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# BLENDED TEACHING FOR RESEARCH METHODS AND STATISTICS COURSES

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## Abstract

*A solid understanding of statistics and research methods is essential for all graduate students in education, social sciences, and psychology. However, effective teaching in statistics and research methods is challenging because students are less likely to enjoy these courses. The author of this paper argued that blended teaching should work as an alternative to traditional face-to-face teaching, including (1) conceptual lectures in class and hands-on activities out of class, (2) lab work online by group with peer support, (3) project-based course design. At the end of this paper, instructor's self-reflection and students' feedback on blended teaching were reported. This paper is of interest to both faculty and students who are teaching and learning statistics.*

**Keywords**

Blended Teaching, Research Methods Courses, Statistics Teaching and Learning, Graduate Student Teaching

## 1. Introduction

A solid understanding of statistics and research methods is essential for all graduate students in education, social sciences, and psychology. However, effective teaching in statistics and research methods is challenging because students are not interested in research methods

courses and statistics and feel these courses difficult (Ball & Pelco, 2006). One of the challenges for students was to meaningfully connect what they learn in these classes to their plan of study and research (Eamon, 2001). On the other side, many teachers have reported that their students experienced difficulties in learning statistics; however, they considered themselves not well prepared to help their students with these difficulties (Batanero, Burrill & Reading, 2011). That said, both teachers and students are facing the challenges in teaching and learning research methods and statistics. Nevertheless, little academic engagement with the pedagogical issues has been given attention regarding teaching research methods and statistics (Mishra & Koehler, 2006).

The objectives of this paper are two folded. First, it explores the development of blended teaching in graduate teaching, especially on teaching statistics and research methods. In literature, this paper explores the advantages and challenges of using blended teaching for graduate research methods courses. In practice, it discusses the specific teaching techniques of using blended teaching for research courses. The second objective of this presentation is to encourage faculty to use blended teaching in graduate research courses. By presenting the author's teaching reflection as well as students' feedback on blended teaching in research courses, the author of this presentation hopes to encourage more professors to consider this type of teaching.

In literature, a small number of reflective papers were found that discussed pedagogical practices in teaching statistics and research methods. In recent years, Hesse-Biber (2015) discussed on the effectiveness of teaching research design courses. Wu and Patel (2016) illustrated how blended learning pedagogy can be integrated into a mixed methods research course. Buckley et al. (2015) and Scott Jones and Goldring (2015) reflected the teaching on quantitative methods courses. Corti and Van Den Eynden (2015) discussed the teaching of data management skills for both qualitative and quantitative data. The previous literature indicated that pedagogical developments in teaching research methods have heavily depended on methods teachers' systematical practice and reflections on teaching and learning (Jenkins, 2006). McBurney (1995) and Celli and Young (2017) proposed alternative teaching methods to lecture-based approaches: the case-based method and the problem-based learning method. Accordingly, students should be encouraged to test hypotheses and collaborate with faculty and fellow students. Other researchers lick Laadem (2017) and Wu and Patel (2016) argued the needs of E-

learning in adult teaching and learning. Therefore, the author of this study adopted blended teaching as an alternative to teach statistics and research methods courses.

## 2. Blended Teaching in Practice

This study is to examine how effective blended teaching in research methods and statistics courses. Blended teaching is also called hybrid teaching, which involves both face-to-face instruction and web-based online learning. This paper discusses the advantages and techniques of using blended teaching in research methods courses according to the author's practice at a Mid-Western U.S. University.

The author's teaching philosophy is "learning by doing". This philosophy guides the course design. Particularly, the online component is designed to replace some proportion of face-to-face lectures to allow students to apply what they have learned in class to practical problems. Web-based group work and peer support is designed to help students learning by doing. In the following sections, I will give two examples to illustrate how blended teaching is employed for research courses.

### 2.1 Blended Teaching for Master Graduate Students

All graduate students are required to take an introductory course of research methods. The course is called *Quantitative and Qualitative Research Approaches* in my institute. It is designed to introduce qualitative and quantitative research methods, develop students' understanding of research process, and build students' skills in empirical research. This course was taught face to face but received low teaching evaluation. Students generally comment on this course as "boring", "too conceptual" and "not useful".

