vojtech & Grissett, 2017). Students read vignettes describing either a male or female professor who adopted either an OER or commercial textbook, followed by rating the professor's characteristics. Professor gender was not manipulated in the study but was treated as a control variable. While student perceptions of faculty were more favorable for the OER textbook conditions, it was unclear whether these perceptions varied based on instructor gender. Thus, the current study sought to examine this question.

Research in social psychology has established clear differences in the ways women and men are judged and perceived. These perceptions may be driven by stereotypes, which are generalized beliefs and expectations about people belonging to a particular group or social category (Pickering, 2015). The Stereotype Content Model (SCM) theorizes that stereotypes of women and men are organized along two key dimensions: warmth/nurturance and competence/agency (Cuddy et al., 2009; Fiske et al., 2002). In general, women are more likely to be perceived as warm and nurturing (e.g., kind, helpful, and sensitive), while men are more likely to be perceived as competent and agentic (e.g., confident and ambitious; Eckes, 2002). These stereotypes further align with beliefs about how women and men should behave, resulting in potential negative impressions of those that violate gender expectations (Sibley & Wilson, 2004).

The SCM has been applied to pedagogical contexts to examine how gender stereotypes affect perceptions of professors. Female professors are often viewed more favorably if they behave in ways that are consistent with traditional gender stereotypes (Sinclair & Kunda, 2000). For instance, the "best-ever" female instructors are described as "caring" and "nurturing" (Sprague & Massoni, 2005). Students also report liking and preferring to attend the courses of instructors who display stereotypically feminine behaviors (Renström et al., 2021). Unfortunately, violating gender stereotypes is more costly for female professors than male professors. The "worst-ever" female instructors are described as "uncaring", while the "worst-ever" male instructors are just "boring" (Sprague & Massoni, 2005). Additionally, instead of experiencing backlash, male professors are sometimes rewarded for violating gender stereotypes (e.g., showing traits such as interpersonal warmth; Meltzer & McNulty, 2011; Sprague & Massoni, 2005). Expectancy violation theory (Biernat, 2003) suggests this happens due to the stereotype violation (i.e., evidence of a nurturing man) leading to expectancy-inconsistent perceptions of the male professor that are more extreme compared to the female professor.

Gender stereotypes also influence student evaluations of teaching (SETs). Specifically, SETs tend to reward female professors whose behavior, course policies, and teaching practices are in line with gender stereotypes (Docka-Filipek et al., 2023), while violating these expectations contributes to the bias female professors routinely experience with SETs (Kreitzer & Sweet-Cushman, 2022). Despite this, SETs continue to be heavily weighted in the tenure and evaluation processes at most institutions (Kreitzer & Sweet-Cushman, 2022; Sprague & Massoni, 2005). Thus, determining whether specific pedagogical strategies (like OER adoption or open pedagogy) differentially impact perceptions of male and female professors is important, as positive perceptions of female professors may help offset some of the gender bias in SETs.

MOTIVATION

The expectancy-value framework of motivation provides a useful framework for examining issues in open education (Eccles & Wigfield, 2020, 2024; see Tang et al., 2023 for an example). According to this framework, one's motivation to engage in a task is a product of one's expectancy to do well on the task and one's perceived value of the task (Wigfield & Eccles, 2000). The perceived value of the task may be categorized as intrinsic value or utility value. Intrinsic value is the interest or enjoyment innate to the task (Rosenzweig et al., 2022). Utility value is the usefulness of the task, which is typically rooted in personal relevance or application to a goal. Both intrinsic and utility value are assumed to increase motivation, but only when one expects to successfully complete the task. By contrast, the cost of the task is a component of value that decreases motivation (Barron & Hulleman, 2015). Examples of costs include task effort cost, which includes the time and energy involved in engaging in a task, and emotional cost, which includes unpleasant emotions evoked from the task, such as anxiety, frustration, and stress.

Open education practices (both resources and pedagogy) may affect motivation, as articulated in the expectancy-value framework (Tang et al., 2023). When students do not have financial barriers to the resources to help them learn, they may have a greater expectation to succeed compared to when these resource barriers are present (Eccles & Wigfield, 2020). Logically, there would be less perceived cost for a course with an OER, both in terms of financial cost and the cost of time, as students often dedicate substantial time to finding less expensive options to access commercial materials (Katz, 2019). In terms of utility value, students may find that having a course with an OER is more personally relevant to them if they aim to minimize the financial expense of completing their degree program. With respect to motivation and open pedagogy, students may have trepidation about the public-facing component of these assignments, which could logically result in more emotional cost compared to traditional assignments. However, knowing that their work could be shared with others might make the assignment more meaningful and personally relevant, thereby increasing utility value (Harackiewicz et al., 2016; Priniski et al., 2019).

