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# Making the Connection: the Impact of Support Systems on Female Transfer Students in Science, Technology, Engineering, and Mathematics (STEM)

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*The availability of student support systems and mentee-mentor relationships provide effective ways to increase the representation of women in STEM areas (Creamer & Laughlin, 2005). Support systems allow students the opportunity to engage in discussion and activities with individuals, including family, faculty, staff, or administrators with whom they feel comfortable. In this qualitative study, five female community college transfer students in STEM disciplines were interviewed. The female students were asked to describe and make meaning of their support systems and the impact of these support systems on their decision to pursue and persist through their respective STEM discipline. The female students described their support systems on three different levels: family, faculty and advisors.*

Several approaches have been identified to increase the number of women in STEM disciplines. The approaches range from ensuring that students are academically prepared and competent in math and science areas (Jackson & Lannan, 2011; Jackson & Laanan, in press; Oaks, 1990) to dismantling the “chilly” climate in math and science-based classrooms (Market, 1996; Rypisi, Malcom, & Kim, 2009). “Gendered” societies, which consist of societal norms and expectations of what is appropriate for females and males, have also been acknowledged as hindering the involvement of females in STEM areas (Seymour, 1995). Support systems and mentee-mentor relationships have been recognized as having a positive impact on female community college transfer students in math and science areas (Creamer & Laughlin, 2005; Jackson & Laanan, 2011) and can assist in uncovering gendered layers that have subliminally discouraged women from pursuing STEM areas of study. The pur-

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pose of this qualitative study is to explore the impact of support systems on the experiences of female community college transfer students in STEM majors at a Mid-western research university. More specifically, five female community college transfer students in STEM disciplines were interviewed to understand how they describe and make meaning of their support systems and the impact of these support systems on their decision to pursue and persist through a STEM major at a research university. The following research question guided this study:

How do community college transfer students describe and make meaning of their support systems while pursuing a STEM degree?

## **Review of literature**

The relationship between support systems and student success has been well documented in higher education literature (Ashby, 2006; Creamer & Laughlin, 2005; Jackson & Laanan, 2011; Subramaniam & Wyer, 1998). The importance of these systems and relationships are even more essential when referring to a population that has experienced challenges entering and persisting through STEM areas of study. Gender inequity regarding the disproportionate representation of females in higher education, more specifically in STEM disciplines, continues to be one of the most significant challenges in colleges and universities (Rypisi, Malcom, & Kim, 2009). Although women make up 51% of the U.S. population (U.S. Census Bureau, 2010) and are “attending higher education institutions in record numbers” (Reyes, 2012), they still remain underrepresented in STEM. According to the American Association of University Women (2010), by graduation “men outnumber women in nearly every science and engineering field” (Hill, Corbett, & Rose, p. XIV). Furthermore, the American Association of University Women (2010) reports that in some areas there are even more dramatic differences with women earning only 20% of bachelor’s degrees in physics, engineering, and computer science. This representation continues to decrease at the graduate level. Increasing the representation of women in STEM areas is vital for several reasons. First, this increase will assist the United States in ensuring that individuals are prepared to assume the STEM workforce needs of the United States (Jackson & Laanan, 2011). Secondly, increasing the representation of women in STEM will allow for a “diversity of perspectives in the search for knowledge and solutions to human problems” (Blickenstaff, 2005, p. 383). Lastly, this increase will assist in future representation of women in STEM areas (Hill, Corbett, & Rose, 2010). Addressing this gender inequity and factors that impact the success of females in STEM is of significant importance. Mentoring and support systems have been identified as a key element in STEM success of female students (Creamer & Laughlin, 2005). The combination of community colleges being identified as providing effective avenues for increasing the representation of women in STEM coupled with community colleges being key players in increasing the representation of female students in STEM areas (Starobin & Laanan, 2005) highlights the significance of this study.

