

# WOMEN OF FAITH IN SCIENCE: THE DOUBLE GLASS CEILING

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## Abstract

The majority of female pre-service elementary school teachers pursuing licensure is choosing English as their cognate rather than mathematics or science. The reason females are not choosing science as their cognate may be due to the fact that science has long been considered a masculine pursuit. To complicate the issue, pre-service female teachers of deep religious faith are further challenged to navigate the dichotomy of science and religion. As a result, women, and especially women of deep religious faith, are at risk of not participating in science studies. The author suggests that there is room in the science classroom for open dialogue with students regarding the distinction between science and religion. This dialogue may help students, especially women of faith, gain a deeper understanding of the nature of science and encourage participation in science.

## Introduction

During Summer 2013, science educators at the collegiate level from across Virginia participated in the VISTA Science Education Faculty Academy at George Mason University. As a group, we engaged in a weeklong series of activities that facilitated learning and discussion related to the challenges and future of science education.

During the Academy, a particular session piqued my interest. The session addressed the concept of social justice in science, and I began thinking about the very nature of science and how individuals from different cultures, religious backgrounds, and genders participate in science.

As the father of a high school daughter who has expressed an interest in pursuing a degree in chemistry, I began to reflect on the challenges females face in the field of science. I started exploring the literature regarding the history of women in science. In a historical analysis of education, gender and science, Watts points out that gender assumptions have “long kept women on the margins of science” and that “the past has long tendrils into the present” [1]. It appears that these tendrils could still be affecting female students.

For example, as a professor of education at a private evangelical Christian university, I noticed that the majority of female pre-service elementary school teachers pursuing licensure was choosing English as their cognate rather than mathematics or science. In a conversation with one of my female students who had recently graduated from a public school for gifted and talented students in science, mathematics and technology, I was intrigued by the numerous advanced placement and dual enrollment courses she had taken in science. When I asked why she was not considering becoming a science teacher, she simply said, "I don't like science." As a result, the student decided to choose English as her cognate. In discussions with colleagues from other universities, a similar phenomenon had been observed. However, my situation appeared somewhat unique in that, not only were the majority of my students female, but being from a Christian university many of my students had a deep religious faith. Watts touched on the issue of religion by pointing out that a woman's success or even willingness to try to succeed in the sciences was greatly influenced by where she came from: class, family, networks, and religion [1].

I began to wonder how female students of deep religious faith, regardless of religious affiliation, navigate science. It appeared that not only did young women of faith have to acclimate to a discipline that had long been considered a "masculine" pursuit, but they were further challenged to reconcile the dichotomy of science and religion [1]. The battle between science and religion is often played out in the media. For example, the well-known scientist and biologist Richard Dawkins in an editorial to *The Independent*, a British national morning newspaper, decried his opposition to religion by stating, "Even the bad achievements of scientists, the bombs and sonar-guided whaling vessels, work! The achievements of theologians don't do anything, don't affect anything, don't achieve anything, don't even mean anything" [2]. This type of rhetoric may cause people of faith to have a negative attitude toward science. In their case study, Roth and Alexander examined students taking physics at an all-male Christian boarding school and reported that the students made the following statements about their beliefs:

- "Religion and science do not connect."
- "Physics offends my beliefs."
- "Science completely goes against what God created."
- "In science, I feel like I am drawn away from religion" [3].

The tension between science and religion is real among students. Understanding how students negotiate their religious beliefs with science must continue to be explored; however, the deeper issues of how females navigate the religious and gender bias imposed by science may prove to be more problematic. In a sense, women of faith are faced with a double glass ceiling.

The glass ceiling is an analogy that refers to an artificial barrier placed above women and minorities who try to advance in a profession. The first glass ceiling most women in science must overcome is navigating a predominantly masculine profession. As reported by *USA Today Magazine*, women in science often experience significantly lower salaries as compared to their male counterparts, and often have limited access to upper management positions within their organizations [4]. To complicate matters, women of deep religious faith pursuing the sciences are further plagued with a tension between science and religion, and must reconcile their religious beliefs with those of the scientific community [5]. Science and religion are often in stark contradiction, creating a second glass ceiling for women of faith to overcome.

### **The Literature on Women of Faith in Science**

Though scarce, the literature does touch on the issue regarding women of faith in science. For example, Astley and Francis conducted a quantitative study exploring the relationship between attitudes toward religion and science among 187 female students attending a series of lectures at the North of England Institute for Christian Education study day. A negative correlation was found between science and religion among female students. The study provided evidence that the more religious the female student, the less positive her attitude toward science [6].

In a similar study, Levesque and Guillaume surveyed 375 female students enrolled in teacher education courses at California State University regarding issues of religion and science. Specifically, the researchers were looking at the theory of evolution. They found that female students with a “strong belief in God, an exclusive view of salvation, and a literal reading of the Bible” were found more prone to reject the theory of evolution. The authors tried to reconcile their finding by stating that “religious faith need not be an obstacle to accepting the scientific theory of evolution” [7]. The statement is problematic in the sense that the authors’ expectation is “acceptance” of the theory rather than just understanding the theory.