In the recent 3 years, I start teaching this course in a hybrid format. It is designed with 50% time of face-to-face lectures and 50% time of web-based online teaching. The face-to-face lectures focus on concepts and theoretical framework. The online learning part is designed as group work and project-based activities. For instance, students learn how to run regression in SPSS in face-to-face classes and then practice it during online sessions. To evaluate students' online learning achievements, I give them quiz, tasks, and open-ended questions. Students can work in groups and learn from each to complete the assignments. For instance, I introduce students a website for students to download public secondary data and ask them to select any variables that are interesting to them to run a logistic regression. Students are asked to report the variables that they found and the SPSS output. To complete this task, students need download

existing data online, select categorical variables, and enter data in SPSS, etc. Students work in groups and can seek my advice during the process. This reflects my teaching philosophy of blended teaching: "Tell me and I will forget. Show me and I will remember. Involve me and I will understand. Step back and I will act."

Besides group work, students are also asked to conduct their individual research project as final test. At the beginning of a semester and throughout the whole semester, the instructor guides students to develop their own projects. Students also have opportunity to share their projects in class and receive feedback from other students. By the end of the course, students should be able to develop a scholarly research proposal. As a research methodologist, I believe students need empirical research experience beyond conceptual understanding of research. My blended teaching provides them an opportunity to accumulate research experience.

**Table 2.2:** *Blended Course Syllabus: Quantitative and Qualitative Research Approaches*

| **Syllabus: Course Requirements** | |
|---|---|
| **Participation [10%]** | You are expected to attend and actively participate in class activities. Participation also includes reading the assigned texts in advance of each class, sharing your ideas during class discussions and completing assignments. |
| **Weekly Assignments [50%]** | Students will be asked to complete weekly assignments to indicate their learning process and understanding of the contents of the course. Feedback will be given timely from the instructor to students in order to help students improve/confirm their understanding of the coursework. Grading rubric is attached at the end of the syllabus. |
| **Online Discussion [20%]** | During the semester, you will be asked to participate in several online discussion activities. In general, the discussion board participation should serve to enrich the learning experience for everyone. Its primary purpose is for you to share thoughts, experience, and ideas with your peers. |
| **Final Test [20%]** | During the semester, students will be asked to generate a research proposal as the final test. The proposal should include (1) research purpose and research questions; (2) research design; (3) data collection techniques, and (4) data analysis techniques. |

### 2.3 Blended Teaching for Doctoral Graduate Students

Compared with master graduate students, doctoral students have knowledge foundation and some research experience. They need more time to conduct research under my instruction. Therefore, when I teach the doctoral level course of research design, I divide students into groups according to their research expertise, such as quantitative research group and qualitative research group. The two groups of students have separate online lectures with different foci. That said, students in quantitative group only need to attend the lectures of quantitative research, and do independent study during the lecture sections of qualitative research. In such case, students have more time to work on their projects. Beyond research projects, students in the same group are asked to study specific methods and present in class as a group. Such group activity is accounted as online sessions. I call it "independent work section". Students do not meet in classroom. They can work in groups wherever they prefer.

I give part of the course schedule as example. The sessions highlighted in blue indicating face-to-face lectures, whereas yellow or green indicating meeting online or independent study. In short, blended teaching is flexible due to the various formats of class. Students with different research interests also have more time to focus on their research methods. During a semester, I provide students with opportunities to work with me on their projects for conference presentation and or manuscript publication. The ultimate goal is to improve doctoral students' research expertise by individualized and flexible teaching style.

**Table 2.4:** *Course Schedule Example in Syllabus*

| Week | Date | Topics to be convered | Readings |
|---|---|---|---|
| 3 | 9/12/17 | **How to outline the Chapter of Introduction**<br>• Meet in person<br>• What should be included in Chapter Introduction? | |
| | 9/14/17 | **Literature review**<br>• ZOOM meeting online<br>• What is the role of literature review? | Creswell (2012) Chapter 3 |
| 4 | 9/19/17 | **Library work**<br>• Independent study/Group work<br>• How to use OU library for literature search? | |

| | | | |
|---|---|---|---|
| | 9/21/17 | **QUAN Group REQUIRED (QUAL group optional)**<br>• ZOOM meeting online<br>• QUAN Purpose Statement and QUAN Research Questions | Creswell (2012) Chapter 4 |
| 5 | 9/26/17 | **QUAN Group REQUIRED (QUAL group optional)**<br>• ZOOM meeting online<br>• QUAN Purpose Statement and QUAN Research Questions | Creswell (2012) Chapter 4 |