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## Support systems and mentee-mentor relationships

Support systems are found to have positive impacts on a female's decision to pursue STEM majors. These support systems exist on various levels including background levels and academic levels. Activity and program leaders who support gender equity acknowledge the instrumental role of parents and educators in encouraging young women's interest in careers in STEM (Creamer & Laughlin, 2005). Additionally, studies have indicated that women who decide to pursue nontraditional majors receive more support and encouragement and have more positive interactions with faculty, advisors, parents, and peers (Fitzpatrick & Silverman, 1989; Sax, 1994). Because women are more relational and are more likely to consult and take advice from others when making academic and career-related decisions (Seymour & Hewitt, 1997), having support and the opportunity to develop a STEM identity early provides women the opportunity to form positive relationships and engage with individuals who are in positions to positively impact their overall socialization experiences and adjustment.

Effective support systems and mentee-mentor relationships have also been acknowledged as positively impacting the self-efficacy of women in STEM. Starobin (2004) asserted that encouragement from both the home and school environment helps develop the self-concept of women in STEM areas. Teachers, counselors, and other individuals in education settings who work with women in STEM areas are in critical positions regarding the influence they have on women who aspire to pursue STEM areas. The quality of the feedback and advice given to these particular women could affect the self-efficacy and the perception these women have of their abilities to pursue STEM-related majors and careers. Bandura (1997) credited the success of women in STEM areas, despite academic and social obstacles, to their confidence in their abilities and capabilities.

For community college transfer students, in particular, the level of support is essential. Baum (1990) asserts, "Engineering must be made an attractive career choice. Where women engineering students are enrolled in programs in which they are a significant minority, they must be nurtured and encouraged to continue" (p.49). Research has also drawn attention to the importance of mentee-mentor relationships for women in STEM fields. Successful women in STEM understand the importance of mentee-mentor relationships. These relationships set the foundation and have the greatest effect on whether women choose to leave or continue in the science field (Subramaniam & Wyr, 1998). In a report by the U.S. Government Accountability Office, one professor asserted that mentors helped students by advising them on the best track to follow for obtaining their degrees and achieving professional goals (Ashby, 2006). Additionally, in September 2000, a congressional commission reported that women were adversely affected throughout the STEM education and career pipeline by a lack of role models and mentors (Ashby, 2006).

The college years are a critical point in attracting women in math and science disciplines. Even with this vital point of entry, "many colleges do not enroll enough women in their engineering programs to create a 'critical mass.' As a

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result of the underrepresentation of women in the aforementioned programs, female students often lack support systems and effective networking opportunities” (Baum, 1990, p. 48). The findings of this study (in terms of support systems and mentee-mentor relationships) will be of interest to community college and university faculty, staff and administrators and will assist in creating opportunities to increase the representation of women pursuing postsecondary degrees in STEM disciplines.

## **Study context and methodology**

The purpose of this study was to describe and understand the impact of support systems on the experiences of female community college transfer students in STEM majors. This study took place at a Research I institution in the Midwest. This institution is an international, prestigious university that enrolls over 25,000 students. According to *U.S. News & World Report*, this institution is ranked with over 100 majors and is among the top 50 public universities. To protect the identity of the university, the university will be referred to as the University of the Great Midwest (UGMW) from this point forward.

## **Data collection**

An interview protocol was developed to guide the interviewing process in this study. The protocol consisted of working topics and questions that highlighted the socialization experiences of community college transfer students in STEM fields. A particular interest emphasized support systems as it related to the pre-collegiate background experiences, community college experiences, transfer experiences, and university experiences. Probing questions were used as needed to obtain as much rich, thick data as possible.

Each interviewee participated in a one-hour semistructured interview conducted in March 2010. Semistructured interviews were designed “to explore a topic more openly and to allow interviewees to express their opinions and ideas in their own words” (Esterberg, 2002, p. 87). The use of semistructured interviews allowed the experiences of women pursuing masculine-dominated fields of study to be explored. Additionally, this methodology allowed the participants to interpret and make meaning of their pre- and posttransfer socialization experiences, including the people, places, and events, in their own voices. The interview was guided by an interview protocol, which consisted of semistructured questions. Each interview was audiotape recorded and transcribed verbatim.

