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How Do Former Undergraduate Mentors Evaluate Their Mentoring Experience 3-Years Post-Mentoring: A Phenomenological Study

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Abstract

This phenomenological study involves a unique, longitudinal assessment of the lived experiences of former undergraduate mentors (n=7) in light of their current experiences (i.e., career or advanced schooling). The objective of a phenomenological study is to engage in in-depth probing of a representative number of participants. Specifically, we followed up with graduates of the Nebraska STEM 4U (NE STEM 4U) intervention 3 years post-program, with the overall goal of describing the mentors' experiences using the lens of their current experiences. This type of longitudinal perspective of mentoring is greatly lacking in the current literature. At the time of the interviews, all graduates were either in a STEM career or STEM-based graduate/professional program. Three major themes emerged: Career, inspiration, and challenges. Each of these themes was further broken down into sub-themes to describe the essence of the mentoring phenomenon for these individuals. This information may be beneficial for any programs that engage undergraduate students in mentoring.

Keywords

Undergraduate, Mentors, Phenomenology, NE STEM 4U

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How Do Former Undergraduate Mentors Evaluate Their Mentoring Experience 3-Years Post-Mentoring: A Phenomenological Study

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This phenomenological study involves a unique, longitudinal assessment of the lived experiences of former undergraduate mentors (n=7) in light of their current experiences (i.e., career or advanced schooling). The objective of a phenomenological study is to engage in in-depth probing of a representative number of participants. Specifically, we followed up with graduates of the Nebraska STEM 4U (NE STEM 4U) intervention 3 years post-program, with the overall goal of describing the mentors' experiences using the lens of their current experiences. This type of longitudinal perspective of mentoring is greatly lacking in the current literature. At the time of the interviews, all graduates were either in a STEM career or STEM-based graduate/professional program. Three major themes emerged: Career, inspiration, and challenges. Each of these themes was further broken down into sub-themes to describe the essence of the mentoring phenomenon for these individuals. This information may be beneficial for any programs that engage undergraduate students in mentoring. Keywords: Undergraduate, Mentors, Phenomenology, NE STEM 4U

The Nebraska Science, Technology, Engineering and Math 4U (NE STEM 4U) intervention is the first to include a three-fold approach, immersing undergraduates in teaching, research, and mentoring (Cutucache, Luhr, Nelson, Grandgenett, & Tapprich, 2016). The related research questions of the program target undergraduate student learning outcomes that align with the *Vision & Change* (AAAS, 2011) core competencies. From most accounts, the United States is not producing enough professionals qualified in STEM to meet existing needs; additionally, new STEM graduates must have ample pre-professional preparation to make them competitive job applicants and progressively contribute to the economy within those jobs (NAS, 2010).

The growing need for qualified STEM professionals corresponds with recent advancements in science and technology that have radically changed not only the nature of science, but also the nature of STEM learning and professional fields. As outlined in the *Vision & Change* report, today's dynamic STEM environment requires that scientists not only understand core disciplinary concepts, but also use 21st century skills such as critical thinking, communicating, and reasoning to apply those concepts to real-life problems (AAAS, 2011). Therefore, undergraduate STEM education must adapt to ensure that students understand the core concepts and acquire the core proficiencies necessary to succeed in today's STEM occupations (Dolan, 2015). The importance of developing core professional skills is also recognized by employers, who report that many college graduates lack the 21st century skills that they need to become gainfully employed and prosper in the workplace (NRC, 2012). Therefore, it is imperative to capitalize on best practices and methods that have demonstrated retention and preparation of a well-trained future workforce.

The NE STEM 4U program incorporates several such practices, including focusing on active learning and involving undergraduate students in hands-on disciplinary practice experiences through *teaching, researching, and mentoring*. Based on previous studies, these

methods are associated with gains in approaching scientific problems, laboratory techniques, logical thinking, personal development, and lower attrition rates (Bauer & Bennett, 2003; Eagan, Hurtado, Chang, & Garcia, 2013; Lopatto, 2004; Nagda, Gregerman, Jonides, & Hippel, 1998; NRC, 2005; Prunuske, Wilson, Walls, & Clarke, 2013). Critically, all three key features of this intervention (teaching, research, and mentoring) are rooted in theory previously recognized by the National Research Council (NRC, 2000, 2012). The theories supported by NRC reports include the recommendation of putting science learned in the classroom into practice. Through the NE STEM 4U program, undergraduates are able to take what they have learned in the classroom and translate it into active STEM lessons that are then shared with their community.

