Examining Students’ Perceptions and Preferences for Traditional Paper vs. Multiple-Choice Question Generation Assignments

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Abstract

This paper presents an action research study that describes the perceptions of 41 students about the implementation of a renewable assignment, specifically a quiz question creation and review assignment as an alternative to guided paper assignment conventionally taught in an undergraduate psychology course. After completing the assignments, students were asked to share their perceptions of several aspects of this particular approach, including their preferences, experiences, expectations, reasons, and confidence in completing the assignments. Results indicated that students prefer the Multiple-choice question generation assignment, which helped them better understand the content and prepare for the exams. In addition, students had a higher level of confidence in creating quiz questions while creating quiz questions actually took more mental effort. It was clear that students valued autonomy, including having an opportunity to choose the type of assignment and being able to create quiz questions potentially being used for upcoming exams.

Keywords: Open Pedagogy; Student-Generated Quiz Questions, OER-enabled Pedagogy, Non-disposable Assignment

Introduction

To support and assist students in learning and success, educators have developed, implemented, and advocated various learning and teaching theories and pedagogies along with the sociocultural changes and technological development, with open pedagogy being one of them. The term open pedagogy was coined decades ago, and with the popularity of open education and open education resources in the 2010s, this method has drawn attention again (DeRosa & Jhangiani, 2017).

Open pedagogy refers to a concept used to establish a pedagogical practice which allows the instruction to be more student-centered and access-orientated and empower students to
engage in public knowledge creation during the learning process while following the “R’s” of open educational resources (OERs), which allows resources to be revised, remixed, reused, or redistributed (DeRosa & Jhangiani, 2017; University of Texas Arlington Libraries, n.d.; Wiley, 2013). Most importantly, there is a shift from a reciprocal learning experience to a more process-oriented experience (Paskevicius & Irvine, 2019).

Wiley (2013, 2018) further asserted the implementation of OERs to transform pedagogy, and advocated ‘OER-Enable Pedagogy.’ One of the key characteristics of open pedagogy is to get students more engaged by creating real-world products such as wiki projects, whole or partial e-textbooks, videos materials, and other supplements, instead of “disposable assignments” (Wiley, 2013), which have a limited use that does not reach beyond the scope or timeframe of the course.

There is growing research on how open pedagogy works and the impact revealed from empirical research (Baran & AlZoubi, 2020; Bloom, 2019; Cooney, 2017; Hilton et. al. 2019; Werth, & Williams, 2021). Open pedagogy allows students to use, adapt or remix, build, curate, and ask critical questions about OERs (DeRosa & Jhangiani, 2019) and can provide a robust basis for student-centered learning through engaging students in real-world projects that allow students to interact and contribute to a larger community (DeRosa & Robison, 2017). The present research, as part of our OER-enabled pedagogy implementation, is another step in the process to better understand how and in what ways students, instructors, and instructional designers accomplished their goals and objectives with this approach and what students feel about this new approach.

Specifically, the present project focuses on implementing a renewable assignment in replacing paper writing assignments. Renewable assignments, an idea introduced by Wiley and Hilton in contrast to disposable assignments, are “assignments which both support an individual student’s learning and result in new or improved open educational resources that provide a lasting benefit to the broader community of learners” (Wiley & Hilton, 2018, p. 137).

The purpose of the present paper is to describe an action research study aimed at examining the implementation of a renewable assignment in an undergraduate psychology course as part of open pedagogy. There are many types of renewable assignments, such as wiki projects, creating open educational resources (syllabus, revising open book or OER, etc.) and creating quiz questions for a quiz bank. The type of renewable assignment for our project was quiz question creation aimed at contributing to a quiz bank that can be used by others in the future.

In this paper, we describe our project that developed and implemented a renewable assignment in an undergraduate psychology course in Georgia. Then we discuss the merits of traditional paper writing assignments versus a question-creation and review (QCR) assignment, where students make ongoing contributions to a quiz bank that faculty can use in future courses. The presentation/paper is aimed toward instructional designers, faculty members, and those interested in learning more about open pedagogy assignments.