## **Participants**

Email invitations were sent to 782 female students who were community college transfer students in STEM, majoring in a STEM discipline at UGMW between the Fall 2006 and the Spring 2009 semesters. Out of the 99 students who responded to the study invitation, a total of five female students were inter-

viewed in detail (Table 1). Pseudonyms were assigned to each of the interviewees. The participants for this study included five female community college transfer students (Table 1). The five interview participants were White female students. While the participants were homogeneous in terms of race and ethnicity, the participants in this study represented different STEM majors and entered the university with various community college credentials. Interestingly, the students who decided to participate in this study were classified as seniors and graduate students.

**Table 1.** *Background of Interview Participants*

| Females in STEM majors at UGMW |                                |                |                |                |                |
|--------------------------------|--------------------------------|----------------|----------------|----------------|----------------|
| Pseudonym                      | Community college credentials* | Classification | Major          | Status         | Race Ethnicity |
| Tonya                          | None                           | Senior         | Dietetics      | Nontraditional | White          |
| Kathy                          | AS                             | Senior         | Biochemistry   | Traditional    | White          |
| Beca                           | AS                             | Senior         | Animal Science | Traditional    | White          |
| Tiffany                        | None                           | Graduate       | Food Science   | Traditional    | White          |
| Kim                            | AS                             | Senior         | Kinesiology    | Traditional    | White          |

\*AS = Associates of Science.

## Data analysis

The data were analyzed using Creswell (2009) steps in the analysis of qualitative research. First, the data was organized and prepared for analysis. Afterward, all of the transcript data were reviewed to gain an understanding of the content of the transcripts. To “get a sense of the whole,” all of the transcripts were carefully read once without taking notes (Creswell, 2009, p. 186). Next, coding was conducted and notes were provided in the margins of the transcripts. Coding is the organizing of interview information into “chunks or segments of text before bringing meaning to information” (Rossman & Rallis, 1998). Themes were allowed to emerge during data analysis (Creswell, 2009). Descriptions were then generated from the coding process, and themes were represented and the data were interpreted. Recoding was used when necessary (Creswell, 2003). To ensure that the information accurately reflected the thoughts and opinions of the participants, the participants were allowed to add or retract information during the analysis process as they saw fit.

## Findings

The purpose of this qualitative study was to explore the impact of support systems on the experiences of five female community college transfer students in STEM disciplines. The female participants in this study indicated that they all grew up in the Midwest. Although all of the female participants enrolled in UGMW as

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STEM degree seekers, their socialization regarding their early social experiences, which Weidman (1987) referred to as precollegiate experiences, community college, and university experiences, were different. Additionally, their motivation for aspiring to pursue a STEM major was different and unique.

While the participants in this study were at different stages in their academic journey, they all expounded on the impact of support systems and mentee-mentor relationships. Table 1 highlights the demographics of the participants. Although the participants are homogeneous in terms of their race and ethnicity, they vary in their overall educational experiences. The female students highlighted their support systems and mentee-mentor relationships in three ways, which includes the impact of the following: family, community college and university faculty, and advisors.

The female participants, regardless of whether they were traditional students or nontraditional students, identified the varying levels of support systems as being essential throughout their academic journey in a STEM discipline. They mentioned supportive individuals at varying stages of their process.

