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## Classrooms on the Frontier: Integrating Original Research into Lectures

Matthew D. Meng  
*Utah State University*

Lucas Rentschler  
*Utah State University*

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## Classrooms on the Frontier: Integrating Original Research into Lectures

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# Classrooms on the Frontier: Integrating Original Research into Lectures

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*By Matthew D. Meng, Ph.D., and Lucas Rentschler, Ph.D.  
Utah State University*

## Abstract

The role of an academic is often spread across two main areas: researching and teaching. Although some argue that the scarcity of time, energy, and commitment precludes the ability to do both well, and are therefore substitutes, we argue that these roles can be complementary. That is, by incorporating original research into the classroom, several benefits can be gleaned by both faculty and students. We feel that if done correctly, a professor's research and teaching can mutually benefit, as well. To illustrate and support this argument, we have included two specific examples of using original research to teach relevant concepts in the classroom.

## Introduction

Academics devote the bulk of their time to two areas: teaching and research. However, it is often the case that research and publishing are more influential in determining rewards and influencing salary decisions (Tuckman & Hagemann, 1976). Many people have pointed to the scarcity of time, energy, and commitment, and noted that devotion to research takes attention away from teaching (Fox, 1992; Trice, 1992). As a result, a common perception is that professors prioritize research to the detriment of their students: that there is a tradeoff in teaching and research quality.

Relatedly, Marsh (1984) posits that there exists a positive relationship between research ability and teaching ability. Indeed, some have argued that the skills and

qualities that lend themselves to good research also predict superior performance in the classroom (Jauch, 1976; Neumann, 1992). However, notwithstanding the positive correlation between abilities in these two arenas, Marsh (1984) suggests that there exists a negative relationship between time spent on research and time spent on teaching.

In this article, we will argue that these two important features of academic life (i.e., research and teaching) are complements and that if professors integrate their own research into their classes, there are benefits for both the students and professors. We are not the first to assert that integrating research into the classroom is beneficial. Brew (2006, p. xiii) convincingly argues that research and teaching ought to be tightly integrated, thus creating “inclusive scholarly knowledge-building communities in universities.” Smith and Rust (2011) propose that an undergraduate curriculum that focuses on direct student involvement in research would provide significant benefits for both students and faculty.

The opinions put forth by the authors are at this time backed by anecdotal evidence. However, we strongly feel that implementing the approach of bringing original research into the classroom will improve the classroom dynamic and yield better student outcomes. We feel that providing additional evidence is a fruitful avenue for future research.

## **Benefits to Students**

By bringing original research into the classroom, there are several benefits to the students. First, it allows students to see cutting-edge findings that are a part of an ongoing conversation, rather than simply “receive wisdom.” Second, works-in-progress can be presented to students, which allows them to be actively involved in the knowledge generation process in a low-cost and low-risk manner. Third, being close to this knowledge generation process makes it salient that answers are within reach. Students become encouraged and motivated after seeing how the process occurs and how answers can be generated. Fourth, by connecting our findings to practical outcomes, we are able to point out real-world implications. This demonstrates the value proposition for students, often something that is missed when learning theory. Fifth, by reducing social distances between students and “faceless scientists,” they are able to connect with the findings at a deeper level. Sixth, the

professor's expertise on their own research allows for a greater discussion and deeper probing by the students, which enables a level of insight that is not usually attainable in the classroom. Finally, exposing students to active research can make them realize that there are a lot of open questions, and much yet to discover. Understanding that knowledge gaps still exist makes the field seem more interesting and less intimidating.

## Benefits to Faculty

Similarly, there are several benefits to faculty of bringing their own research into the classroom. First, by presenting works-in-progress, faculty are able to elicit real-time feedback. This often results in students ruminating on the ideas presented, and suggesting research extensions or their own research questions. This can sometimes lead to co-authorship with motivated students. After presenting original research in the classroom, both authors have been approached by a number of students asking to learn more about the topics, sharing their own ideas, and volunteering to be involved in future projects. Involving undergraduate students in research has a positive effect on “fourth-year graduate degree aspirations” (Kilgo & Pascarella, 2015). Second, most faculty members are enthusiastic about their own research. This enthusiasm is often contagious in the classroom and also allows us to create interesting and interactive lesson plans. This results in a more enjoyable classroom experience for both faculty and students. Third, integrating one's own research into lesson plans may reduce preparation time because the materials are on-hand and familiar. Finally, including research in lectures allows faculty to practice presenting an idea in an accessible and compelling way, which can be used when presenting to professional and academic audiences.

## Potential Issues

Although there are many benefits to including research in the classroom, this approach is not without its caveats. First and foremost, the research needs to be relevant to the subject being taught. This is often not an issue for those teaching classes directly related to their area of expertise, as is the case for the current authors, but if there is not an obvious parallel between the class topic and the research, then students may become bored and unengaged. Second, it is important to ensure that

the main “takeaways” from the research are sufficiently general to appeal to all of the students. The point is to use our research to highlight and demonstrate larger concepts that fit within the theme of the course.

## Illustrations of Using Research in the Classroom

To illustrate how to incorporate original research into the classroom, we have included several specific examples. We provide examples of how research can be integrated into classes that focus on introducing students to analytical tools, such as statistics and game theory. We also provide examples of how learned knowledge and theories can be applied to solve real-world problems in the classroom.

### Economics Example

In an advanced statistics class, the focus is often on the statistical techniques, and it can be difficult to engage the class. To demonstrate the relevance of the material, as well as to provide an interactive classroom exercise, the second author uses data sets generated in economics experiments from his own research.

