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How Faculty's Academic Support Influence First-Year Female Students in Aviation: A Qualitative Case Study

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An increasing number of female students are enrolling in aviation education institutions to pursue their dreams. To combat the issue of the underrepresentation of females, this case study explored the significance of faculty's academic support to first-year females in aviation. There is scant research surrounding the topic of faculty in higher education and their perspectives on academic support. This case study aimed to bridge the existing literature gap related to faculty's academic support and teaching styles to first-year female students. This qualitative case study's objective was to increase awareness of the importance of faculty's academic support and better understand how academic support can be improved among other higher education institutions. The qualitative research design brought in seven faculty members employed at a higher education institution in the southeastern United States. The participants in this study taught aviation-related courses, and their participation took place remotely via Zoom in the format of semi-structured interviews. After obtaining institutional review board (IRB) approval, the qualitative data collected from in-depth semi-structured interviews helped identify prominent aspects and patterns that higher education faculties in aviation recognize as significant for academic support. This study's findings have theoretical and empirical implications that can better serve underrepresented students in aviation and provide meaningful guidance to current faculty on how academic support can be better provided. In conclusion, this study's practical findings could bring awareness to females' underrepresentation, a subject that is not currently widely studied or discussed in educational aviation institutions.

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Women are underrepresented in aviation, and the issue of low representation of women in aviation must be addressed amid a global pilot shortage (Karp et al., 2001). Previous research has been conducted to understand what it takes for female flight students to succeed in aviation higher education (Kim & Albelo, 2020). However, current literature related to underrepresented aviation students and academic support from the faculty shows that little research has been done regarding the faculty role in providing academic support to first-year female students in aviation—the present study framed faculty mentorship for the scope of research. A qualitative case study was used to analyze a small group of aviation faculty and identify how the faculty provide effective academic support to first-year female students in aviation.

Research on the perceptions of underrepresented aviation students has found that the number of females entering the aviation industry and the rate of retention in higher education institutions (HEI) remains low (Mattson et al., 2007; Wladis et al., 2015). Furthermore, Hurtado and Ruiz Alvarado (2015) found that the faculty's academic support can become a valuable opportunity to discuss and learn about different issues in diverse classrooms. The problem is that current research has not explored how aviation faculty provide academic support to female students and how these practices have impacted their academic success. The research question guiding this study was: How do faculty academic support influence first-year female students in aviation? This study targeted the role of faculty in providing academic support to females in an aviation specialized HEI. Furthermore, the present study strives to add to the existing literature in aviation education on academic support for women in aviation. The present study creates an initial bridge on the existing gap in the literature related to women in aviation and the academic support they need in order to complete a four-year degree.

Literature Review

Current research showed a systematic analysis of the overviewing theories related to the retention of women in aviation (Morrison, 2019). Furthermore, significant literature expands on other STEM faculty members' practices to ensure success among their students (Boehm et al., 2017; Dennehy & Dasgupta, 2017). Educational researchers have explored how perceptions of underrepresented aviation students and the academic support provided by higher education institutions (HEI) influence their academic success (Karp et al., 2001; Turney, 2000).

Perceptions of Underrepresented Aviation Students

An overwhelming amount of research claimed that females in the aviation industry continue to lack in numbers despite steadily increasing over the past few years (Clark, 2006; Ison, 2009; Karp et al., 2001; Morrison, 2019). Luedtke (1994) affirmed that female students shy away from joining the STEM HEI, and as a result, the number of female STEM graduates is lower than ever before. It is important to realize the demand that awaits thousands of graduates coming out of the STEM field of study and maintaining an acceptable retention level. Similar to STEM, the number of women interested in entering the aviation industry and the pool of talented female pilots in the current workforce remains low, which can be a sign of low retention rate of females in the undergraduate HEI (Mattson et al., 2007; Turney et al., 2002). Female student pilots are aware of the importance of the issue at hand, which is the underrepresentation of female students in the aviation HEI (Kim & Albelo, 2020). Depperschmidt and Bliss (2009) concluded that female flight students were often discouraged from achieving success in aviation HEI due to their perception of the lack of female representation in administrative and faculty

positions. Therefore, the aviation HEI must focus on identifying racial discrimination, but it is only possible when the representation of female students is improved (Hurtado & Ruiz Alvarado, 2015).