## **Early background experiences**

The role of family is essential in the early understanding and fostering of STEM identities, activities, and behaviors. The literature highlights the importance of exposing female students to math- and science-based activities early in their overall development (Blickenstaff, 2005). Additionally, it is also essential to foster early identification of STEM interest among female students, in particular. Tonya, a nontraditional student in dietetics, highlighted the various organizations she was involved in and how her family was supportive in identifying and tailoring activities that focused on her STEM interest. She also highlighted the various part-time jobs she held during her K-12 experiences that were related to her interest in dietetics. When asked to discuss her support systems, Tonya recalled how her parents assisted her in identifying activities that were relevant to her interests and ultimately her major while in secondary education:

“I always liked science, and I liked being outdoors, and I raised livestock and showed animals at the fair, and I did 4-H and FFA. I did cooking and nutrition and things like that for 4-H. Once my parents figured out what I liked, then they helped me kind of tailor to that. They let me figure out kind of the area and then they helped push me along.”

In addition to ensuring that students have a good foundation and interest in STEM, the role of family is also essential even after an individual enrolls in a STEM major. When Kim decided to enroll at UGMW, she had a really good family support system that encouraged her along the way. Kim’s support system included her father and brother. Her husband, a university professor, also was one of her supporters:

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My family was really supportive. . . . We have no family here so I just have my husband and my kids here, and then my family is in [a Midwestern state] and they were really supportive. When they can't do anything to help me, they were supportive.

Tiffany, a graduate in food science, did not complete an Associate's degree prior to transferring to the university. She did not have family members who were professors. Therefore, she did not have individuals who were familiar with the academic culture. Regardless of this fact, she highlighted the importance of simply having individuals who are supportive of her academic aspirations. She asserted that her parents were always supportive of her decisions: "My parents always supported me in my decisions . . . both my parents. I have a brother and they support him in his academic ambitions."

Kathy, a senior in biochemistry, highlighted that while her parents may not have clearly understood her areas of academic interest, they served as a source of validation in ensuring that she fulfilled her goals. She describes her parents as follows:

They are very supportive. They want me to do what I want to do. They don't really give their opinion. Rather, they make sure that is what I want to do and that I completely thought things through and have a good plan in mind.

The female participants identified their family as serving as points of early exposure to STEM areas, but it was the academic environments in which the female students began to learn more in-depth about STEM areas, the careers they could pursue with a STEM degree, and the overall transfer process.

## **Academic environmental influences**

**Community college faculty and advisors.** In addition to family serving as support systems, the participants discuss the role of the faculty and advisors in their success in STEM. Tonya, a nontraditional student, identified a community college faculty member as very influential in her experiences in dietetics. Tonya initially pursued nursing because her mom wanted her to become a nurse. Tonya, however, was not interested in nursing and did not want to pursue nursing as a career. After being in the nursing program at the community college for a semester, she approached one of her professors in nursing and explained her circumstances and dissatisfaction with being in the nursing program. She expressed to her professor that she was going to discontinue enrollment in the program because she was not interested in nursing. Tonya also explained that she would return to school after she figured out what she wanted to do. The professor looked at Tonya and said: "You know . . . I did the same thing." Tonya explained that those simple words made her feel empowered. Hearing these words from "such a successful nurse and successful teacher in the nursing program" helped Tonya understand that she was not a failure because of her decision to put her education on hold. Tonya expressed:

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“Here’s this woman who was very headstrong . . . but she cared enough and she knew. I mean she has experienced the same things. She dropped out at some point and then went back to school. She had experienced that and was like, ‘Yeah, I did do the same thing.’”

Tonya was at a very critical point in her decision on whether or not to continue pursuit of an undergraduate degree in nursing. While Tonya wanted to discontinue her enrollment in the program and return to school after deciding what she wanted to pursue, there were some reservations on whether her exiting school would result in difficulties returning as a STEM major. The literature indicates that students who do not choose to pursue STEM academic paths do so during their undergraduate academic journey (Matyas & Dix, 1992). While the community college faculty member with whom Tonya spoke was not a faculty member that she had in class, the faculty member was very influential and supportive of her decisions regarding her academic journey. The experiences with this particular faculty member validated Tonya’s experiences and placed her in a position to make an informed decision regarding her individual pathway. Tonya later enrolled at the university and completed a bachelor’s degree in dietetics. Kathy, a traditional student in biochemistry, also found her support systems with faculty at the community college to be beneficial as well. Kathy had many experiences in STEM areas prior to enrolling at the community college. She became fascinated by the idea of explaining how living things worked by chemical and physical laws. Her community college faculty member increased her knowledge on the various areas and career paths available with a degree in biochemistry. Being able to see the big picture of what a degree in biochemistry could provide her further increased her desire and motivation to pursue this area of study.