In an ethnographic study, Brandt described the experience of Deborah, a Native American woman, in an undergraduate biology program at a university in the southwestern *United States*.

The study addressed the issues of language, power, and authority and how Deborah had to accept the “game rules” of scientific discourse while negotiating her Native American heritage with that of Eurocentric science [5]. In a conversation with her mother, she expressed her frustration which was grounded in her Native American spiritual beliefs:

Well, in our Navajo way of thinking, I was trying to tell my mother about the atom and molecules, and all this and she looked at me like I was crazy. And I’m like, “you know, this is what I’m learning!” You have to go through so much explaining. “Here’s our body, the organ systems, the heart. Within our heart are tissues . . . [w]ithin that are cells and ... [t]here are molecules that make up the cells, and within that are the atoms.” It can’t be seen! But that’s our whole makeup! ... And she’s looking at me like I’m crazy, because our Navajo creation story is similar to Adam and Eve ... So I’m trying to explain it! [5]

These studies are not presented to debate the origin of life, but to demonstrate that there is a distinct population of females who hold deep religious views that sometimes contradict that of science. This form of double jeopardy may further discourage young women of faith from pursuing the sciences. Brandt points out that Eurocentric science may put up artificial barriers that exclude people of various cultures and religions from participating in the sciences by dismissing other ways of knowing; this may often cause confusion and anxiety within students [5].

### **Social Ramifications of the Issue**

Socially accepted ways in how we act, think, feel, and believe play an important part in finding self-identity and how a person fits into socially meaningful groups [5]. Changing one's identity to be able to participate in deposing groups may be too much to endure for some students. Furthermore, there are particular social stigmas attached with a particular way of speaking, acting, believing, or performing among peers.

In his study of minority students and their involvement in high school science classes, Brown argues that participation in scientific discourse carries considerable social risk, especially among students in the minority who constantly have to negotiate their relationship with teachers, classmates, family, and community. This social process is marked by “assimilation and resistance” [8]. In order to survive, students must have the ability to perceive the values and

norms that govern acceptable behavior at each location or social setting [5, 9]. What is acceptable belief and discourse within a religious community may not be acceptable within the science classroom and vice versa. As a result, women, and especially women of deep religious faith, are at risk of not participating in science.

### **Conclusion**

As a society, we cannot afford to allow any voices, regardless of culture, religious background or gender, to be silenced with respect to scientific discourse. To hear these different voices, both the formal and informal power structures must be sensitive to the past bias that still inhibits women from pursuing science. Moreover, acknowledgment of the ongoing tension “between religious and science fundamentalism” must be addressed [10].

I believe that there is room in the science classroom for open dialogue with students regarding the distinction between science and religion. Furthermore, as an educator, my experience has been that classroom discussion regarding science and religion has proven to be beneficial in helping students gain a deeper understanding of the nature of science. Simply, the nature of religion should not be taboo as a discussion topic. When handled in a respectful and professional manner, it can provoke deep thought and challenge students to see the limitations of both science and religion in how each answers a particular question. My hope is that all students, and especially women of faith, will become active participants in scientific discourse and active members of the scientific community.

## References

- [1] R. Watts, "Whose Knowledge? Gender, Education, Science, and History," *History of Education*, **36**(3) (2007) 283–302.
- [2] R. Dawkins, "Letter to the Editor," *The Independent*, March 20, 1993.
- [3] W.M. Roth and T. Alexander, "The Interaction of Students' Scientific and Religious Discourses: Two Case Studies," *International Journal of Science Education*, **19** (1997) 125–146.
- [4] "Talented Women Still Hitting Glass Ceiling," Society for the Advancement of Education, *USA Today Magazine*, January 1, 2012.
- [5] C.B. Brandt, "Scientific Discourse in the Academy: A Case Study of an American Indian Undergraduate," *Science Education*, **92**(5) (2008) 825-847.
- [6] J. Astley and L.J. Francis, "Promoting Positive Attitudes towards Science and Religion among Sixth-form Pupils: Dealing with Scientism and Creationism," *British Journal of Religious Education*, **32**(3) (2010) 189–200.
- [7] P.J. Levesque and A.M. Guillaume, "Teachers, Evolution, and Religion: No Resolution in Sight," *Review of Religious Research*, **51**(4) (2010) 349-365.
- [8] B.A. Brown, "Discursive Identity: Assimilation into the Culture of Science and Its Implication for Minority Students," *Journal of Research in Science Teaching*, **41**(8) (2004) 810-834.
- [9] G.S. Aikenhead and O.J. Jegede, "Cross-Cultural Science Education: A Cognitive Explanation of a Cultural Phenomenon," *Journal of Research in Science Teaching*, **36**(3) (1999) 269-287.
- [10] F. Cho, "The Limits of the Buddhist Embrace of Science: Commentary on 'Compassion, Ethics, and Neuroscience: Neuroethics through Buddhist Eyes,'" *Science and Engineering Ethics*, **18**(3) (2012) 539–542.