Academic Support

Academic support is a term that can be defined in various ways as it can be referenced to instructional methods, educational services, school resources, supplemental courses, teacher advisors, counseling, or academic support strategies (Great Schools Partnership, 2013). Another debate that revolves around the idea of academic support is the level and the degree of impact it will play on the student. Saks and Karl (2004) stated that assessing academic support's effectiveness could be challenging as it can be used as either long-term skill development or short-term grade boosting tutoring. Therefore, HEI must develop a strong foundation for an academic support system that incorporates programs that can benefit both long-term and short-term effects (Paul et al., 2009). However, current research has only focused on the importance of early identification of strugglers and providing an early support system (Boehm et al., 2017; Dennehy & Dasgupta, 2017; O'Neill et al., 2016). Moreover, other researchers agreed that promoting diversity in the pool of faculty would encourage more female students to commit to studying aviation because of the value of face-to-face interactions with female role models (Gumpertz et al., 2017; Ison, 2010). Thus, the demand for impactful academic support from a diverse faculty remains high, especially for the underrepresented aviation students.

Theoretical Framework

Luedtke (2011) argued that globalization has helped change male dominance in the aviation industry. As a result of such a rapidly expanding industry that is now entirely globalized, the focus of teaching and training a diverse group of students is being emphasized within the aviation industry (Stokes et al., 2015). However, to further improve underrepresented female flight students, faculty members should apply the theory of teaching and capitalize on their mentorship capabilities.

Faculty mentorship is a valuable tool where experienced faculty with proper licenses and achievements can guide an inexperienced individual, usually a student, for further development (Savage et al. 2010). It can be used to explain the relationship between teaching and learning and identifies factors that can serve as guidelines for a more meaningful faculty-to-student connection. The present study is rooted in the theory and fundamentals of teaching and has been adopted and revised as a tool with benefits to focus on improving the quality of education and guidance provided to students (Adkins et al., 2021; Fuentes et al., 2014; Savage et al., 2010). Recruitment and retention of female students into STEM and aviation HEI has been a global challenge in the 21st century (Hurtado et al., 2009; Karp et al., 2001; Wladis et al., 2015). Emphasis on the impact of faculty mentoring for first-year female students in the aviation HEI is critical for determining the attrition rate. A student's first-year experience (FYE) can signify the quality of students' academic and social experiences, and the HEI can use this information to assist in improving educational outcomes (Boehm et al., 2017). Moreover, Young et al. (2014) concluded that in a high-risk industry such as aviation, first-year students could experience a significant level of environmental pressure and become overwhelmed.

However, close relationships with faculty can ease the stress that students will experience at any level of education and allow them to find a healthy method of reducing anxiety and the risk of dropped academic performance (Spilt et al., 2015). Faculty must identify a struggling student in an early stage before the student enters the training portion, which poses a greater level of threat. Based on faculty

mentorship, there are three paths on recommendations for faculty to serve the URM better. A portion of studies suggested a university's tutoring system as student and faculty mentors can better act as role models in a less hierarchical setting (Luedtke, 1994; O'Neill et al., 2016). Another portion suggested undergraduate research opportunities to broaden the perspective and students' experience (Hurtado et al., 2009; Stokes et al., 2015). The remaining portion firmly believed in increased structure-based courses with higher formative assessments, in-class modules, and collaborative workshops (Ison, 2010; Mattson et al., 2007; Wilton et al., 2019). Faculty mentorship has proven beneficial, especially in STEM-focused institutions, so further analysis into how faculty mentorship can benefit first-year female flight students will provide a notable input to better serve these underrepresented students (Lisberg & Woods, 2018). It is crucial for aviation HEI faculty to understand the impact of their teaching and mentorship on these students and find ways to modify the existing instruction format to serve the female students better.