[The faculty at the community college] were very friendly. I liked them a lot. We all knew each other by our first name pretty much. I had kind of a mentorship with a biology professor that I was talking about before. We often spent a lot of time not just with that professor but also with a lot of other ones outside of the class discussing topics within their field. . . . I still keep in touch with a few of them . . . We were almost like friends.

Beca, is a traditional student majoring in animal science. Upon completion of her bachelor’s degree, she planned to go to veterinary school. Beca was very clear about her career aspirations and transferred to the university after completing her associate’s degree. Beca, like Tonya and Kathy, also found her community college professors to be a great deal of support. However, she explained her support in terms of being accessible and understanding of life situations that may arise.

I love my community college professors. They are so helpful. They’re there all the time. It’s like you can just go to their office. You don’t have to set up an appointment. You can talk to them [about] like what’s going on in class like if you missed a day, you can get the notes from them. You don’t need to find a fellow student. They were just super, there to help you. I think they were fantastic at helping me.

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In addition to feeling supported by the community college faculty, the students also expressed how the community college academic advisors assisted in their overall understanding of what to expect at the university. Tiffany, a traditional student in food science, discussed initially feeling overwhelmed with the transfer process and what to expect in terms of transferring from the community college to the university. Meeting with her community college advisor prior to transferring eased some of Tiffany's anxiety regarding the new environment.

Meeting with my advisor at the community college before attending [UGMW] helped me feel comfortable about the transition and have an understanding of what to expect upon transferring.

Beca expressed many of the same sentiments regarding the role of the community college advisors in terms of the overall transition and adjustment to the university: "Help from an advisor and other faculty made it pretty easy to make the transition."

**University faculty and advisors.** Although Kathy found her interactions and experiences with the community college faculty to be beneficial and valuable, she recalls a time when she did not feel supported by the university faculty. This instance occurred with a faculty member who taught her class. This experience, in turn, affected her future participation in this particular class. Kathy understood the nature of STEM and what it took to be successful as a female in STEM. She participated in every class discussion while at the university and was very engaged in the course. Kathy felt that her outgoing spirit in class regarding participation and asking questions was not well received by her peers, thus feeling a little of the "chilly climate" among her peers. Additionally, she would pose questions that did not receive a response from her peers. Kathy expressed how she did not feel supported by the faculty member in the class in terms of the treatment by her classmates. Consequently, her class involvement began to suffer. Kathy expressed the reaction from the university faculty member as follows: "He [the university faculty member] just basically stayed out of it and he didn't participate. . . . I kind of toned down my participation after that."

While Kathy believed that effectively engaging in class in the university setting was an expectation, she soon adjusted to the dynamics of the course.

Beca expressed a similar situation with her university professors. When asked to describe her support systems at the university, Beca indicated differences regarding her interactions with the university professors. She stated: "Here, some professors don't even like to answer questions. I feel like some of the professors are here teaching because they have to and not because they want to."

Similar to Kathy, Beca had to make adjustments at the university and understand the institutional differences.