As mentioned, the purpose of the present study is to examine student perceptions of the renewable assignment implemented as an alternative option in an undergraduate psychology in Georgia. The overall research questions for this study are:

1. What are students’ overall learning experience of a renewable assignment, specifically the QCR assignment?
2. What is students’ preference if given an option between a paper assignment and QCR assignment?

Research Design

The Context of the Study

The context of the study was in an introductory undergraduate psychology course, Human Growth and Development, with 41 students enrolled using an open textbook. Students in the course completed five assignments: a paper assignment, a QCR assignment, and a choice between a paper or a QCR for assignments three to five.

The renewable assignment, QCR assignment, was introduced to the class with a purpose of potentially contributing to a quiz bank that can be used by other people in the future as well as for the upcoming exams. The assignment consisted of two parts. The first part was to create three Multiple-Choice Questions (MCQ) based on the given text/textbook chapters. The second part was to review MCQ created by other students. The QCR assignment served an alternative to the guided paper assignment so students could choose either one for the assignments three to five.

Data Collection

The primary sources of data were three survey questionnaires. There were total of three surveys: two of them were one-question surveys and were collected mid-semester and the third survey was distributed at the end of semester. The first survey was distributed right after homework assignment #2 (QCR assignment) and asked them how they felt about the QCR assignment. The second survey was distributed after they completed homework assignment #3, for which students could choose between the QCR and paper assignment. The survey asked students which assignment they chose and why. The third and the final survey asked students about their overall learning experiences with the assignments. The number of responses for each survey were various because all surveys were anonymous and voluntary.

Another source of data we examined were the students work/homework assignments. We rated the level of Bloom’s Taxonomy [Figure 1] for each question that students created across each homework assignment. Bloom’s Taxonomy (1956) is a classification for learning outcomes and objectives that instructors can use to assess student learning and that students can use to determine their level of knowledge. Bloom’s Taxonomy can be used in creating assessments, including MCQs. In our study we analyzed the MCQs that students created to determine the level at which students were thinking about the material when creating the MCQs.

*Figure 1.* Bloom’s Taxonomy
Data Analysis

Descriptive analysis and ANOVA were used for survey data analysis. The collected survey data were cleaned up and imported into SPSS. The descriptive analysis was used to present students’ general perceptions about the QCR assignment, preferences between the two assignments, and the efforts they perceived in completing assignments. ANOVA was applied for further examination to see if there were any statistical differences between the means of each aspect.

For the Bloom’s Taxonomy rating, we coded each question that students created for Homework 2-5 on the following levels: Level 1- Remember/Recall; Level 2- Understand; Level 3- Apply. No questions were coded beyond Level 3 due to no students creating questions beyond that level. After students submitted their assignments, all multiple-choice questions were examined and rated by two reviewers, who each assessed the questions’ composition and decided whether the question was focused on remembering/recall, understanding, or application. If a disagreement occurred between the two raters, a third person would share their judgment. A discussion would follow among the three individuals until a consensus was reached.

Results & Discussion

Student Perceptions and Preference

Initial Experience (first survey)

After students experienced both type of assignments (paper and QCR), the first survey asked students how they felt about QCR compared to paper assignment. Data from the first survey (N=35) showed the majority of students (65.7%) indicated that the QCR assignment was better than the paper assignment, while 10 students (28.6%) felt they were the same, and two students (5.8%) felt the QCR assignment was worse than the paper assignment (see Table 1).
The students who felt QCR assignment was better indicated that it was fun, creative, and helped them study. One student (S1-33) wrote “This was a simple, yet in my opinion, effective assignment to do. You must know material to make a test question about it so it was helpful.” Another student (S1-19) wrote “It allowed me to be a little more creative and was definitive It also forced me to read the book. Something I should do but don't.”.

