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Introduction

Elite universities often receive massive grants from the Federal and State Governments due to their immense amounts of research in various fields. This research helps further the efforts of academics and contributes many positive features to different realms of research. Large research grants foster even larger enrollment numbers because the size and reputation of the University grows with each new publication and contribution made by faculty.

As research expectations for university faculty increase, the competitiveness of faculty positions also increases. Faculty members are expected to produce research and are often hired for their prior research productivity (Prince, Felder, & Brent, 2007). Faculty members have been pressured to produce contributing research pertaining to their fields and, therefore, place a significant amount of importance on their research. This recurring trend regarding academic research is often justified by the claim that research enhances teaching quality and instructional delivery for the students (Prince et al., 2007).

Statement of Purpose

Academic research is becoming increasingly more important at large public and private universities. This informational report seeks to examine and analyze the literature regarding the relationship between academic research and the quality of instruction.

The Relationship Between Research and Instruction

For most academic staff, their primary allegiance is directly tied to their field of study or profession; the institution they work for is typically considered secondary (Healey, 2005). As competition and demand for teaching positions increases, major public and private universities have been requesting staff and faculty members who excel in research (Prince et al., 2007). But, as students enroll in large universities for their reputation and brand name, some question the quality of instruction they are receiving, believing faculty members have become too enthralled with the research aspect and have neglected classroom teaching and student learning.

A Negative Relationship

A long-standing debate exists pertaining to whether or not "research productivity in the faculty incentive and reward system is often justified by the claim that research enhances teaching" (Prince et al., 2007, p. 283). Feldman (1985) searched for a connection between research productivity or scholarly accomplishments of faculty members and their teaching effectiveness as assessed by their students.

Feldman found that the link between research productivity and instructional quality is extremely small, if it exists at all. Additionally, many researchers believe there is a negative relationship associated with research and teaching. Over fifty years ago, Moore (1963) expressed the scarcity model that "given the scarcity of time and energy, the probability of role conflict for the multiple joiner is somewhat more than abstract and hypothetical" (p. 108). Following this logic, the relationship between academic research and quality of instruction is negative or at least unrelated. Because professors who conduct research spend a great deal of time producing valuable research, they automatically spend less time on classroom instruction and teaching responsibilities than they would have had they not been involved in research. Some even went as far as to say that research and instruction are completely different and separate from one another and are even at odds with the other (Fox, 1992).

Callaghan and Coldwell (2014) conducted an exploratory quantitative cross-sectional research study of a university in South Africa to determine the satisfaction levels of professors. They found that professors who derived their primary job satisfaction from teaching were much less productive in the research labs when compared to professors who were more satisfied from research. Faculty members, who receive salary increases and promotions in the academic hierarchy because of their research, are much more likely to conduct more research (Callaghan & Coldwell, 2014). Because teaching and research are both highly demanding tasks that require a significant amount of labor, it is very challenging for a faculty member to excel at both research and instruction due to the strict demands of both realms (Trice, 1992).

The Differential Personality Model also proposes a negative relationship between academic research and quality of instruction. The model highlights the personality traits of an effective teacher as one who seeks out company, handles pressures, ignores distractions, prefers communication with students, and enjoys manipulating ideas (Arif, Rashid, Tahira, & Akhter, 2012). Alternatively, researchers are more prone to desire to work alone; become easily irritated from distractions; develop frustration with external pressures; and favor ideas, facts, and materials of a discipline rather than working with students or teaching classes (Arif et al., 2012). This model purports that teachers are unable to adopt to a personality that requires demands from both the research and classroom domains.

The Divergent Reward System Model suggests that research and teaching are conflicting roles with unique expectations and obligations. The role of the teacher and the role of the researcher are in constant strain that involves an apprehensive division of labor, necessitating trade-offs at the expense of the other (Fox, 1992; Hattie & Marsh, 1996).

A Positive Relationship

While several models exist that allege a negative relationship between academic research and instructional quality, several models assert a positive relationship between the two realms.

The Conventional Wisdom Model argues that teaching and research are positively correlated and the relationship between the two are mutually enriching (Neumann, 1992). Teaching and research, in practice, often merge in the university environment and facilitate achievement in both domains. The relationship operates as the “tangible connection relating to the transmission of advanced knowledge, the intangible connection relating to the development in students of an approach and attitudes towards knowledge and a stimulating and rejuvenating milieu for academics, and the global connection relating to the interaction between teaching and research at the departmental as well as the individual level” (Hattie & Marsh, 1996, p. 511).