## 3. Students' Feedback on Blended Teaching

35 students from five courses over two years were interviewed about their perspectives on blended teaching. The interview was conducted via online discussion board. Open-ended questions were asked, such as what advantages could have blended teaching provided to you? How do you evaluate the effectiveness of blended teaching? Why do you like/dislike blended teaching?

According to the data, students like blended teaching or the online portion of blended teaching because (1) time is flexible to fit their busy schedule; (2) students prefer independent learning style; and (3) the course is designed well to fit their learning process. First, students appreciated the online portion of blended teaching that allowed them studying at their own pace. For instance, a few students indicated "I have 3 jobs and go to school full time so the flexibility of online courses is extremely valuable. " "I really enjoyed and needed the flexibility of the online portion of the class. This allowed me to devote the time to the class work when I could fit it into my schedule."

Second, students appreciated the opportunity that online portion provided in terms of independent learning. They mentioned "The course gives more time for independent study. " "Have the course as a hybrid allows for more independence." "Online portion of this course allows me to learn at my own pace and complete the assignments when it is convenient for me. I think it is often a more valuable use of time rather than spending four hours in a classroom once a week. The classroom meetings are also beneficial as they allow for collaboration among students and clarification of topics that may be difficult to grasp in a purely online setting."

"I really like hybrid classes because I learn well from the textbook and I feel like my time is being used efficiently.

Third, students valued the teaching style in terms of guiding them learning by doing by incorporating both in-classroom and online sessions. Some students addressed "the coursework and instructions have been clear and concise. I trust the professor has designed each meeting to incorporate important elements for students to takeway." "This class has approached hybrid teaching properly for the content." "I really like that this course allows about a week to complete each assignment and that new assignments are posted around the same time every week and feedback is always offered. Consistency is very important to me when it comes to online. "Group discussions and the weekly assignments were the most valuable course activities. The every week interaction online helped to keep up with the material and made it easier to understand." "The instructor did an excellent job of making the material manageable and enabled me to see its application throughout the course."

Meanwhile, some other students indicated their negative perspectives on blended teaching because they prefer classroom teaching. For instance, students indicated "More offline lessons are needed regarding statistical data analysis." "From a learning standpoint, I do not feel that I learn best from online courses. Face to face interaction and discussion is much more education for my learning style." "I personally prefer the personal connection of being in a classroom and that learning atmosphere best."

## 4. Discussion

According to students' feedback in teaching evaluation, although a few students do not think they have learned much during online sessions, the majority of students like blended teaching for research methods courses because (1) online and independent study sessions allow them more time to improve understanding, (2) online group work sessions give them the opportunity to use the concepts and test their skills, and (3) group work also highlights peer support so they can know what others do and learn from each other.

The author has reflected on the course design and online activities and draw the following conclusions. First, blended teaching requires much more effective lectures than traditional teaching approaches. Instructors' experience and teaching philosophy are very important when they design a blended course. Both face-to-face sessions and online sessions should be arranged appropriately to fit students' learning process. Using online sessions such as

group activities and independent study to facilitate students' understanding and application to practice. The portion of online sessions could vary between 30% to 70% according to course content. Second, blended teaching requires various technologies to design the online work. Technology integration could facilitate students' learning in a useful and meaningful way. Third, hands-on guidance should be provided to students who are used to classroom teaching. In most cases, students do not feel comfortable nor confidence about online portion of teaching. The instructor should guide the students use technology and provide help via emails or online meetings.

In all, the paper advocates blended teaching for research courses to provide students with opportunity to apply ideas to practice. Due to the limited time, the author did not conduct follow-up interviews to investigate how students' experience of blended teaching could be improved. Future research is needed to longitudinally study those students who have negative feeling on blended teaching. Such exploration could help instructors to design blended teaching efficiently.

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