Research also suggests professor gender can affect student motivation. In particular, female instructors positively influence measures of student interest or task value in courses across a variety of disciplines (Bettinger & Long, 2005; Velez et al., 2013). Compared to courses taught by male professors, student gender gaps in motivation (including utility value and interest) are smaller in STEM classes taught by female professors (Solanki & Xu, 2018). Female instructors also may have a stronger influence on students' likelihood of taking future STEM courses, particularly for female students (Carrell et al., 2010). Pertinent to the current study, these findings suggest that students may report greater motivation for courses taught by a female professor, as well as a greater likelihood to enroll in those courses.

THE CURRENT STUDY

Although there is evidence that students have more positive views of faculty who use OER compared to those with commercial textbooks, it remains unclear how open pedagogy affects and intersects with OER in terms of student perceptions. Moreover, the majority of research in open education relies on descriptive methods about materials (for OER) and projects (for open pedagogy). These methods are useful in elucidating how students view open educational practices. However, a controlled experiment with students randomly assigned to course descriptions varying in their incorporation of open educational practices is necessary to establish a cause-and-effect relationship regarding student perceptions of faculty who use open educational practices. Without such an approach, findings about student perspectives of open educational practices may be biased by confounds, such as the instructor's personality or the course discipline. Details irrelevant to open education and gender, such as personality and discipline, are held constant throughout the conditions in a controlled experiment.

Furthermore, it is unknown whether open educational practices interact with instructor gender, and how this interaction may impact student perceptions, motivation, and likelihood of course enrollment. Given that perceptions of faculty who adopt OER align with female gender stereotypes (e.g., caring, kindness; Nusbaum & Cuttler, 2020; Vojtech & Grissett, 2017), it is possible that female professors who adopt OER and use open pedagogy will be perceived more positively than male professors, and that students would be more likely to choose to enroll in their courses (Fiske et al., 2002). On the other hand, expectancy violation theory suggests it is also possible for male professors using open education to be perceived more positively than female professors (Biernat, 2003).

Since conducting a randomized experiment of actual courses meeting the criteria for a controlled experiment is untenable (e.g., students self-enroll, leading to a selection bias; Decuyper, 2019), an experimental vignette methodology was chosen for this study. In this methodology, participants are presented with scenarios (vignettes) purposefully constructed by researchers to represent a realistic situation (Aguinis & Bradley, 2014). These vignettes have different versions created to intentionally manipulate certain variables, and information unrelated to those manipulations is identical across vignettes (Eckerd et al., 2021). This allows researchers to effectively manipulate and control variables in a manner that is challenging or even impossible in terms of participant lived experiences (Harrits & Møller, 2021). In this study, the vignettes contained descriptions of a professor and the course they taught. The textbook assigned by the instructor (commercial or OER), pedagogical approach of the instructor

(traditional or open), and gender of the instructor (man or woman) were systematically varied, and participants were randomly assigned to only see one version of the vignette. In this way, causal claims (cause-and-effect relationships) could be made about the textbook, pedagogy, and gender on participants' responses to the vignette.

The following research questions guided our inquiry:

1. What are the effects and interactions of textbook type (OER or commercial textbook), pedagogy (open or traditional), and gender (woman or man) on student motivation for a course? This question will be examined in the context of the expectancy-value framework with measures of perceived expectancy of success, intrinsic value, utility value, and cost.
2. What are the effects and interactions of textbook type (OER or commercial textbook), pedagogy (open or traditional), and gender (woman or man) on student perceptions of professor traits? This question will be examined with a measure based on the Stereotype Content Model, including items assessing warmth and competence.
3. What are the effects and interactions of textbook type (OER or commercial textbook), pedagogy (open or traditional), and gender (woman or man) on students' reported likelihood of enrolling in a course?

