What Motivates STEM Students to Want to Try Teacher Recruiting Programs?

James Kunz, Keith Hubbard, Lesa L. Beverly

Teacher shortages in the US have continued for decades (Aragon, 2016; Howard, 2003). More students are being taught by unqualified teachers as a result, and low-income and minority students are disproportionately affected (Carver-Thomas & Darling-Hammond, 2017). In addition, demand for teachers is projected to continue to substantially exceed the supply of teachers until at least 2021 (Sutcher, Darling-Hammond & Carver-Thomas, 2016). Moreover, teacher shortages are most common for teachers of STEM subjects (Interim Study Committee, 2015).

Consequently, new programs aimed at recruiting students who are not in teacher education have been designed and implemented to counter this challenge (Hubbard, Embry-Jenlink & Beverly, 2015). In order to maximize the potential of such programs in recruiting more teachers and increasing their desire to teach, a deep understanding of potential teachers' motives for teaching must be achieved. Of particular interest in this study is understanding the motives of students majoring in biology, mathematics and other STEM disciplines who are considering teaching. Understanding teacher motives will do more than merely improve teacher-recruiting. Watt et al. (2012) have suggested that a deep understanding of motives of new teachers can also help increase retention by helping administrators know how to prevent decreased interest and motivation in new teachers. We now turn to motivation for teachers more broadly.

In order to recruit the most effective teachers, it is useful to understand what can motivate them to start their own path to teaching. In prior teaching literature, the primary motives for teachers have generally been broken into three categories, which include intrinsic, extrinsic, and altruistic types of motivation (Yüce, Şahin, Koçer & Kana, 2013; Jungert, Alm & Thornberg, 2014; Heinz, 2015). Those with intrinsic motivation enjoy the characteristics of the job in and of itself, such as the content they teach, and/or teacher roles such as teaching and lesson planning.

Those with altruistic motivation enjoy the service-oriented aspects of teaching or the broader idea of contributing to society. Extrinsic motivation is different from the other two primary motives in that it is rooted in characteristics that are not inherent to the job itself, such as job security or salary.

Not surprisingly then, the extrinsic motive is more common in developing nations compared to the United States, plausibly because there is a greater urgency for resources (Bastick, 2000; Watt et al., 2012). However, in developed countries such as the United States, the altruistic and intrinsic motives are the two biggest (Bastick, 2000). The desire to care for others has also been found to be a substantially higher value for those who want to go into the profession of teaching compared to those who prefer not to (Kyriacou & Coulthard, 2000).

As a further matter, the altruistic motive may be even more pronounced among millennials. In order to find work that matches their values, more than half of millennials said they would take a pay cut (Zukin & Szeltner, 2012). Moreover, after an organization's primary purpose and workplace culture, its volunteerism program was highly valued as the third most important factor for millennials considering potential employers (Feldman et al., 2014). A desire to "use their skills for good" was also found among 94% of millennials surveyed (Feldman et al., 2014).

The fact that the altruistic motive is arguably the most common motive overall is encouraging. This is because the altruistic motive was found to be the only type of motive negatively related to dropout in pre-service teachers (Ingersoll, 2001; Jungert et al, 2014). Additionally, the altruistic motive in teachers has been found to impact teacher-student interactions, which lead to better student outcomes (Cadima, Leal & Burchinal, 2010). Yet, Sinclair (2008) has noted that it is common for there to be considerable overlap of different types

of motivation among teachers.

In fact, despite the altruistic motive plausibly being the most common, nearly all (96%) teachers say they love to teach, which could be considered an intrinsic form of motivation (Wadsworth, 2001). The fact that intrinsic motivation is so widespread is also encouraging since intrinsic motivation is associated with autonomy, or, the freedom to begin and control one's behavior. This type of perceived freedom among teachers is associated with greater teacher and student outcomes (Kim & Cho, 2014; Roth, Assor, Kanat-Maymon and Kaplan, 2007). As noted, teacher shortages are especially common for teachers of STEM subjects (Interim Study Committee, 2015). Thus, to reduce teacher shortages within STEM subjects, research must include STEM majors interested in teaching while assessing motives.