To illustrate, when studying linear probability models, in which the variable of interest is binary, the data set used in the classroom exercise involved an experiment investigating the determinants of entry into conflict games. The class first discussed the assumptions that would have to be made to use a linear probability model to answer this question. Afterward, students were asked to open the data in Stata (a statistical software package) and estimate the model themselves. They were then asked to interpret the results, and we discussed it as a class. This exercise demonstrated the value of the technique by showing how the professor used it in his own research. In addition, it reinforced the statistical method by having the students actually perform and interpret the results of the relevant statistical tests. It also provided an interactive dynamic to the lesson, which improved student engagement. Several students approached the second author after the class to ask about the research methodology, and to inquire about what related research was ongoing.

In a course on game theory, the focus is often on concepts of equilibrium, and how to solve for equilibrium in a particular game. To illustrate Bayes Nash Equilibrium, the second author provided the class with one of his manuscripts, which

derived Nash equilibrium in a particular type of incomplete all-pay auction. The class went through the analysis, which provided an excellent demonstration of the mathematical techniques involved in finding equilibrium in a larger class of games. The student's interest in this complex topic was heightened by the fact that this exercise demonstrated the value of the techniques (they were used to generate the manuscript), as well as by the professor's enthusiasm for the topic. In addition, once students understood the process, they became excited by the fact that extensions they proposed had yet to be answered, and that they now had the tools that would allow them to address them.

## Consumer Behavior Example

In a consumer behavior class, there is a continual discussion of the importance of research. That is, researching consumers can reveal paths forward when making marketing decisions. However, many students do not initially make the connection between research, knowledge generation, and fact-based decision making. The first author brings his own research into the classroom to illustrate this.

Beginning with the broad question "Is paper recyclable?," 100% of the students will raise their hand to indicate "yes." This question is followed by statistics that reveal that 25% of paper that is disposed of is not recycled (EPA 2010), and 60% of what is in landfills could have been recycled (EPA, 2013). Conversation is then steered towards why recyclable materials might end up in the trash. The first factor discussed is a lack of education or knowledge (Andrews, Gregoire, Rasmussen, & Witowich, 2013), but in situations where the vast majority of consumers are aware that paper is recyclable, this is less of an issue. The second factor is effort (Ludwig, Gray, & Rowell, 1998). That is, is it too much effort for people to go out of their way to recycle a product? However, most trash cans have a companion recycle bin next to them, meaning effort is less of an issue in modern society. This is when students are lead to think about what else could explain why consumers dispose of known recyclable products, and thus, explicitly draw attention to a formulated research question.

Discussion then switches to specific research projects undertaken to address this question. The project reveals that when a product has been distorted (e.g., crumpled or torn paper, crushed soda cans), it is less likely to be recycled because it is incorrectly viewed as being less useful and therefore erroneously categorized as "trash" (Trudel & Argo, 2013; Trudel, Argo, & Meng 2016). To directly connect this finding to the

marketing world, examples of an advertising campaign run by Coca-Cola that uses crushed cans in order to encourage recycling are shown. Students are often inspired by seeing the direct connection with original research and a large company's decision making.

The distortion example above reflects how a tangible aspect of a product can influence when/if it is recycled, whereas the second example focuses on an intangible aspect of the product. Specifically, the second project reveals that consumers are more likely to recycle a product if it reflects part of their self-identity (e.g., social roles, personality traits, and defining characteristics that express who we are); otherwise, they would be “trashing” a part of their “self” (Trudel, Argo, & Meng 2016). This section begins by establishing that physical and digital representations of aspects of their self-identity can be imbued with deeper meaning. That is, products that reinforce or express part of an individual's self-identity are connected to the individual via a “possession-self link.” After discussing individual experiments and the findings, the class is asked how this information can be used in marketing to encourage recycling. This allows students to solve a recognized problem using a new concept.

Finally, as a more practical, applied example, a project that uses emoticons (e.g., red frowny faces) to activate an injunctive norm (e.g., that “trashing recyclable products is unacceptable”), which results in an increase in recyclable materials being placed in the correct bin is discussed. The lesson is concluded by summarizing how consumers disposing of products is an important area to consider, and how we can use consumer behavior knowledge and research to encourage positive behaviors.

## Conclusions

While it may seem daunting to plan lessons using research on the frontier of individual discipline, we have found that such research can be integrated into a wide variety of classes in a way that adds value for students. In particular, the research of the professor can be used to reinforce the learning objectives of the class in a novel and engaging way.

It is important to tailor the level to the students. In our view, it is less important that students completely understand all aspects of the research discussed than it is to engage students in the research itself, even if at a relatively superficial level. In fact, if

part of the research is too advanced for students, instructors can highlight this in class, and use this to interest students in future classes.

In this paper, we have highlighted the benefits of integrating one's own research into the class. However, it is important to note that many of the benefits to students can also be realized by discussing research at the frontier done by other academics. One approach that is particularly appealing is discussing the research of faculty at the lecturer's home institution, not least because the researcher can come to the classroom to discuss the topic with the students in person.

There are many implications of introducing your research into the classroom for future classroom practice. However, we would like to highlight two that seem like particularly interesting avenues to explore. First, our approach suggests designing lesson plans with your research in mind. That is, to actively look for ways that your research can enhance your classroom dynamic. We feel that this could be taken a step further so that individual research becomes part of the classroom dynamic. For example, professors could bring research questions to the class and design lesson plans about answering these questions. This could involve, for example, designing a statistical plan of analysis for a data set or formulating experiments to address research questions. This deeper integration would directly involve students in the knowledge generation process.

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