Jauch also found the relationship between researching and teaching to be linked a bit differently. A professor who expresses an active interest in research is a more effective teacher while a "good teacher" does not influence the quality of research (1976).

Additionally, the "G" Model proposes a positive relationship between academic research and a high quality of instruction (Hattie & Marsh, 1996). The "G" Model reasons that the positive relationship between research and teaching lies in the inherent abilities one must possess to succeed at either. A high performing researcher will possess traits resembling high levels of commitment, perseverance, dedication, hard work, and other positive academic study attributes. Likewise, a high performing teacher will possess similar characteristics (Hattie & Marsh, 1996).

No Relationship

The previous two sections have assumed that a relationship exists between professors conducting academic research and the effect their research has on their quality of instruction. While several models exist both supporting and opposing a positive or negative relationship between the two domains, other models purport that no relationship exists.

The Different Enterprises Model contends that research and teaching are entirely different enterprises that bear no effect on one another (Hattie & Marsh, 1996). "Research relates more to the discovery of knowledge usually by normative means within various disciplines; whereas, teaching involves imparting information leading, it is intended, to student learning" (Hattie & Marsh, 1996, p. 513). Rugarcia (1991) explained how researchers are valued for what they discover, while teachers are valued for what they enable their students to discover.

The Unrelated Personality Model also suggests that no relationship exists between the two different domains. This model is based on the belief that researchers and teachers are different types of people, and very few personality attributes overlap (Hattie & Marsh, 1996). Researchers are more likely to be ambitious, enduring, definitive, dominant, aggressive, independent, and unsupportive; whereas, teachers are more liberal, sociable, extroverted, calm, objective, supportive, intelligent, and aesthetically sensitive (Hattie & Marsh, 1996).

Brew and Boud (1995) portrayed a different perspective than any of the aforementioned theories. They recognized previous scholars' attempts at discovering a connection between research activities and teaching performance and acknowledged the current the debate regarding both schools of thought as not fruitful. In addition, they explained how, if there was a link between conducting research and instructional quality, it exists only in the sense that both research and teaching involve learning (Brew, 2003; Brew & Boud, 1995). Brew and Boud continued to explain how a greater emphasis must be placed on the ways in which knowledge is generated and communicated; the aspects of both research and instructional quality of learning are the realms that are important. The focal point of their study was to show the missing link between academic research and any positive or negative effect it may have on teaching due to the differing conceptions of the two domains and how vastly different they are from one another (1992).

While there are many models and theories surrounding the relationship between academic research and instructional quality, there is also much research about how the two realms interact. The following

section attempts to discuss recent developments in the literature regarding the effects of research in the classroom.

Models That Propose Mediating Variables

Thus far, this report has discussed models and theories that purport a negative, positive, or neutral relationship between academic research and quality of instruction. Hattie and Marsh (1996) alluded that some of the aforementioned models were too simplistic and based only on two variables. The lack of creativity and forward thinking was argued when they proposed a model that included mediating variables that support the inconsistencies and remove the reliance on only two small variables. Marsh (1979) created the following model to help explain the mediating variables responsible for the relationship between academic research and instructional quality as illustrated in Figure 1.

As Marsh and Hattie (1996) explained "via the model, the abilities to be effective at teaching and research are positively correlated; time on research and time on teaching are negatively correlated and