Those students who indicated both type of assignments were about the same felt “it has the same effect (S1-2)” on [learning] and engagement. One student (S1-7) wrote “It got me engaged about the same amount as the paper assignment, I just enjoyed the paper assignment more because it was the first time I've really been interested in what I was writing down.” Those students who felt QCR was worse felt the structure of assignment was complicated and one wrote “format was too complicated, could've been done in a more simple fashion.” (S1-24)

### Preference on the Type of Assignment (second survey)

The second survey (N=33) asked students which assignment, Paper or QCR, they chose and why they chose. As shown in Table 2, three respondents (9.1%) chose to write a paper assignment over creating quiz questions, while 30 respondents (90.9%) chose creating quiz questions. Those who chose QCR felt that QCR assignment was helpful to study. One student (S2-3) wrote “I really enjoy the making questions step, having to look at information in a new way to present it as a question is really cool to me.” A representative comment of this cohort of student was, “Creating and reviewing the questions helps me retain the information.” (S2-15)

Only three students chose paper assignment. Student 9 (S2-9) chose paper because of the topic and wrote “I was interested in the topic and I love writing about stuff that actually interests me.” Student 22 chose the paper assignment because of time consumption, “Creating the questions were time consuming versus doing the standard writing a paper.” The third student (S2-29) felt “more comfortable with writing paper than constructing questions.”

### Helpfulness and Confidence

The third survey (N=34) asked students to compare each type of assignment on its helpfulness in learning the content, exploration of the concepts, and preparation for the exams, as well as the level of effort required and confidence, they had to complete the assignments.
As shown in Table 3, more students reported that QCR assignments were more helpful to prepare for the exam and to learn the content in depth, whereas the paper writing assignments were more helpful to explore the topic/content. However, repeated measures ANOVA did not reveal a significant difference in helpfulness.

As for the confidence in completing assignments, results of repeated measures ANOVA showed there was a significant difference in confidence to complete a good quality assignment between paper and QCR assignment ($F(1,33) = 10.38, p = .003$). In other words, students were more confident in coming up with good quiz questions than writing a good paper.

### Table 3
*Means and Standard Deviations for the Helpfulness and Confidence Regarding Assignments (n=34)*

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Examination Preparation</th>
<th>Learning Content Deeply</th>
<th>Concept Exploration</th>
<th>Good Quality Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>QCR</td>
<td>M: 8.21, SD: 2.147</td>
<td>M: 7.93, SD: 1.939</td>
<td>M: 8.06, SD: 2.373</td>
<td>M: 8.65, SD: 1.535</td>
</tr>
</tbody>
</table>

### Mental Effort and Time Spent

As shown in Table 4, nearly half the students (47.1%; 16 out of 34) felt the mental effort they made on QCR assignments was about the same compared to paper assignment, 35.3% of the students felt the mental effort of QCR assignments was less than paper assignment, while 17.6% of respondents thought QCR assignments took more mental effort than paper assignment. About 50% of students felt that time effort to complete a QCR assignment was less than expected, compared to paper assignments.

### Table 4
*Comparison of Mental Effort on QCR Assignment and Paper Assignment (n=34)*

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>More mental effort to complete QCR assignment</td>
<td>6</td>
<td>17.6</td>
</tr>
<tr>
<td>About the same</td>
<td>16</td>
<td>47.1</td>
</tr>
<tr>
<td>More mental effort to complete Paper assignment</td>
<td>12</td>
<td>35.3</td>
</tr>
</tbody>
</table>

### Preferences on the Proportion of Assignment

In terms of preference on the type of assignments, most of the students (85.3%) preferred to have more QCR assignments than paper assignments, and the majority of students (82.4%) would like to have some kind of combination of both types of assignments. None selected all paper assignments while six (17.6%) students selected all QCR assignments. In short, students recognize that each assignment brings different merits and they prefer to have a mix of both assignments. They also appreciate to have a choice.
Table 5
Preference for QCR or Paper Assignment, by Proportion (n=34)

<table>
<thead>
<tr>
<th>Proportion of Assignment</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% QCR assignment</td>
<td>6</td>
<td>17.6</td>
</tr>
<tr>
<td>80% QCR assignment, 20% Papers</td>
<td>14</td>
<td>41.2</td>
</tr>
<tr>
<td>60% QCR assignment, 40% Papers</td>
<td>9</td>
<td>26.5</td>
</tr>
<tr>
<td>40% QCR assignment, 60% Papers</td>
<td>4</td>
<td>11.4</td>
</tr>
<tr>
<td>20% QCR assignment, 80% Papers</td>
<td>1</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Bloom’s Taxonomy Levels of Student-Generated Questions