METHODS

OPEN SCHOLARSHIP STATEMENT

The research design is a quantitative, experimental study (Creswell, 2004). The research methods and hypotheses of this study were pre-registered prior to data collection on Open Science Framework (Clinton-Lisell & Kelly, 2024). The data and survey instrument are also available on Open Science Framework (Clinton-Lisell & Kelly, 2024). Prior to data collection, ethical approval was obtained from the University of North Dakota which is the authors' institution.

PARTICIPANTS

College students in the United States and Canada were recruited to participate through the Prolific platform and received 3.50 USD for participation (initial sample $N = 447$). Overall survey completion time was recorded and the participants whose times were less than $\frac{1}{3}$ the median time, termed "speeders," were not considered attentive enough to have usable data and were removed from analyses ($n = 7$; Belliveau & Yakovenko, 2022; Greszki et al., 2015). Participants who failed an attentiveness check item (an item in which they were instructed to respond a certain way to demonstrate attentiveness) were also removed from analyses ($n = 27$).

The analytic sample had $N = 413$ participants. The average age was 25.38 years ($SD = 7.52$ years). Regarding gender identity, 2 were agender, 3 were gender fluid, 172 were men, 227 were women, and 10 were an other gender identity (e.g., nonbinary, maverique). In terms of racial and ethnic identities, 27.1% indicated Asian or Pacific Islander, 11.9% indicated Black or African American, 7.5% indicated Hispanic/Latino/Latina, 3.1% indicated Middle Eastern, .2% indicated Native American, 38.5% indicated white, and the remaining participants indicated multiple racial/ethnic identities.

MATERIALS

Vignettes of a psychology professor and their course were adapted from Vojtech and Grissett (2017) and further developed for this experiment. In the vignettes, the name of the professor was stated, with the first name varying by gender (Dr. Jennifer Smith for the woman and Dr. John Smith for the man). Then the textbook used in the course was described with the price for students (\$30 for the paper version of the OER and \$0 to download an electronic copy, or \$300 for the paper version of the commercial textbook and \$200 for an electronic copy). The textbook information also included how the professor addressed errors or inaccuracies in the textbook (i.e., the OER is edited to correct any issues; for the commercial textbook, the professor posts correct information to the course because it cannot legally be edited).

In terms of varying pedagogy, all versions of the vignette described a research paper on the contributions of a diverse scholar whose work has lacked recognition in psychology textbooks.

In the closed pedagogy condition, only the professor reads the research papers. In the open pedagogy condition, students have the option to share their research papers as chapters in a publicly available book that future students may learn from. Because the study design is a 2 (textbook type) by 2 (pedagogy) by 2 (gender) between-subjects design, there were a total of 8 conditions, and subsequently 8 different vignettes were written. Any details unrelated to the study condition were consistent across all conditions. See Appendix for examples of the vignettes.

MEASURES

Attentiveness Check

In the motivation items, the sixteenth item served as an attentiveness check and stated “The purpose of this item is attentiveness. Please select strongly disagree.” Indicating strongly disagree to this item was assumed to indicate attentiveness and only participants who responded accordingly were kept for analyses (see Participants section).

Motivation

Participants completed measures of their expectancy to do well in the course, their interest in the course (intrinsic value), the perceived usefulness of the course (utility value), perceived task effort (part of cost) for the course, and emotional cost of taking the course. Expectancy to do well, intrinsic value, and utility value were adapted from Hulleman and Harackiewicz (2009). Task effort and emotional cost items were adapted from Flake and colleagues (2015). Participants responded to each item using a five-point Likert scale to indicate their level of agreement (1 = strongly disagree to 5 = strongly agree). Higher scores represent higher levels of each of the motivation subscales. Descriptions of each subscale are in Table 1.

MOTIVATION SUBSCALE	NUMBER OF ITEMS	EXAMPLE ITEMS	CRONBACH'S ALPHA (INTERNAL CONSISTENCY)
Expectancy to do well	4	“I know I could learn the material in this course.”	.89
Intrinsic value (interesting and enjoyable)	5	“I think this course would be very interesting.”	.89
Utility value (useful and personally relevant)	4	“I think what I would learn in this course would be important.”	.90
Task effort (time and energy required)	5	“I would have to put too much energy into this course.”	.95
Emotional cost (unpleasant emotions involved)	8	“I would feel too anxious about this course.”	.94

Table 1 Descriptions of motivation subscales.