Tiffany, a food science major, had a positive experience with her university professors. She contributed such experiences to having interacted with them while she was still in high school. Tiffany did not complete an associate's degree

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prior to enrolling at the university. Tiffany discussed how her interactions with the university professor while in high school impacted her perceptions of university faculty and the level of expectations regarding support. This early exposure with university faculty assisted in her comfort level and dismantled many of the perceptions of university professors in STEM. Tiffany expressed how this early connection assisted in her transition to the university environment:

I think I knew a lot of faculty pretty well. I had known [a certain professor] from when she helped us in high school. I spoke with [a professor] during the transfer process. I had met with him and right away when I came, he was an advisor in the Food Science Club, so I got to know him through that.

Interactions with university professors while in high school allowed Tiffany to network and build relationships with individuals with whom she would later be working with.

The students also discussed the role of the university advisors in their support systems. Advisors were also identified as essential in the system of support for female students in STEM. Kim talked in great detail about her experiences with her academic advisor at the university. Kim began her academic journey at the community college as an engineering major. She quickly decided that she did not want to major in engineering. After someone at the community college mentioned an exercise major to her she quickly looked into this option and decided to pursue a degree in kinesiology. Upon transferring to the university, she majored in kinesiology and discussed how she valued her experiences and the role that her university academic advisor played in her transition and adjustment to the university environment. When asked what was the most helpful in transferring to UGMW, Kim responded:

The most helpful? I would say my university advisor. Yeah. Hands down. It's really good to have a good advisor. She knew everything. She just sat down and told me to bring in my transcripts and she just knew everything that would pretty much transfer. If it had not been for my advisor, I would not have continued with school.

The female students in STEM had similar experiences regarding their support systems at the community colleges and university. Having support systems in different areas of expertise- STEM areas and transfer areas benefited the female students greatly. Regardless of their academic STEM major or whether they were traditional or nontraditional students, the level of support they received was impactful.

## **Discussion and conclusion**

This study explored how community college transfer students in STEM majors at a research university describe and make meaning of their support systems on two main levels: background level and the academic environmental levels. In this

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study the notion of support systems was deconstructed to understand how students of multiple marginalized groups (females in STEM and community college transfer students) describe and make meaning of their support systems. While the findings of this study may be similar to the findings of other studies that focus on support systems, it is clear that the successful female transfer students in STEM in this study benefited from their support systems on all levels by increasing awareness in STEM areas, increasing validation for pursuing STEM areas as a female and assisting with transfer preparation. Additionally, the findings support the literature highlighting that family, faculty, and advisors all play an essential role in their persistence and retention while pursuing degrees in male-dominated areas of study (Creamer & Laughlin, 2005). The students were very clear regarding the impact of support for females in STEM.

### **Early background experiences**

All of the students in this study had early exposure to STEM areas. This exposure came through different extracurricular activities and job opportunities. With societal expectations regarding gender roles and expectations, having support systems and structures that support and challenge the expectation of gender-specific roles validated the STEM interests of the female students. One student expressed how her early involvement in 4-H and FFA increased her interest in STEM areas and confirmed her desire to initially work with livestock and eventually pursue a career in dietetics. Similarly, the female students elaborated on how their family, during their impressionable years, supported their interest in STEM instead of leading them into areas that more aligned with gender-specific expectations.

### **Academic environmental influences**

Faculty and advisors at the community college proved to be great support systems for female students in STEM areas. While the female students in this study identified their early background experiences as playing a vital role in their STEM interest, they credited their early academic motivation to persist through their STEM degree to their experiences at the community college. As suggested by Seymour & Hewitt (1997), the female students in this study discussed how the community college faculty members served as avenues for mentoring and consultation. The community college faculty members assisted the female students with understanding their own experiences regarding STEM and their overall interest in STEM. The faculty proved to be an authentic source of encouragement that allowed relationships to develop among the faculty and students. Additionally, the community college faculty members assisted the students with understanding the different careers they could pursue with a STEM degree and validated their desires to pursue STEM areas of study.