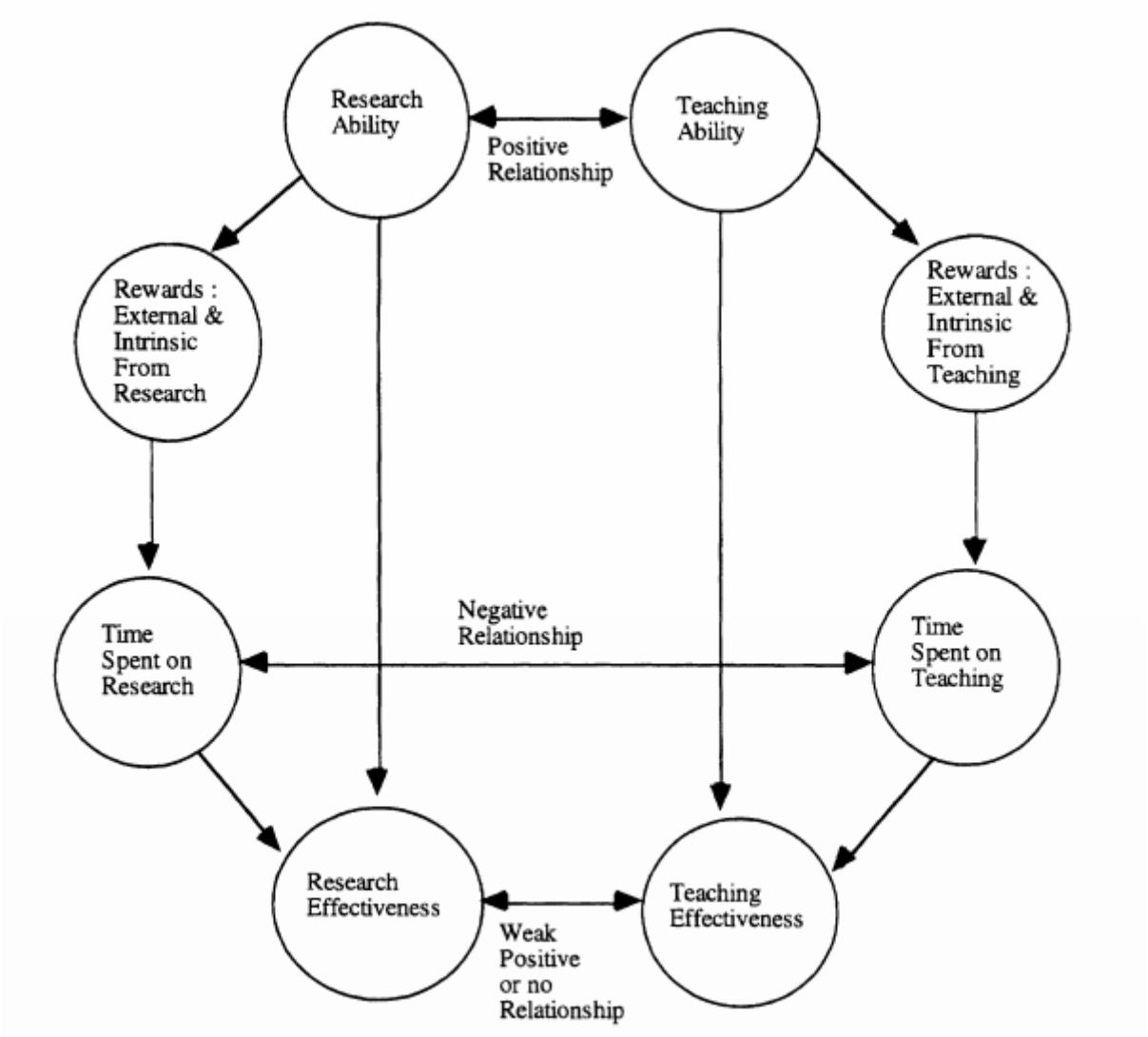

Figure 1. Marsh's Differential Variables Model (1979).

may in turn be influenced by a reward structure that systematically favors one over the other; effectiveness in both teaching and research is a function of both ability and time; and the positive relation between abilities in the two areas and the negative correlation in time spent in the two areas will result in little or no correlation in measures of effectiveness in the two areas" (p. 515).

As is clearly represented by Marsh's model, potentially many more variables influence the relationship between academic research and quality of instruction than the previously mentioned theories. Henceforth, after Marsh (1979) pioneered the Differential Variables Model, Friedrich and Michalak (1983) were influenced to create an Intervening Variables Model.

Friedrich and Michalak (1983) proposed a model to better explain the zero relationship between academic research and instructional quality. First, realizing that most empirical studies had shown little to no relationship between the two domains, Friedrich and Michalak were unsatisfied with the reasoning behind the results (Hattie & Marsh, 1996). They were not content with the measurement of teaching quality (as determined by surveys completed by the students) because they did not account for personality differences; Friedrich and Michalak thought the sampling pool that other researchers used was too general and not representative; they wanted to pursue the premise that teaching and research were related due to the idea that participation in research mutually supports teaching, and vice versa (Hattie & Marsh, 1996(. Therefore, Friedrich and Michalak developed the Intervening Variables Model as shown in Figure 2.