Methodology

Design

Creswell and Poth (2018) argued that qualitative research is an appropriate choice because it is a bounded system. Specifically, a case study approach was selected to provide insight into a particular issue (Merriam & Tisdell, 2016). Case studies are best described as a "detailed, in-depth data collection involving multiple sources of information-rich in context." (Creswell & Poth, 2018). The primary intent of this design was to obtain a holistic view of the participants involved in the research while narrowing the broad view of the phenomenon to specific themes as data accumulated.

Site and Sample

This study was conducted in a HEI with an aviation program located in Florida. The faculty within this institution has a diverse faculty body with a wealth of experience in both teaching and the aviation industry. Because qualitative research focuses on the in-depth understanding of a small sample (Creswell & Poth, 2018), seven targeted faculty members agreed to participate in this study. Only logical generalizations were made, given the small sample size. Faculty participants included two males and five females. Two males identified themselves as Caucasian and Hispanic, while females identified themselves as Caucasian. Table 1 illustrates the participants' demographics using their pseudonyms.

Table 1

*Participants Demographics (*Pseudonyms)

Pseudonym	Ethnicity	Age	Years Teaching	Degrees
Daisy	Caucasian	32	13	BS, MBA
Dorothy	Caucasian	42	20	BS, MS
Sophia	Caucasian	34	6	BS, MS, Ph.D.
Blanch	Caucasian	52	16	BS, MS, MBA
Phillip	Caucasian	38	6	BS, MS, Ph.D., GradC
Jose	Hispanic	30	6	BS, MS
Alice	Caucasian	62	20	BS, MA

Procedures

After receiving approval from the Institutional Review Board (IRB), 11 emails were sent to targeted faculty members containing a detailed description of the research. Purposeful sampling was used to select the sample within the case (Merriam & Tisdell, 2016). Students were not considered as maximum variation sampling was attained by "identifying and seeking out those who represent the widest possible range of the characteristics of interest for the study" (Merriam & Tisdell, p. 98, 2016). Faculty members who agreed to voluntarily participate emailed the researcher with their availability to schedule the interviews.

The researcher conducted individual semi-structured interviews with each faculty participant to capture their descriptions of academic support provided to female students. Table 2 shows the semi-structured, open-ended questions used for the interviews that ensure consistency with the case inquiry (Yin, 2014). The interview questions were reviewed by an external subject matter expert (SME) to increase the validity, credibility, and transferability of the present study, in addition to being grounded in the existing literature. The researcher audio recorded the interviews, transcribed them, and sent them back for member checking.

Table 2

Semi-Structured Interview Questions

1) How would you define academic support?
2) How would you describe the academic support you have provided to first-year aviation female students?
3) How would you describe the challenges that first-year aviation female students face?
4) What are some of the perceived challenges of flight training and aviation education?
5) Please describe poor academic performance.
6) How would you describe aviation female students' willingness to seek academic support?
7) As adult learners, what are your expectations of first-year female students in aviation?
8) What are your perceived needs of female aviation students?
9) Describe the ideal academic support meeting with a female student.
10) Describe the ideal learning environment for female students in classrooms.
11) What else do you think would be important for me to know about academic support for first-year female aviation students?

Data analysis

After transcribing the interviews, the researcher became familiar with the data by reading through the transcripts multiple times. At this stage, the researcher annotated short memos to the transcripts. After

reading and recording memos, the researcher emerged with a tentative code list. Creswell and Poth (2018) define coding as the process of grouping the text into categories prevalent across all forms of the research data. The final analysis resulted in 3 themes: understanding when to intervene as a faculty, acknowledging perceived challenges and needs, and providing academic support. Then, the data were interpreted within the context of the theory of teaching. Finally, the data analysis concluded with the representation of the data. Data representation helps visualize the themes and the relation to the phenomenon (Merriam & Tisdell, 2016). The visual representation of the common themes is illustrated below in figure 1.

Figure 1

Common Themes Visual Representation

Like in any other type of research, determining scientific rigor and understanding is empirical. Credibility was established by requesting a member check from the participants to ensure that their essence was fully captured (Creswell & Poth, 2018). Participants reviewed the transcripts for accuracy and any missing information. Feedback from the participants showed that themes capture their own sense of reality through their descriptions. None of the participants suggested editorial changes. Dependability and confirmability were established by following the format outlined by Yin (2014). The researcher arranged the evidence to enable the readers to determine the reliability of the study.