Instructor Perceptions

Instructor perceptions were measured using eight items adapted from Fiske et al. (2002). Items were combined into two subscales that reflect both dimensions in the Stereotype Content Model. Four items made up the warmth subscale (trustworthy, warm, good natured, and sincere), and four items made up the competence subscale (capable, efficient, skillful, organized). Items were rated on a 5-point scale (1 = not at all to 5 = extremely) and internal consistency for items on both subscales was excellent based on Cronbach's alphas of .92 for warmth and .89 for competence.

Likelihood of Course Enrollment

Participants were asked to indicate the likelihood they would enroll in the course described given it fulfilled a degree requirement on a range of 0 (absolutely would not enroll) to 100 (absolutely would enroll).

Manipulation Checks

Without the vignettes available, participants were asked about the gender of the professor (man, woman, non-binary/third gender, I don't remember), the cost of the textbook (\$3, \$30, \$300, or I don't remember), and who will read the final projects (the professor only, current students only, the professor and future students, or I don't remember). The purpose of these items was to examine whether students noticed the experimental manipulations in the vignettes.

PROCEDURE

The study sessions began with an informed consent document articulating the procedures, risks, and benefits for participating in the study. After indicating consent, participants were randomized through the Qualtrics algorithm to one of the eight conditions. They were instructed to read a description of a psychology professor and answer the subsequent questions based on the description. A comprehension check question asked the discipline of the course taught, which all participants answered correctly. Participants then completed the motivation measures and the instructor perceptions measure. Then they indicated the likelihood of enrolling in the course if it would fulfill a degree requirement. This was followed by the manipulation checks for professor gender, cost of the textbook, and audience for the final project. Finally, participants responded to demographic questions and were directed back to the Prolific platform to receive their incentive. The median completion time for the entire survey was 8.83 minutes.

FINDINGS AND DISCUSSION

To examine condition effects on motivation, a multivariate analysis of variance was conducted with the motivation measures as the dependent variables (expectancy, intrinsic value, utility value, task effort, and emotional cost) and textbook type (commercial or OER), pedagogy (closed or open), and gender (man or woman) as independent variables (see Tables 2 and 3 for descriptive statistics). Compared to students in the commercial textbook condition, students in the OER condition reported higher perceived expectancy to do well ($F[7, 405] = 6.51, p = .01$, Cohen's $d = .24$), intrinsic value for the course ($F[7, 405] = 16.88, p < .001$, Cohen's $d = .40$), and utility value for the course ($F[7, 405] = 16.77, p < .001$, Cohen's $d = .40$). In addition, task effort was perceived as lower in the OER condition than the commercial textbook condition, $F(7, 405) = 8.04, p = .01$, Cohen's $d = .40$.

PROFESSOR GENDER	PEDAGOGY	EXPECTANCY M(SD)	INTRINSIC M(SD)	UTILITY M(SD)	TASK EFFORT M(SD)	EMOTIONAL COST M(SD)
Man	Closed	4.14(.69)	3.76(1.00)	3.83(.95)	2.47(.94)	2.10(.80)
	Open	4.37(.53)	3.78(.93)	4.01(.84)	2.54(.97)	2.19(.80)
	Total	4.26(.62)	3.77(.96)	3.92(.90)	2.50(.95)	2.15(.80)
Woman	Closed	4.17(.820)	3.49(.99)	3.65(1.08)	4.72(1.05)	2.48(1.15)
	Open	4.28(.59)	3.69(.93)	3.90(.92)	2.52(.99)	2.32(.98)
	Total	4.22(.72)	3.59(.96)	3.78(1.01)	2.62(1.02)	2.40(1.07)
Total	Closed	4.16(.76)	3.62(1.00)	3.74(1.02)	2.60(1.00)	2.30(1.01)
	Open	4.33(.56)	3.73(.93)	3.96(.88)	2.53(.98)	2.26(.89)
	Total	4.24(.67)	3.68(.96)	3.85(.96)	2.56(.99)	2.28(.95)

Table 2 Descriptive statistics for motivation variables by professor gender and pedagogy for commercial textbook condition only.