Friedrich and Michalak (1983) found that students viewed professors who conducted research as expecting more from them, assigning lower grades, and requiring more work. Additionally, professors who actively engage in research were not considered less interesting or less enthusiastic than professors who did not actively conduct research (Friedrich & Michalak, 1983). In summation, they did not find sufficient evidence to support their model.

Despite which theory or model best represents the relationship between academic research and instructional quality, it is important to acknowledge the other benefits of introducing empirically-based research in the university classroom.

Research in the Classroom

As previously discussed, more and more college professors are attempting to conduct research. While the duty of the college professor extends beyond research and into the classrooms, frequently both dimensions interact. The professor may seek to utilize his or her current research to provide students with more learning resources.

Colbeck (1998) sought to discover how faculty integrate teaching and research and to identify the contextual conditions that either augment or limit integration. Colbeck concluded that it is difficult to bring research into the classroom when the professor's field of study is much too difficult for the general student to comprehend (1998).

Several studies have been conducted that relied heavily on self-report measures given to students of professors who consistently conduct research and attempt to incorporate the research in their lesson plans. Neumann (1994) conducted several student case studies analyzing the connection between teaching and research. The results of the studies showed that nearly all students had experienced a relationship between the teaching and research roles of academics and that students' felt as though

integrating research helped instructors impart a positive and inquisitive approach to learning (Prince et al., 2007). Another positive aspect associated with teachers being involved in academic research is the potential for their students to have exposure to empirical analysis.