Findings

Information collected from the personal interviews was analyzed to answer the research question, and themes were developed from recurring codes to describe how the participants defined academic support and its impact on first-year female flight students in the aviation education field. First, a tentative code list was developed, where coding was used to group the text into categories (Creswell & Poth, 2018). Then, the data were interpreted within the context of the theory of teaching, followed by the

representation of the data using the prominent themes. Finally, after notable statements from the participants were grouped, three major themes emerged that answered the problem statement (see Table 3).

Table 3

Open Codes and Themes

Open codes	Appearances across data sets	Category
Help	50	Understanding when to intervene as a faculty
Poor performance	22	
Professor	18	
Willingness	14	
Struggle	13	
Interaction	11	
Interest	10	
Office hour	10	
Attendance	5	
Appointment	3	
Needs	23	Acknowledging perceived challenges and needs
Challenges	22	
Motivation	13	
Goal	11	
Women in aviation	10	
Respect	10	
Stereotype	8	
Representation	7	
Community	5	
Intimidating	5	
Academic support	61	Providing academic support
Mentor	20	
Participation	12	
Experience	12	
Involvement	9	
Opportunity	8	
Career	7	
Relationship	6	
Role model	6	
Knowledge	4	

Theme 1 Understanding when to intervene as a faculty

To provide proper guidance and academic support to a student, the faculty must first understand the signs and timing for when a student is struggling and might be requiring extra attention. It is difficult as a faculty in higher education as the curriculum requires a rapid turnaround period for students every term, and it is even more challenging to assist students who are more independent than from K-12. Participants were asked to define poor academic performance from their years of teaching in higher education. Commonly overlapping themes emerged within the spectrum of poor academic performance by a student. The mental withdrawal of a student was one of the main signs of poor academic performance; as stated by Daisy, "not willing to try, not willing to talk to me, not willing to make changes if your grades or your performance in the classroom isn't doing well." Similarly, Dorothy added to this point, "not engaging with the material, not engaging with the material outside of class because a lot of what happens has to happen outside of class, resulting in poor test grades." Many participants seem to agree that some of these signs come up early in the term and can lead to further detrimental study habits and poor performance.

Another common theme identified by the participants was attendance and test grades. Blanch commented, "the first test is usually a really good gauge and how people are going to perform for the rest of the class period or the rest of the semester." Along with Phillip's comment that "poor academic performance is partially grade based," Blanch claimed that attendance is an important sign for the student's level of commitment and, therefore, is a good measuring tool for how the student will perform in the class. Sophia added an interesting perspective to the argument as she shared poor academic performance may have "to do with not being prepared for whatever reason, maybe they're not prepared for the college setting, maybe they're not prepared because their prerequisite courses didn't adequately provide them the background needed to enter that class." Nevertheless, test grades, midterm progress reports, and attendance are effective tools that faculty can utilize to gauge students' academic performance.

Theme 2 Acknowledging perceived challenges and needs

In order to understand how academic support can be better provided to first-year female flight students by the faculty, the students' perceived challenges and needs must be acknowledged. As a female student in a rather homogenous field in gender population, there will be physical challenges and some invisible perceived challenges. One of the challenges is the lack of an on-campus representation environment in aviation higher education institutions. Blanch supported this claim, "I saw a need for the female incoming [sic] students to have people that look like them. There's not a lot of females on our campus and the fewest female population is in the College of aviation." Furthermore, one of the perceived needs that were identified by the faculty is that female students need to feel included, and Blanch further stated, "because there's [sic] so few females, so let's all bond together and support each other." Students who are exposed to more female role models from the current industry will have more drive to pursue this degree and achieve a greater level of success. In addition to inclusion, female students feel the need for acceptance by the institution and the faculty, and this point was carried out by Phillip as he stated there is "a need for feeling comfortable in the environment that they're in." More inclusive group studies and collaborations are welcomed ideas for creating an open and comfortable environment. This point related to creating a welcoming environment for female students was prevalent in the participants' responses.