Likewise, many universities across the country are increasingly encouraging undergraduates to participate in mentoring, yet little research has been done to understand the ways mentors view their experiences (Budge, 2006; Carpenter, 2015; Rao, Shamah, & Collay, 2007). The gap in the literature becomes even more pronounced when we consider that former mentors are rarely followed up with post-graduation, to gain a picture of how these individuals reflect upon their experiences after having more "real-world" experiences, such as a career or advanced education and to define how, if at all, mentoring experiences shaped these successes.

To that end, what is well documented is that peer mentoring and faculty-student mentoring foster higher-order thinking and build strong relationships among undergraduates, resulting in a stronger sense of community, more responsible behavior, and higher productivity (Aikens, Sadselia, Watkins, Evans, Eby, & Dolan, 2016; Eby & Lockwood, 2005; Pita, Ramirez, Joacin, Prentice, & Clarke, 2013). In a randomized control trial, students that received mentoring showed higher performance in classes and higher satisfaction in career choice (Kim & Park, 2013). Additionally, studies suggest that mentoring can positively impact the mentor's career skills (Laursen, Thiry, & Liston, 2012; Page, Wilhelm, & Regens, 2011) and academics (Carpenter, 2015; Nelson, Sabel, Forbes, Grandgenett, Tapprich, & Cutucache, 2017), but no studies, to our knowledge, have followed up with the mentors several years after graduation to determine if these gains were actualized upon entering a career or continued schooling. Therefore, in this report, we focus on the undergraduate mentoring component of NE STEM 4U to understand how former undergraduate mentors perceive the phenomenon of mentoring in light of their current positions (i.e., in a career or professional/graduate school).

NE STEM 4U Program

To provide context, undergraduate mentors in our program offer three, 8-week sessions of active learning per year at each school. In each session, NE STEM 4U mentors, working in teams of 2-3, deliver two after-school activities per school per week for 1 hour at a time. On average, the program engages 500 Omaha Public Schools (OPS) students across all schools in each 8-week session. The sessions are designed to increase interest and understanding in STEM topics among socioeconomically disadvantaged students in OPS and to provide opportunities for these students to pursue STEM education and careers. At the same time, the NE STEM 4U undergraduates gain valuable discipline-based experience through their roles as instructors, researchers, and mentors (Cutucache et al., 2016).

In this program, there are 3 levels of mentorship: (1.) from faculty advisors to undergraduates, (2.) peer mentoring from undergraduates to undergraduates, and (3.) from undergraduates to youth participants. Faculty advisors serve as sounding boards to undergraduates to assist with career aspirations and educational choices. As peer mentors, upper-level NE STEM 4U undergraduates mentor lower-level undergraduates in the program. This includes making recommendations about coursework, extracurricular and volunteer opportunities, and the resources necessary to prepare for STEM jobs and professional or

graduate school. The more experienced NE STEM 4U students also mentor new mentors in their instructional and research-related roles within the NE STEM 4U program. Lastly, undergraduates serve as role model mentors to youth, in an effort to deliver content and expand inquiry, but also to familiarize the youth with college life and to provide confidence to the youth as they graduate to the next grades. While mentoring is known to provide benefits to both the mentees and the mentors, little research is available that follows former undergraduate mentors after graduation to better understand the impacts mentoring may have on the undergraduate's future. The current study helps to fill this gap in the literature.

As researchers, we have many years of experience teaching undergraduate and graduate students in Biology. We are very passionate about improving undergraduate education and have worked toward this end by incorporating active learning in the classroom and involving students in more authentic experiences, such as research and outreach. About 4 years ago, we developed NE STEM 4U in order to benefit the community as well as our undergraduates. We have designed our research to evaluate the outreach program to determine how our undergraduate mentors perceive this experience. If we find in our research that mentoring is not benefitting our mentors, we want to make adjustments in the program so the undergraduate mentors benefit from investing their time.