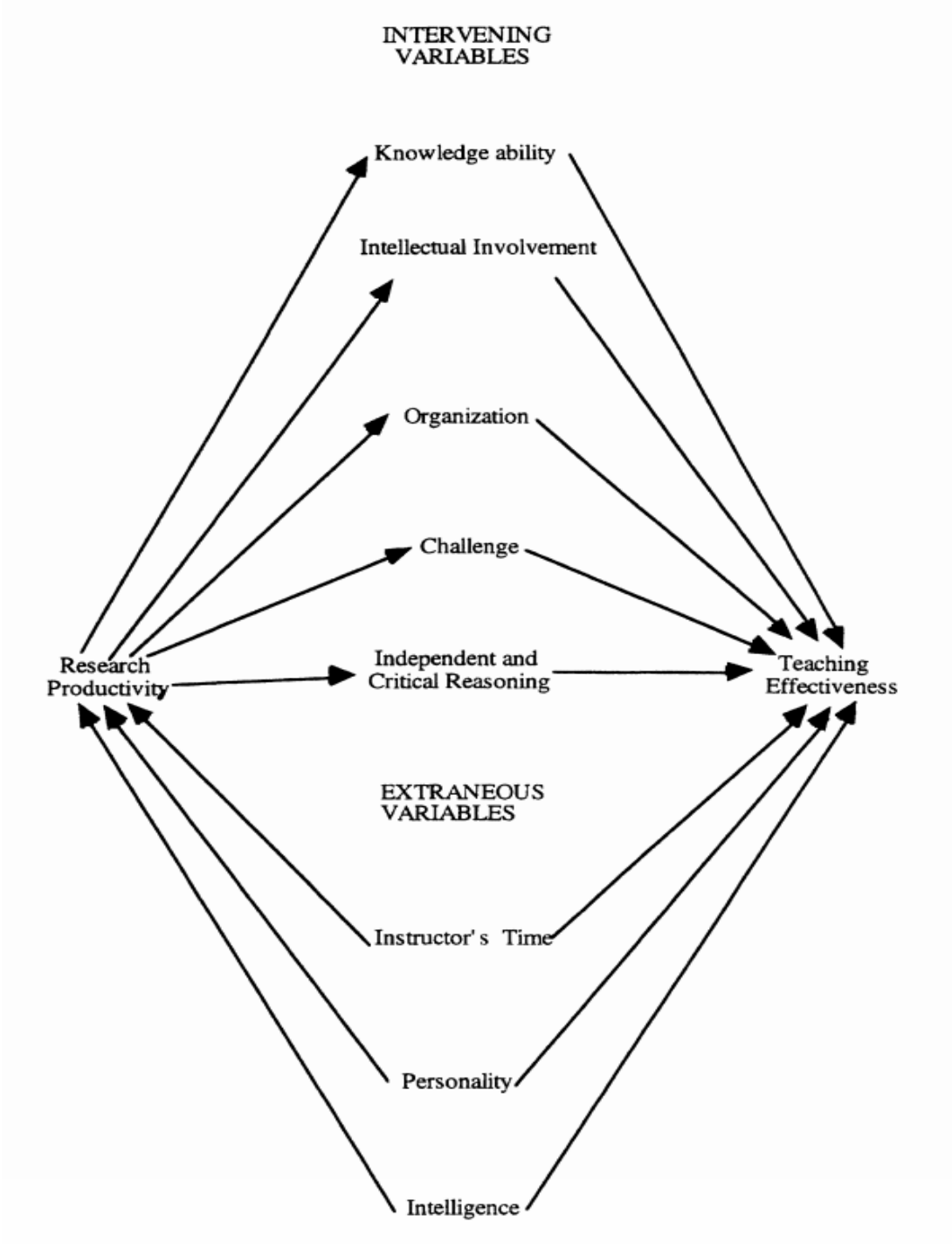

Figure 2. The Intervening Variables Model posited by Friedrich and Michalak (1983).

Because the research process is rather obscure to many students, experienced researchers' consistent interaction may help direct students' interests by steering them to higher levels of thought and critical thinking. Prince et al. (2007) referred to this instructional strategy as inductive teaching. First, the students are presented with a question or problem to be solved and are asked to think critically about it. As students face the challenge and attempt to answer the question or solve the problem, the professor guides the students' thinking until they solve it together by creating an observational or experimental setting to facilitate increased understanding and achieve more clarity about the problem's complexity. As a result, Prince et al. (2007) proposed that "skilled faculty researchers could take the methods they use in their scholarly activities and translate them into an inductive teaching environment by borrowing elements of their own research or choosing challenges more appropriate to the subjects and levels of the courses they are teaching" (p. 285).

Further, Badley (2002) explained how both research and teaching are both considered methods of inquiry if the traditional model of instruction is ignored and information is delivered in a more inductive teaching approach. Students interested in research would greatly benefit from this method of learning and would only be able to partake in this method if the faculty member has been actively involved in his or her own academic research.

Tension Between Academic Research and Instructional Quality

As this discussion has already made apparent, tension exists between research and teaching expectations. The competitiveness of the current market for professorships and teaching positions has caused hiring officials to focus more primarily on previous research accomplishments as opposed to student evaluations of teaching methods or effectiveness (Serow, 2000). The shift in importance from teaching standards to research productivity is a demand for some institutions designated as research universities and can have a negative effect on instruction (Serow, 2000).

Glassick, Huber, and Maeroff (1997) explained how these large universities, funded by external sources and compensated heavily for their research, product development, and other consultancy contributions, have created special awards for outstanding teaching. Many universities have established resource centers for students to seek help outside the classroom, enforced minimum teaching standards for promotion and tenure, and increased the instructional load of some faculty members to help increase the quality of instruction.

Serow (2000) conducted a case study involving undergraduate professors at a research institution. The samples were cross-classified along two dimensions: their own adaptation to the reward structure, as indicated by their five-year records of research, and individuals' stated attitudes and beliefs toward the teaching and research roles. Serow explained how professors enjoyed autonomy unseen in many other professions and how that independence contributed to their preference for conducting valuable research. Further, Serow detected a trend in the older, more experienced faculty who valued the idea of teaching to undergraduate students, while newer professors enjoyed conducting research and viewed teaching as a secondary task behind producing valuable and noteworthy research (2000).

Summary

While the trend and job duties of the professoriate change, so does the relationship between academic research and the quality of instruction that students receive. Many theorists hypothesize varying models and have conflicting ideas regarding whether the relationship is positive, negative, or nonexistent; some

assert that other unforeseen variables, which we have yet to measure, intervene. As competition thrives for current and future higher education professors, research continues to be vital to ensuring survival.

The field of research brings awareness, brand recognition, and federal and private funding. Even though the relationship between academic research and instructional quality is still debatable, the professor's inclusion and discussion of research findings in the classroom does offer advantages to aspiring students curious about the methodology of study.

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