PROFESSOR GENDER	PEDAGOGY	EXPECTANCY M(SD)	INTRINSIC M(SD)	UTILITY M(SD)	TASK EFFORT M(SD)	EMOTIONAL COST M(SD)
Man	Closed	4.40(.64)	3.84(.82)	4.01(.87)	2.43(.95)	2.19(.98)
	Open	4.41(.64)	4.20(.74)	4.37(.64)	2.23(.98)	2.13(.91)
	Total	4.40(.64)	4.02(.80)	4.19(.78)	2.33(.97)	2.16(.94)
Woman	Closed	4.49(.57)	4.14(.66)	4.31(.66)	2.20(.99)	2.02(.93)
	Open	4.33(.72)	3.95(.86)	4.10(.85)	2.30(.89)	2.05(.73)
	Total	4.41(.65)	4.05(.77)	4.21(.76)	2.25(.94)	2.04(.83)
Total	Closed	4.45(.61)	4.00(.75)	4.17(.78)	2.31(.97)	2.10(.95)
	Open	4.37(.68)	4.07(.81)	4.23(.76)	2.27(.93)	2.09(.82)
	Total	4.41(.64)	4.04(.78)	4.20(.76)	2.29(.95)	2.10(.89)

Table 3 Descriptive statistics for motivation variables by professor gender and pedagogy for OER textbook condition only.

There was also a two-way interaction between textbook type and gender for emotional cost. To examine the nature of the interaction, one-way analyses of variance were conducted with

the data file split by gender, with textbook type as the independent variable and emotional cost as the dependent variable. When the vignette described a male professor, there was no difference in emotional cost by textbook type, $F(1, 200) = .001, p = .94$. When the vignette described a female professor, emotional cost was higher for the commercial textbook than the OER textbook, $F(1, 209) = 7.67, p = .01$, Cohen's $d = .39$.

There was also a three-way interaction between textbook type, pedagogy, and gender for intrinsic value. To examine the nature of this interaction, the data file was split by professor gender and textbook type and one-way analyses of variance were conducted, with pedagogy type as the independent variable and intrinsic value as the dependent variable. There were no reliable pedagogy differences for courses described with male professors and commercial textbooks, $F(1, 103) = .01, p = .93$, female professors with commercial textbooks, $F(1, 107) = 1.11, p = .29$, nor for female professors with OER, $F(1, 100) = 1.59, p = .21$. However, for the male professor and OER courses, there were higher levels of intrinsic value reported for the open pedagogy condition than the closed pedagogy condition, $F(1, 95) = 4.98, p = .03$, Cohen's $d = .45$.

To look at instructor perceptions, a multivariate analysis of variance was conducted with the traits as dependent variables and textbook type, pedagogy type, and gender as independent variables. The professor was rated higher in both competence (e.g., capable, efficient, organized, and skillful) and warmth (e.g., good natured, sincere, warm, and trustworthy) in courses with OER compared to courses with commercial textbooks. There were no reliable effects for gender or pedagogy. There were also no reliable interactions. In the interest of space, only descriptives for textbook conditions are displayed in Table 4, as there were no other effects or interactions.

	COMMERCIAL M(SD)	OER M(SD)	TOTAL M(SD)	F STATISTIC	COHEN'S <i>d</i>
Professor competence	3.83(.80)	4.13(.67)	3.97(.75)	17.25***	.40
Professor warmth	3.79(.86)	4.03(.84)	3.92(.83)	11.90***	.29
Likelihood of enrolling	61.04(28.24)	73.09(23.54)	66.85(26.74)	21.99***	.45

Table 4 Descriptive statistics of professor traits and likelihood of enrolling in the course for textbook conditions.

Note: Statistical significance noted by asterisks with * $p < .05$, ** $p < .01$, *** $p < .001$.

The effects and interactions of textbook, pedagogy, and professor gender on likelihood of enrolling in the course was examined through a univariate analysis of variance, with likelihood of enrolling as the dependent variable, and the textbook type, pedagogy type, and gender as independent variables. Likelihood of enrollment was higher for course descriptions with OER textbooks than in course descriptions with commercial textbooks (see Table 4). There were no other reliable effects or interactions.

The answers to the manipulation checks were examined for accuracy: 86.4% of participants answered the gender item correctly, 97.3% answered the textbook cost item correctly, and 76.8% answered the question about the final project's reading audience correctly. Participants responded to these questions from memory and did not have access to the faculty/course descriptions at the time of the manipulation checks. In the interest of including all eligible participants and to avoid biasing results (Kotzian et al., 2020), participants were not excluded based on their answers to the manipulation check questions.