Purpose

The purpose of this study is to better understand how undergraduate mentors reflect upon their mentoring experiences in the long term; in particular, in light of their current knowledge and experiences 3 years post mentoring, how do these former mentors view their experience? This study is unique because we describe this viewpoint using the lens of the former mentors' current experiences (i.e., graduate/professional school or career); notably, this longitudinal perspective of mentoring is greatly lacking in the current literature.

In order to better understand this phenomenon, the current study employees the Experiential Learning Theory (ELT) as the theoretical framework. ELT defines learning as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" (Kolb, 1984, p. 41). We also employ Vygotsky's Zone of Proximal Development Theory (Vygotsky, 1934/1986) because this mentoring/teaching relationship is known to be "transformative for both students and teachers" (Ash & Levitt, 2003, p. 1). More specifically, by engaging the younger students in this way, undergraduate mentors may co-construct their own understanding as they foster the younger students' learning (Ash & Levitt, 2003). Notably, both of these theories address the ideas of transformation. In this study, we encourage previous mentors to reflect upon their experience to better understand how the former mentors view the mentoring phenomenon and if it was potentially transformative for the mentors in the long term.

This research follows the phenomenological tradition because we investigated the essence of the mentors' shared experiences in mentoring K-8 students. The objective of a phenomenological study is to engage in in-depth probing of a representative number of participants. Specifically, it follows the descriptive phenomenological tradition described by Husserl (1913/1983), because the overall goal is to describe the lived experiences of the mentors in light of their current experiences. As Husserl (1970) expressed regarding phenomenology, we want to not only understand the experience of the mentors but also their perceptions of the mentoring experience, by encouraging them to focus and reflect back upon that experience.

Therefore, the central question of this study is: *After being in a career or professional/graduate school for 3 years post-mentoring, how do former UNO undergraduate*

mentors describe and reflect upon their experiences of mentoring K-8 students in an after school STEM program?

Methods

The authors of this study interviewed the NE STEM 4U mentors who completed their mentoring 3 years ago and are currently either in a career or continued schooling (n=7). We selected these mentors because they provide a unique, longitudinal perspective of individuals who experienced the same phenomenon (mentoring) and can now reflect back upon their mentoring experiences after working in a career or graduate/professional school for at least 3 years. Sanders (1982) suggested that sufficient information might be collected from three to six individuals, while Creswell (1998) proposed long interviews with up to 10 people is appropriate for a phenomenological study.

Data Collection

Semi-structured interviews guided by open-ended questions were conducted with former mentors from NE STEM 4U in the fall of 2016. The interviews followed the phenomenological tradition, which requires long, informal, flexible and interactive sessions in order to collect "rich, vital, substantive descriptions of a phenomenon" (Moustakas, 1994, p. 116). Utilizing this open-ended format allowed the researcher to follow cues given by the interviewee. In order to prepare for the interviews, the interviewer followed the principles set out by McNamara (2009), namely: (1.) choose a setting with little distraction; (2.) explain the purpose of the interview; (3.) address confidentiality; (4.) explain the interview format; (5.) indicate typical interview length; (6.) tell interviewees how to contact the interviewer if desired; (7.) ask if the interviewee has any questions before beginning the interview; and (8.) don't rely on memory to recall their answers.

Additionally the interviewer was not involved in NE STEM 4U at the time the interviewees participated as mentors, nor has the interviewer participated in the program as a mentor at any time. This was intentional to encourage the interviewees to be honest and open about their responses as well as to ensure that the interviewer would not convey bias or preconceptions into the data collection or analysis processes.

Upon graduation from the NE STEM 4U program at UNO, NE STEM 4U mentors were asked if they would give consent to be contacted up to five years post-mentoring to participate in follow-up studies. Only those who voluntarily gave consent were contacted for the current study (n=7). Additionally, prior to the start of the interviews, informed consent forms were emailed to all participants. At the beginning of the interview, the interviewer asked for permission to record the interview and interviewees were told that a pseudonym would be assigned to ensure their personal information would be kept confidential. All methods, data collection, analysis, as well as data management and storage, described herein, are covered under the approval #548-12-EX from the University of Nebraska Medical Center/University of Nebraska at Omaha Institutional Review Board.