Regarding academic advisors, the female students credited the academic advisors at the community college with preparing them for transfer in terms of their social and psychological adjustment. The academic advisors at the community

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college assisted students with the overall transfer process and what to expect at the university. Having academic advisors who were knowledgeable and in positions to prepare the female students, who were already in a vulnerable position in terms of STEM areas, made their transition into the university environment smoother.

While similar support systems were expressed by the female transfer students upon transfer to the university, one student, however, did identify a time when she did not feel supported by the university faculty member. This greatly impacted her overall involvement. This may have been due in part to the contrasting experiences of the female students in the community college and university environments. Interestingly, while all of the students identified support systems as being vital to their success, the students did not seem to have a preference over whether the support systems consisted of males or females, which challenges the thought that mentors must be of the same gender as the mentee to be effective.

## **Implications for practice/recommendation**

This study highlights essential implications for faculty and advisors within both the community college and the university environments. Regarding community colleges, the students explicitly highlighted the positive interactions and experiences with community college faculty and advisors. They elaborated on how they felt comfortable interacting with the faculty. They also expressed how they felt the community college faculty genuinely cared about their progress and success in STEM. Additionally, the female students indicated feeling that the community college faculty took the time to understand their feelings and authentically shared their own personal experiences as examples of the different academic journeys. One student even referred to her relationship with the community college faculty as a “mentorship.” The academic advisors in the community college setting were also beneficial by preparing the female students for transfer. In contrast, one female student expressed feeling isolated and unsupported by the faculty at the university. The students highlighted not clearly understanding the classroom expectations and the role of the university faculty. The female students also indicated feeling like some of the professors “are here teaching because they have to and not because they want to.”

Community college transfer students in STEM are at critical points in their academic journey and support systems are essential. Community college faculty, staff, and administrators are in ideal positions to prepare students, more specifically female transfer students in STEM, for the university environment. Students at the community college have formed relationships with faculty at the community college and, in some ways, look to community college faculty for guidance. It is important for community college faculty and advisors to realistically prepare students for the university environment. Helping the female students to understand that the university environment will be different from that of the community college environment is essential. The differences will be among the teaching styles and interactions with faculty and peers, classroom dynamics, and

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overall expectations. Additionally, assisting the students in understanding that, like the community college environment, differences will exist among faculty even within the university environment, will help the students to understand that no two environments will be the same. A large part of education is being able to adjust to multiple environments. Encouraging students to be flexible and open to a variety of teaching styles, approaches, and foci allows students to make a smoother adjustment to the university. Additionally, helping the students understand the differentiating roles of the community college and university faculty assist students in successfully making the academic and social adjustment to the university. Educating students on the different types of learning environments and classroom dynamics as well as the variations in levels of support systems prepares students to be successful in multiple types of environments. Encouraging female transfer students to be proactive in seeking mentors and mentoring relationships as well as motivating students to become involved at the university will allow students to feel connected and will essentially make available resources that the students may find beneficial.

The success of transfer students is the responsibility of both the community college and university. University faculty are also in positions to ensure that female community college transfer students in STEM feel supported through their academic journey. University faculty should visit with prospective transfer students in the community college environment and provide opportunities for prospective transfer students to visit the university environment prior to transfer. Interacting with community college students prior to transfer assists in breaking down preconceived perceptions that students may have of the university environment, faculty, staff, administrators, and students. Learning communities have been identified as models that foster engagement among female students (Chaves, 2006) and also serve as an avenue for support among female transfer students in STEM. Encouraging female students to participate in learning communities specific to their respective STEM majors allows the large university environment to appear to be smaller and can assist in developing support systems among involved faculty, staff, administrators, and peers.

Partnerships among community colleges and universities are effective success models for transfer students; more specifically, transfer students in STEM. Partnerships assist students in understanding that both institutions are in support of their academic success in STEM. This may subside the comparisons among the different institutional types that students may have. These partnerships also allow for consistent information regarding transfer courses and credits and university expectations. If the representation of female community college transfer students in STEM areas is to increase, changes and modifications must be made on all levels.

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