IMPLICATIONS AND SUGGESTIONS

The purpose of the study was to examine how student perceptions of faculty and the courses they teach are affected by the type of textbook (OER or commercial), pedagogy (open or closed/traditional), and professor gender (woman or man). Overwhelmingly, the findings indicated students were more motivated to take a course with an OER than a traditional textbook, viewed professors who adopted OER more positively, and were more likely to enroll in a course with an OER than a traditional textbook. This positive attitude toward OER is consistent with previous findings in which students perceive faculty who use OER more favorably than faculty who use commercial textbooks (Nusbaum & Cutter, 2020; Vojtech & Grissett, 2017).

In addition, there was an interaction between textbook type and gender, such that vignettes with the female professor using a commercial textbook were associated with higher emotional cost (unpleasant emotions such as anxiety and frustration) than vignettes with the female

professor using an OER textbook. It is possible that stereotype expectancy violation is behind this finding. Expectancy violation theory suggests when a person's characteristics are not aligned with stereotype-based expectations, evaluations of the person are more extreme in the direction of the violation (Jussim et al., 1987). Since students perceive faculty who use OER as kind and caring (Nusbaum & Cuttler, 2020; Vojtech & Grissett, 2017), and these are both gender stereotypes commonly held about women, a female professor using a commercial textbook may serve as a violation of these expected stereotypes (Anderson, 2010). As a result, students may have responded to this violation by reporting more unpleasant emotions associated with the course. These findings suggest male and female professors are evaluated differently when they adopt commercial textbooks, with higher costs for female professors. Thus, adopting an OER textbook may be a small way to offset biased perceptions of female professors.

An interaction with textbook type, pedagogy, and gender was also found for intrinsic value (how interesting and enjoyable the course was perceived). For the vignettes describing a male professor adopting an OER textbook, students perceived the intrinsic value of the course as higher with open pedagogy (the projects may be publicly shared) compared to closed pedagogy (only the professor reads the projects). These findings could also potentially be explained by expectancy violation theory, as stereotypes about male professors may not be consistent with perceptions of faculty that use OER (Vojtech & Grissett, 2017). As a result, students may have responded to this stereotype violation by reporting greater interest and enjoyment in a course where a male professor adopted an OER textbook and used open pedagogy compared to closed pedagogy. Future research should identify possible traits that predict differences in motivation for open pedagogy based on professor gender, given ratings of warmth and competence were equivalent for male and female professors in the current study.

Motivation was examined through the expectancy-value framework (Eccles & Wigfield, 2020). Based on this framework, motivation is the product of one's expectancy to do well and the value of the task. This value may be intrinsic (inherently interesting or enjoyable) or utility (useful or personally relevant). It should be noted that cost (the downsides of engaging in a task, such as task effort or unpleasant emotions involved) subtract from the overall value of the task. Having an OER instead of a traditional textbook was anticipated to reduce the perceived task effort cost, as students would not need to engage in time-consuming activities to find less-expensive alternatives for their course materials (Katz, 2019). In addition, students perceived the utility value of a course with an OER to be higher than that of one with a commercial textbook, perhaps because saving money on course materials was a personal goal for college. Moreover, the likelihood of enrolling, which could be inferred as motivation to be a student in the course, was higher with an OER than with a commercial textbook.

Pedagogy did not have any independent effects on motivation, perceptions of professor warmth or competence, or likelihood of enrolling in a course. It was anticipated that open pedagogy, in which students' projects may be publicly shared, could enhance the perceived value of the course. Moreover, there was concern that the potential for projects to be publicly shared would be anxiety provoking for students. However, there were no overall effects of pedagogy type on motivation. There was some indication that pedagogy and gender interacted with textbook type, in that the intrinsic value of a course taught by a male professor adopting an OER was greater when the pedagogy was open and students had the option to publicly share their work. The gender aspect may be due to the previously-discussed stereotype expectation violation. Furthermore, the findings may be limited to OER due to its notable positive effect on student perceptions across this study's findings. Students may find the opportunity to share their course projects with the public as an interesting or enjoyable opportunity, thereby enhancing intrinsic value. This explanation aligns with findings from surveys and interviews in which students reported more motivation for open pedagogy than traditional, closed assignments (Clinton-Lisell & Gwozdz, 2023; Trust et al., 2023). However, it should be noted that with the numerous tests and comparisons, it is possible that this finding for one motivation measure was spurious (e.g., due to chance rather than an actual effect).