The interviews lasted approximately 30 minutes and started with some general discussion of the interviewee's current career/professional school to help create the full picture of the interviewees, to establish rapport (Smith, Flowers, & Larkin, 2009) and to make them comfortable with the conversation (Creswell, 2007). Additionally, the researcher encouraged the interviewees to think back to the period when they were mentoring in NE STEM 4U in order to return the former mentors to the time of the event and restore the emotions and feelings they experienced, as suggested by Moustakas (1994). Of the seven interviews conducted, four were conducted over the telephone and three were conducted in person. All interviews were recorded and transcribed verbatim. Member checking was completed as participants were sent

interview transcripts for review and corroboration of accuracy. The general interview questions/prompts were:

- After you graduated from UNO, what did you do in terms of employment or continued schooling?
- Are you currently employed or in graduate/professional school? Please provide detail.
- Reflect back and describe your mentoring experience in NE STEM 4U.
- What does mentoring mean to you?
- What contexts/situations affected your experiences of mentoring?

As a former mentor, when you reflect back upon your mentoring experience:

- What, if anything, do you feel you gained? Why?
- What was the most difficult aspect of mentoring? Why?
- In hindsight, did the mentoring experience influence what you are doing now – why or why not?

However, as is common for the semi-structured interview, additional probes were used at some points or, alternatively, if the interview was flowing well without additional prompts, the interviewer, "made a short note of key words/topics the participant referred to" for follow up (Smith, Flowers, & Larkin, 2009, p. 65). In general, the interviews were flexible and open, which according to Koch (1996), allows the interview process to stay as close to the lived experience as possible.

Data Analysis

In the current study, the researchers used the modified Stevick-Colaizzi-Keen method of analysis (SCK) originally modified by Moustakas (1994) and later simplified by Creswell (2013). Before conducting the interviews, the researcher participated in self-reflection and Epoche to be unbiased and set aside prejudgment (Giorgi, 1997; Moustakas, 1994). The researcher's experiences were bracketed to ensure those experiences or preconceptions would be reduced as much as possible, precluding influence on the study or interpretation of the phenomenon (Chan, Fung, & Chien, 2013). This was done, as described by Moustakas and others, by repeated rounds of reflection upon any preconceptions or prejudgments the researchers may have had. These prejudgments were written out and reviewed until the researchers felt "an internal sense of closure" was achieved (Moustakas, 1994, p. 89; se also Colaizzi, 1978).

After transcription, the researchers read over the interviews many times and utilized NVivo 11.4 to assist in data analysis, beginning by horizontalizing the interviews into preliminary groupings, listing every quote relevant to the experience. In other words, when the interviewees mentioned an idea, these ideas were collected as codes, or horizons, according to Moustakas (1994), using *in vivo* coding wherever possible. Once this was completed, codes were evaluated for redundancy and overlap and, for the coded text (invariant constituents) that remained, two questions were asked: (1.) Does the text contain relevant information from the actual lived experience; and (2.) Can the text be identified and labeled? Any text that was deemed irrelevant, repetitive or vague was eliminated. From the text that remained, themes were generated utilizing *in vivo* terms as much as possible. The themes were used by the researchers to generate, "a textural description of the experience - what happened" (Creswell,

2013, p. 193). The overall themes that emerged were then compared with the complete interview of each participant to validate that the themes were consistent with the interview. The textural descriptions were considered in light of the context in which the phenomenon occurred to provide a "structural description" or meaning of these descriptions (Creswell, 2013, p. 194). In other words, we describe two elements for each assertion, the descriptions or themes that emerged from the interviews (textural descriptions) and the meaning of these descriptions (structural descriptions). Taken together, these descriptions were used to describe the essence of the phenomenon (Creswell, 2007).

Validity of the data was determined using participant review and peer review. Participants were asked to review the transcripts and the findings, to ensure their experiences were accurately represented. This respondent validation increases the credibility and validity of the study (Creswell, 1998). Additionally, peers and a qualitative analysis faculty member from the University of Nebraska, Lincoln, who were not involved in the study, reviewed the data analysis to ensure the phenomenological process was accurately followed and researcher bias was minimized (Creswell, 2007).