Table 6 outlines the number of student-generated multiple-choice questions at each level of Bloom’s Taxonomy. At first, on HW 2, most questions (90.8%) that students created were at the lowest level of the taxonomy, Remember/Recall. No questions on HW 2 were coded beyond the second level (Level 2, Understand). The instructor provided feedback to the students following HW 2, prompting them to create questions that included examples (and therefore would be coded on a higher Bloom’s Taxonomy level). Following this discussion, on HW 3 more students created questions that were coded at Bloom’s Taxonomy’s second level, Understand (7.8%). Even more students created questions coded at the Understand level (Level 2) on HW 4 (16.2%). However, Bloom’s taxonomy Level 2 (Understand) decreased on HW 5 (4.3%), with rates returning close to that of HW 2. Based on the authors’ reviews of the questions, most of the questions on HW 5 dealt with ages (e.g., “What is the age range of late adulthood?”) or specific stages of development, which were on the lowest taxonomy level (Remember/Recall).

Table 6
Bloom’s Taxonomy Rating

<table>
<thead>
<tr>
<th>BT rating</th>
<th>HW 2</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
<td>%</td>
</tr>
<tr>
<td>Level 1</td>
<td>90</td>
<td>90.8</td>
<td>94</td>
<td>92.8</td>
<td>82</td>
<td>83.2</td>
</tr>
<tr>
<td>Level 2</td>
<td>3</td>
<td>3.2</td>
<td>8</td>
<td>7.8</td>
<td>16</td>
<td>16.2</td>
</tr>
<tr>
<td>Level 3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Note: Level 1 = Remember/Recall; Level 2 = Understand; Level 3 = Apply

The Bloom’s taxonomy ratings illustrated that students were thinking about the material on a surface-level, focusing on remembering definition and important facts about the material. However, with some feedback from the instructor about creating more questions that were applied (e.g., examples that illustrated the concepts), we noticed that there was an uptick in the number of responses that were on higher levels of Bloom’s Taxonomy, including “Understand” and “Apply.” Of interest, we noticed a decrease in the number of questions that were rated on higher levels of Bloom’s taxonomy for the final homework assignment. There are several possible explanations, including the material covered or possibly that students rushed through the
assignment because it was later in the semester when they may have had less time to complete it due to other course assessment, assignments, and projects.

**Instructor’s feedback/reflection**

The instructor (Grissett) observed that students were engaged throughout the assignment, in part because of the different stages and components of the assignment, rather than a “one and done” paper assignment. Students are used to writing papers, but the QCR assignment was new for many students and therefore appeared to allow students to do something different, and therefore more engaging. The instructor also noticed that students created surface-level questions and feedback on the first assignment. Therefore, she provided feedback in class and online for students to provide richer feedback to their peers and to create questions that were more applied (e.g., example-based questions). Finally, the instructor enjoyed the assignment, as well. Having read and graded many papers over the years, this was a new and engaging pedagogical activity that she enjoyed. In the future, the instructor will consider prompting students to create higher level questions on Bloom’s taxonomy, providing sample questions for students to model, allowing students to create questions in class to get peer and instructor feedback, or incorporating the questions students create into more formative assessments or in-class activities, such as quiz games.

**Conclusion**

Overall, based on the survey results, students liked having two types of assignments but preferred QCR more than paper assignment writing. In general, students considered writing the paper assignment to be more helpful to explore the topic and content and to learn the content intensively, while creating quiz questions was more beneficial to study the content and prepare for the exam. Additionally, students had a higher level of confidence in creating quiz questions while creating quiz questions actually took more mental effort. It was clear that students valued autonomy, including having an opportunity to choose the type of assignment and being able to create quiz questions potentially being used for upcoming exams.

Further, although student generated testing items were not always on high cognitive skill level, we can expect that the quality of student generated MCQ can improve with instructor’s feedback or investment.

Further research is necessary to determine the efficacy of OER-enabled pedagogy beyond student perceptions, and also to determine which types of open pedagogy are most efficacious, including examining changes in learning and engagement of various type of assignments.

**References**


University of Texas Arlington Libraries. (n.d.). *Introduction to open pedagogy,* https://libguides.uta.edu/openped