The general lack of effect of pedagogy in this experimental vignette study contrasts findings from surveys and interviews showing students generally have positive perceptions of open pedagogy (Baran & Al Zoubi, 2020; Chen & Hendricks, 2023; Tillinghast et al., 2020; Williams, 2022). It is possible that the cost of the textbook was such an important factor for students

that they were relatively unconcerned with the pedagogy type. The finding that nearly all of the participants correctly identified the cost of the textbook, but only three-quarters knew the intended audience of the final projects (key to open pedagogy) further supports this possibility.

LIMITATIONS AND FUTURE DIRECTIONS

College students were asked to consider their potential motivation and perceptions of professor traits for a hypothetical course. Although this design allows for straightforward comparisons based on the study's experimental variables (Harrits & Møller, 2021), these were not actual courses the students were enrolled in and it is uncertain how much the findings would carry over to experiences in the real world (Eifler & Petzold, 2019). Moreover, notable percentages of students did not correctly identify the professor's gender (13.6%) or the opportunity to share their final projects with future students (23.2%). This may be one reason why there was an overall lack of gender or pedagogy effects—students simply did not notice these characteristics as well as they noticed the cost of the textbook. In an actual course, students would likely notice both the professor's presumed gender and whether their work would be shared with future students or others outside of the course.

In this study, gender was examined as a binary (man/woman) rather than as a spectrum with multiple genders beyond the two described (Kedley, 2021). For the sake of experimental design simplicity, the two most common genders were examined. However, a thorough examination of gender should include genders beyond the binary. An interesting area for future research would be to examine student perceptions of gender diverse faculty (Fleck & Richmond, 2024). Furthermore, we did not examine race, ethnicity, sexual orientation, or other diverse characteristics of faculty known to bias student perceptions (Chávez & Mitchell, 2020; Heffernan, 2022). Importantly, issues of intersectionality that consider how combined identities converge were not incorporated into this study (Crenshaw, 1991; Kouzoukas, 2019). Such examinations would be important to conduct in a future study given how marginalized scholars may face social and political risks when engaging in open educational practices (Clinton-Lisell et al., 2023; Finley et al., 2018; Kaerwer & Prichett, 2023).

CONCLUSION

The goals of this study were to examine how OER, open pedagogy, and professor gender affected student motivation for a course and perceptions of instructors. Notably, a course taught by a professor described as a woman was perceived as higher in emotional cost if the course used a commercial textbook compared to an OER, but no such pattern was noted with a course taught by a professor described as a man. Overall findings aligned with previous work indicating students have positive perceptions of courses with OER and faculty who use OER. This study built on previous work by incorporating the expectancy-value theory of motivation (Eccles & Wigfield, 2020), stereotype content model (Cuddy et al., 2009; Fiske et al., 2002), and expectancy violation theory (Biernat, 2003). Similar to previous findings, the financial cost of the textbook appeared to be particularly salient to students. Open pedagogy did not appear to affect student perceptions, except students indicated higher levels of intrinsic value (inherent interest and enjoyment) in the course when a male professor teaching with an OER incorporated open pedagogy compared to closed pedagogy. Overall, these findings may be helpful for encouraging faculty to adopt OER.

DATA ACCESSIBILITY STATEMENT

The datasets generated and/or analysed during the current study are available in the Open Science Framework repository, <https://osf.io/74amg/>.

ETHICS AND CONSENT

Ethical approval was obtained for the work described in this article by the University of North Dakota Institutional Review Board prior to data collection.

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COMPETING INTERESTS

The authors have no competing interests to declare.

AUTHOR CONTRIBUTIONS (CRediT)

Virginia Clinton-Lisell: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Writing – original draft, Writing – review & editing. Alison Kelly: Conceptualization, Formal Analysis, Investigation, Methodology, Validation, Writing – original draft, Writing – review & editing. All authors have read and agreed to the published version of the manuscript.

AUTHOR NOTES

Based on *Academic Integrity and Transparency in AI-assisted Research and Specification Framework* (Bozkurt, 2024), the authors of this paper acknowledge that this paper was reviewed, edited, and refined with the assistance of Grammarly, Version 8.912.0 complementing the human editorial process. The human authors critically assessed and validated the content to maintain academic rigor. The authors also assessed and addressed potential biases inherent in the AI-generated content. The final version of the paper is the sole responsibility of the human authors.

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