Method

The goal of the present research was to better understand the motivations for teaching within a group of STEM majors participating in a teaching job shadow experience. The research questions investigated the teaching motives of STEM majors before and after their job shadow experience and sought to understand the impact on the motives of STEM majors following a teaching job shadow experience. Participants for this qualitative combined-case analysis consisted of a non-probability sample of 40 undergraduate STEM majors across two cohorts for the same teaching job shadow experience that lasted five days. Participants were recruited from a local university and surrounding community colleges.

As part of the job shadow, the students completed journal entries daily, which included questions that gauged job shadowers' motivations for teaching before and after the job shadow. The journaling was completed by job shadowers while outside of the school environment. Analysis centered on two different journal prompts. The first prompt (summarized in Table 1),

posed a day prior to the job shadow, was, "What are you most looking forward to about spending a week shadowing a teacher?" The second prompt (summarized in Table 2) was asked on the last day of the job shadow experience: "What has been the most rewarding part of your week in the classroom?"

Journals were collected, scanned and transcribed. The lead researcher then examined the entries for emerging themes in order to establish a qualitative codebook by which two independent researchers coded the entries. The initial coding uncovered responses in the intrinsic motivation (e.g., wanting to teach the material) and altruistic motivation (e.g., wanting to help students) categories, which were consistent with Bastick's (2000) findings for developed countries. However, the initial coding did not find any responses fitting the extrinsic type of motivation (e.g., wanting to participate in the job shadow for financial reimbursement) in response to either question. This is interesting in light of its frequent occurrence in the literature (Yüce et al., 2013; Jungert et al., 2014; Heinz, 2015). Instead, a pattern appeared in which vocational search-based motivations (e.g., wanting to participate in the job shadow to see if teaching is the right career) were found among journal entries, which was consistent with the work of Kyriacou and Coulthard (2000). They suggested that research must be conducted to better understand the motives of students searching to self-identify with a particular vocation, particularly examining the teaching vocation. Thus, a heuristic codebook was created for external coders, which included intrinsic, altruistic, and vocational-search based motives.

External coders were trained on the heuristic created from the initial coding and a second-level of coding by the external coders was conducted on answers from job shadowers for each question. The external coders had strong agreement - for over 80% of journal responses to each question, the job shadowers agreed on what category (e.g., intrinsic motivation) the response fit

under without influence from the other coder. According to Frey, Botan and Kreps (as cited in Neuendorf, 2002) these percent agreements are considered acceptable, as they are above 70% agreement. Percent agreement between coders categorizing independently is an inter-rater reliability measure that indicates the dependability of the coders' work (Neuendorf, 2002; Bennett, Foot & Xenos, 2011).

Results

As noted above, the first question asked job shadowers what they most looked forward to about the job shadow experience prior to starting it. The results of how coders interpreted them are displayed in Table 1 below. Examples of intrinsic-based responses from job shadowers were, "I am really looking to get a good glimpse at what daily activities teachers participate in. Observing teaching style and student responses to the instructor are also qualities I am looking for," and, "I am most looking forward to watching different teaching styles and learning how I might want to teach my students in the future." By contrast, examples of vocational-search-based responses were, "I look forward to learning whether or not I want to be a teacher," and, "I'm looking for a back up plan, so I'm just testing the water to see if I want to become a teacher if I do not achieve my all-time life goals."

Table 1

What Job Shadowers Reported Most Looking Forward to Prior to Job Shadow

Type of response	Percent of journal responses
Intrinsic-based	40%
Vocational-search-based	32.5%
Altruistic-based	0%
Other	2.5%

Unable to determine or no response given	7.5%

The second question asked job shadowers what they found most rewarding about the job shadow experience immediately after it ended. The results of how coders interpreted them are displayed in the table below. Examples of intrinsic-based responses from a job shadower were, "The most rewarding part was getting the experience of being in front of the students and grading the papers. Just being able to witness how much work and patience actually goes into being a teacher makes me appreciate them even more," and, "The students have been really cool and seeing how Ms. _____ interacts with them, both individually and as a group."