Results and Discussion

To begin the interviews, former mentors were asked to describe what they were currently pursuing as a career or continued schooling. Of the seven mentors interviewed, five were in a STEM-related professional/graduate school and two were pursuing a career in a STEM field.

All of the interviewees very positively remembered their mentoring experiences in NE STEM 4U. As they reflected back upon their experiences in light of what they currently know and have experienced, three major themes emerged: *career, inspiration, and challenges.* These themes were subsequently broken down into sub-themes based on the interviews. The breakdown of the themes can be seen in Figure 1 below.

Figure 1. Three themes, career, inspiration and challenges as well as sub-themes that emerged from analysis of data.

The first major theme related to *career skills* gained from the experience. We have broken this down into two categories: (i.) *indirect career skills gained*, meaning the skills are so-called 21st century skills (i.e., communication, problem solving, team work, critical thinking, organization and planning) that could potentially benefit the former mentor in their career or other areas, and (ii.) *direct career skills gained*, meaning participating in mentoring in NE STEM 4U directly helped them achieve where they are today, in terms of potentially being notable on their resume, during their interview, or directly influencing their career trajectory.

Below are some quotes from former mentors regarding *indirect career skills gained:*

Communication

> Explaining scientific concepts to kids can – it's not always the easiest thing to do. So it's something you kinda have to work at, and I kind of have had the same experience talking to patients, explaining something kind of complicated and turning it into terms that are understandable and that are manageable.

This quote directly correlates the skill of communicating complex concepts to mentees to communicating complex concepts to patients in the mentor's career trajectory.

Communication and Problem Solving/Critical Thinking

> So to put people who are not necessarily thinking like teachers, to put them in that role, it's like if you explain something one time and you can see deer in the headlights out in the classroom, you have to kind of re-engineer how you're going to communicate that information. So I feel like it was – I think it was good in that regard, you know, communication being huge.

By using terms such as "re-engineer and communication," this suggests that the mentor realized that teaching led to critical thinking in order to solve the problem of better communication to his/her audience.

Critical Thinking and Problem Solving

> I think it impacted my critical thinking, but sort of in a nontraditional way that you think of critical thinking. I think it is sort of, like, critical thinking and problem solving hand-in-hand. I can remember a few times where we were talking about something that was pretty difficult, so whether it was DNA and replication or something like that, a pretty complex process, and I just remember a few times having the kids just look at me and be like, "We have zero clue what you're talking about right now.: So, being able to, in that moment, think of a different way to be able to present it to them that was more relatable to their life and more relatable to how they think about things, I think, enhanced those skills in myself because it was constantly forcing me to think of different ways to present material that seems so trivial to me because it's something that I've been thinking about for a decade.

This mentor also acknowledges that, as a mentor, even though he felt very confident in his content knowledge, he had to be aware the mentees did not have the same

knowledge/experiences and had to restructure how the material was presented for different audiences.

Organization, Teamwork, Planning, and Critical Thinking

> I think if you were somewhat disorganized, it definitely would help kind of help you collect your thoughts, make sure that you're on the same page with people that you're mentoring with, and just working with the kids and making sure that – the worst thing to happen is to go to a school and you have absolutely no idea what's going on as far as what that lesson is today – that day, and it was an exercise in, you know, the night before or earlier that afternoon, looking up that lesson, kind of, "Okay, I can explain this and this way," or, "Oh, I really like that way of explaining it," and kind of tweaking – reversing the lesson in your head, kinda helping organize your thoughts a little bit before you go was – mandatory for me. I mean, some people, I'm sure they can jump right into it and do just fine, but for me, I had to rehearse a little bit in my head. I'm like, "Okay, this is how I'm probably gonna do this."

Here the mentor talks about evaluating her own thoughts and presentation style in addition to being organized and prepared as a team.

Team Work and Planning

> "Just anytime I'm working with a team of students with different backgrounds - interpersonal skills and teamwork and task allocation, those things all apply."

Another student commented,

> It always seems that no matter how many teams you work on, every single one of them is different and the contributions by members are always different, and so sometimes it's very easy to be on a team and sometimes you certainly think that being on a team is a detriment and you have to figure out how to make it work.