 Examples of vocational-search-based responses were, "The most rewarding part of shadowing in the classroom was the feeling of knowing this is where I want to be… Just knowing that my decision to pursue teaching is really the decision that I should have made. This is where I want to be. This is where I will be," and, "…All in all, everything kind of meshed together to really impact how I will approach future career options, not just teaching."

 Examples of altruistic-based responses were, "Knowing that I've helped the children understand the subject a lot better and the fact that they'll miss me makes me think they liked me…" and, "…We then helped them with some of their homework and that was really rewarding because they all are very thankful, but the best part was seeing it start to click for them."

Table 2

What Job Shadowers Reported They Found Most Rewarding Following Their Job Shadow

Experience

Type of response	Percent of journal responses

Intrinsic-based	35%
Vocational-search-based	10%
Altruistic-based	32.5%
Other	0%
Unable to determine or no response given	0%

Discussion

Surprisingly, no responses given by job shadowers for the first question were coded as altruistic. However, altruistic-based responses surged more than 30% between the responses to the first question asking what job shadowers most looked forward to beforehand and what job shadowers said they found most rewarding afterward. This difference may be explained in several ways. It may have been that job shadowers were not aware the job shadow experience would give them opportunities to truly help the high school students with whom they would be interacting. For example, job shadowers may not have thought they would have enough time to bond with students or truly have an impact on them. For instance, one participant wrote, "Even though it's only a week, we've started to bond and make connections. It has been very educational, to say the least." If this is correct, and job shadowers simply did not think they would have enough time to impact students during the relatively short job shadow experience, recruiters for such job shadows may want to emphasize that it is possible to make a difference in such a short amount of time. Sharing testimonies from past participants that explain how making an altruistic impact can occur in such a short time may be a beneficial recruiting method.

An alternative explanation may be that job shadowers were aware that the experience

would actually allow them to help high school students but did not accurately anticipate the extent that they would enjoy those altruistic aspects. This is plausible, as job shadowers often seemed to emphasize how the particular instance of helping made them feel, without mentioning being surprised about being able to help during the relatively short job shadow experience. For example, one participant wrote, "…It made me think how great it was that my explanation of something is how they may forever understand that concept." Another participant wrote, "You can really see something click in their mind. The feeling you get after that is very rewarding." In this case too, recruiters for such teacher recruiting job shadows may want to share testimonies of past participants that explain how rewarding such altruistic experiences during the job shadow were.

Given that the altruistic motive is plausibly the most common reason new teachers go into the profession, it is possible the above results suggest STEM majors interested in teaching may be more motivated initially by intrinsic factors such as teaching material within their own major (e.g., biology) (Rinke, Mawhinney & Park, 2014; Heinz, 2015). Both before the job shadow experience, and after the job shadow experience, job shadowers reported looking most forward to, and feeling most rewarded by, intrinsic factors. Repeated testing of this gap between interest in intrinsic motives and altruistic motives among STEM majors may be a possible future research direction. If STEM majors are most motivated, at least initially, by intrinsic factors, recruiting efforts should be aimed at emphasizing the intrinsic aspects of teacher recruiting programs or job shadows, such as getting to teach on specific STEM topics.

In retrospect, the vocational-search based type of response was to be expected as students were STEM majors considering teaching as a profession. It is interesting that such a motivation appeared to have diminished in importance during the experience. Though the current study

specifically recruited STEM majors who had some interest in teaching, many were plausibly still

highly committed to a career more central to their own field and merely "peeking" at teaching as

a potential career.

Finally, it might not be entirely surprising that participants failed to list extrinsic motives

for doing the job shadow, either prior or post experience. Though they were paid, it was not

sustained pay, and no other benefits (e.g., vacation, health insurance) accompanied the job

shadow itself, so participants could not hope to directly experience the extrinsic benefits of the

profession through the job shadow.

Future Recommendations

First, it has been suggested that pre-service teachers should be taught that teaching is

more about altruism within their teacher training institutions (Yüce et al., 2013). Therefore, the

same should be done while recruiting teachers from undergraduate STEM programs.

Interestingly, a suggestion similar to this has been made outside of the teaching literature.

Feldmann et al. (2014), while explaining how to better recruit millennials in the workforce more

broadly, stated that organizations should explicitly state the service opportunities millennials

could partake in alongside the organization itself. Consequently, teacher recruiting programs

may also benefit from program leaders being more forthright about the opportunities for job

shadowers to make an impact on younger students' lives. Sinclair (2008) suggests that

advertising more than one type of motive would be useful since students may differ in what

draws them to teaching, and since some students will also have more than one motive for

wanting to teach.

This suggestion may seem unintuitive given our results, which showed that STEM majors

generally did not list altruistic reasons when explaining what they most looked forward to about

the experience. Yet, it is highly plausible that job shadowers said this because they believed they could not have such an altruistic effect on students in the small amount of time the job shadow occured. STEM recruiting programs thus may benefit from telling new job shadowers how much past job shadowers found the altruistic aspects of the job shadow experience to be so rewarding.

Second, as a result of finding that the altruistic motive was the only one negatively related to dropping out of teacher preparation programs, Jungert et al., (2014) have suggested students be given more opportunities to teach in order to promote and grow altruistic motives in themselves. Hence, teacher recruiting programs may not just help find potential teachers, but they may also increase the desire to teach within those recruits by exposing them to altruistic experiences in teaching (Hubbard et al., 2015). Moreover, a future research question that might be answered would involve examining pre-service (or novice teacher) dropout rates of those who did a job shadow compared to those who did not. The job shadow used for this study is consequently conducting follow-up surveys.

Third, in the event that only a limited number of recruits can be accepted into a teacher recruiting program, one may want to use assessment measures of entrant motives in order to ensure that only the most suited are accepted into the program (Sinclair, 2008). Fourth, Kyriacou and Coulthard (2000) have noted that in order to attract new recruits to teaching, one must simply find out what motivates them and persuade them that teaching has it. Ergo, one may simply conduct a short survey among undergraduates or high school students in order to figure out what that particular student body from that university or school is seeking. The more precise the approach in understanding the motives of potential teachers, the higher the likelihood of success.

There is strong evidence that certain motives, such as the altruistic and intrinsic motives,

are associated with better outcomes for both teachers and their students (Kim & Cho, 2014; Roth et al., 2007; Jungert et al., 2014). There is also evidence that the prevailing teacher shortage is primarily caused by attrition (Ingersoll, 2001). Thus, by understanding the motives of potential teachers, leaders in education will be more effective in properly recruiting and bolstering the retention of STEM teachers.

The current research adds to existing literature on prospective teacher motivations by specifically targeting STEM majors and by including STEM majors who have not yet affiliated with an educator preparatory program. Since STEM teaching is an area of particularly high need within the teaching profession (Interim Study Committee, 2015), members of teacher recruiting programs would do well to pay particular attention to this demographic's unique motivations. In particular, educating potential participants of benefits of which they might previously have been unaware of, and understanding potential participants' existing dominant motivations might be especially critical. The current study yields insight into both of these areas. Such qualitative research should also serve to find patterns that can then be tested within or compared to broader populations. These findings regarding changes of motives found among STEM majors before and after the job shadow might also be examined more broadly to look for similar changes of motives among teaching majors before and after participating in other types of early field experiences. Such work might lead to a more well-rounded understanding of potential teachers' motives and the subsequent effects of different types of field experiences.

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