These mentors refer to how every team of mentors is composed of different, unique individuals; each with their own skills, so to be successful there must be some awareness and planning/structuring of the team around those strengths (and likely weaknesses). Furthermore, several of the former mentors found that mentoring had a *direct application to career*; below are a few quotes from the former mentors related to this gain:

Career Choice

> I think that it also helped me realize that research wasn't necessarily where I wanted to be, that training or education is more of where I wanted to be, and so I think that it really opened my eyes to a variety of career opportunities that involved more of training or education side of science as opposed to just the bench work and the lab work.

This mentor discovered, through the mentoring experience, that she did not want to follow the basic science research path, but rather found a passion for education and training.

Application/Interview

> I've kind of had focused on going to PA school for quite a while at – when I started NE STEM, so that was pretty set, but what I noticed on my interviews for school – and I got – I was accepted to a few PA schools, but they really liked to – they didn't really like to talk about my biochemistry grade. They didn't really want to talk about, necessarily, my – yes, about my patient care experience before school, but they were interested in what I did outside the classroom, and having NE STEM as something on my application – I mean, not that I did NE STEM for an application booster alone or anything like that, but it was nice conversation piece for an interview and it was brought up at every single school interview I had. They said, "Oh, tell me a little about this. We're not exactly sure what this is."

Interview

> I think that having that sort of type of skill or the ability to say that you mentored kids in the sciences, I think in my job now, specifically, it probably helped because they realized that if I could break it down to that content level and context for seventh-graders, I could probably do it for people of any variety of skill level. So I think that it probably helped in that way directly.

Both of these former mentors note direct career gains from the mentoring experience related to the application and/or interview for professional school or career.

STEM Content Knowledge (Direct), Communication and Preparation (Indirect)

> When you explain something to somebody else, you have to know it at such a deeper level than what you would normally – so even doing NE STEM 4U, where even – I mean, they're pretty basic scientific concepts, you know? And I graduated UNO with a science degree, but it was even helpful for me to really dig in deep on a particular topic and really investigate it and kind of anticipate questions that kids might have. But you solidified concepts when you had to explain them.

When this former mentor reflects upon "knowing" at a deeper level, this relates to having a robust understanding of content. This directly corresponds to preparation as well, because the interviewee expressed that he had to "dig deep on a particular topic" in anticipation of questions. Furthermore, it was also noted then that explaining (communicating) was an important part of the mentoring experience.

Additionally, five of the former seven mentors interviewed also spoke about inspiration, which is the second theme that emerged. Related to inspiration, former mentors either reflected upon how the faculty mentors inspired them and/or how the idea of inspiring the younger students was one of the most rewarding and memorable aspects of the mentoring experience. Below are a few quotes related to *inspiration*:

Faculty to Mentors

> The big thing I remember when I look back on my time here was actually just working with Dr. X personally. She's a good influence. She's a really hard worker. She'd accomplished a lot and she was someone to look up to.

Another student noted,

> On campus when you find a professor that is passionate about their work and knowledgeable and you appreciate that, I don't know how everyone else is, but that means a lot to me. It still does when I'm sitting in lectures now when I see people that are devoted to their work and they're studying their pursuit. That pushes me forward.

Both of these former mentors directly reflect upon being inspired by a faculty member while working in the mentoring program.

Mentors to Students

> You can catch a couple of them. Not all of them are interested, but you catch a couple of them going through that experience that I went through and that's where the personal rewards are.

Another student mentioned,

> While I was in it, I didn't necessarily understand the full impact that it would have on the community, and I think stepping back from it and really thinking about even just a few of the kids who came every day and enjoyed it every single week, I think that I fully understand now that even if it's – even if I had an impact on only one student, that is something greater than I could've possibly thought would happen, and especially being a woman in the sciences, being able to effect change in seventh grade girls' mindsets about science is a pretty awesome feeling to have, and so I think that at the time, I certainly didn't understand the impact that a program like NE STEM could have on a community, and going to other places where there are lack of afterschool programs that are directed towards the STEM field, I think that it's something that's certainly important.

These former mentors shared strong reflections about feeling rewarded because they inspired the mentees.

The final theme that emerged was *challenges* that the former mentors experienced while mentoring. These related to the students themselves and function of the program (i.e., cancellation of program by the school, extra students added that week, etc.) or time, meaning the time constraints that the mentors felt.

Below is a quote related to the *challenges* one mentor felt. A similar theme was recorded for all seven interviewees:

> I think that for me, I'd say that 80 percent of my experience was really, really great in that I had kids in my lessons who were attentive and who cared and who were interested, but then I also spent some times in some schools where it was

> a lot harder to maintain attention and just to maintain your student interest in those classrooms, so those times often made it difficult – [laughs] – because, you know I think that I went into it really wanting to make an impact, and to not see that play out in those times was pretty difficult.

This quote indicates that the mentor reflected upon the experience positively, but remembered feeling frustrated by disruptive or uninterested students.

> The negative for me is the time commitment, I was very strained because I was finishing my UG education. It is manageable though.

Another common sub-theme related to challenges in the program was the issue of time. Several mentors mentioned that they would have liked to do more, in terms of being more involved in the research or lesson planning, for example, but that they were unable to commit additional time.

This study differed from previous research on mentoring from the mentor's perspective by: (1) taking a phenomenological approach, and (2) utilizing a longitudinal, 3-year, post-mentoring perspective. In this study, the emphasis was on understanding and describing the lived experiences of these individuals; notably, using the lens of their current experience (i.e., career or graduate school). The overarching question of this study was, after being in a career or professional/graduate school for 3 years post-mentoring, how do former undergraduate mentors at UNO describe and reflect upon their experiences of mentoring K-8 students in an after school STEM program?

In this study, all interviewees provided thoughtful and insightful answers to the questions posed and seemed to genuinely reflect upon their experiences with NE STEM 4U in an overwhelmingly positive tone. This may not be surprising, as much prior research suggests that mentoring positively impacts mentors; however, while many studies claim that mentoring benefits mentors in terms of career preparedness, communication, problem solving abilities, among other skills, to our knowledge, no other studies have followed up with the mentors to determine if these benefits were actualized several years post-graduation.

In the current study, former mentors reported that mentoring led to direct and indirect career gains (Figure 1). Likewise 5 of the 7 former mentors interviewed expressed some component of inspiration related to their experience, either from faculty to themselves or from themselves to the K-8 youth they were mentoring. Lastly, while reflecting upon their mentoring experience, all mentors also noted challenges brought about by mentoring, related either to the mentees and programmatic challenges or the challenge of time constraints.

While these results are specific to this study and may not be broadly applicable, this study is unique due to its longitudinal nature and may serve as further evidence of the benefits of mentoring for the mentors themselves. It also serves as an expansion of our current knowledge of the impact of mentoring on mentors, as opposed to the often-cited impact of mentoring on mentees. Finally, it may also provide awareness for the challenges mentors express in such programs so that these potential challenges can be mitigated or made known upfront.

Limitations

Hermeneutic considerations for this project include the personality types of participants. Specifically, while the description of realm of being through reflected experience (Husserl, 1970; Laverty, 2003; Valle, King, & Halling, 1989), and the subsequent impact on current ventures, were our desired outcomes, we need to admonish the fact that not all

individuals will perceive such interventions in an impactful way to then subsequently report on them. While we designed the interview questions (listed in the methodology) to minimize such limitations on perceived beliefs (Osborne, 1994), and lead to positive, genuine communication (Gadamer, 1960/1998) and the cultivation of impact on the individual, limitations still exist in terms of individual reporting, as well as the potential for misinterpretation by researchers. To help alleviate that limitation, we provided much of the raw responses herein, and asked for outside viewpoints from other researchers to further validate that our interpretation of the data was accurate.

Moreover, we recognize that memory distortions and/or lapses could occur during the window of this longitudinal study. To address these limitations, we designed interview questions such as "reflect back…what contexts/situations affected your experiences of mentoring" to deploy exemplary intuition to have the individual reflect and hold an idea in his/her mind, and then elaborate on it (Klein & Westcott, 1994; Laverty, 2003). Therefore, we acknowledge these limitations from this study, as well as the relatively small sample size, as being the most profound weaknesses (with subsequent methods attempted to minimize the pitfalls).

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