Intimidation was a common theme among the participants' responses as a factor that greatly influences female students' academic success. Jose and Alice both stated that female students could be intimidated by being in a classroom full of male students and faculty. Especially in the aviation field of study, the gender proportion may not be as balanced as in other studies. Sophia stated, "that diversity in their instructors and their teachers brought to the classroom to show a variety of diverse figures in that field to promote interest" is essential in increasing the level of visibility in classrooms. Intimidation is a factor that cannot be examined at face value, so further creating a safer environment where any concerns or comments from the female students can be openly discussed and brought to the faculty's attention is critical.

Theme 3 Providing academic support

The core of the research focused on academic support provided by the aviation faculty in higher education in order to serve the underrepresented female flight students better. Reasons and methods for providing academic support were prevalent in the responses of the participants. The participants in this study seem to agree that academic support is critical in better serving the student body as students experience hardships and perform poorly in classes. Daisy stated that academic support "can be strictly classroom support, anticipating the needs of your students, diversifying your lessons to different types of learning needs, but it can also mean giving support to your students outside of the classroom." Many participants seem to agree that there are different types of learners and students who come from different cultural and academic backgrounds. As a result, it is important for faculty to acknowledge and identify these different types of students in order to provide the most beneficial academic support. Dorothy further identified the need for specialized academic support by defining it as "accommodating different types of learners and providing the same information in a lot of different ways." Comments made by the participants can observe the reason for providing academic support. Jose stated academic support needs to be the "engagement between the student and the professor" as they work towards their common academic goal. He further makes a valuable insert by stating that the faculty needs to "be part of that student progress from day one all the way until the last day."

Shifting focus towards methods for providing academic support, Jose's previous comment about student progress is worth mentioning. When asked about how academic support should be provided, Sophie commented, "it's a university-wide effort, and it extends beyond the university as well, it comes from your parents, your community, the rest of your family and your friends, it starts in high school, obviously, and younger." The importance of academic support should be highlighted at a higher education level and across the whole spectrum of educators and learners. There is no doubt that there will be a variety of methods on how different faculty can provide academic support to students. These types can vary from flexible office hours, interactions in and outside of classrooms, online presence, and availability to class activities designed for inclusion and open discussions. Academic support can certainly vary in shapes and forms depending on the faculty and the nature of the subject being taught. However, it has been proven that despite varying methods of academic support, its presence has significance to the students' academic performance (Saks & Karl, 2004). Therefore, there is a need for the faculty to identify the different academic support methods offered in higher education and understand the reason for implementing a support system for the students.

Limitations

There are numerous limitations associated with qualitative research. First, though the researchers implemented a purposeful maximum variation sampling strategy to increase the exploration of different perspectives (Merriam & Tisdell, 2016), only seven of 11 targeted faculty members showed interest in participating. Therefore, it results in a limited variation among participants in terms of gender, years of experience, and academic background. Furthermore, the study only examined faculty members' role in providing academic support to first-year aviation females at one major aviation university in the United States. Therefore, it is crucial to point out that faculty roles and support initiatives might be different at other major aviation academic institutions.

Discussion

Three themes were identified in the qualitative data findings: as faculty, the importance of understanding when to intervene, acknowledging perceived challenges and needs, and providing academic support. Based on these themes, it is evident that higher education faculty understands the need for a better academic support system for first-year females in aviation. Individual teaching styles are accepted for the variation of what one may define as academic support. There is no right or wrong method to provide a more welcoming and valuable learning environment for these students. From the themes developed in the case study, it is evident that faculty are aware of their students' needs and are willing to find new methods to better approach them. Every student comes from a different background, and it is important as a faculty to connect and understand their individuality and unique learning styles. This study focused on the significance of the faculty's academic support, but identifying solid solutions regarding teaching methods is up to the individual faculty to determine according to their situations.

This study encourages a further focus on the teaching side of aviation-related to underrepresented female flight students and identified a common theme prevalent in aviation faculty in higher education. This case study focused on the influence of faculty's academic support for first-year females in aviation. The study conducted semi-structured interviews with seven faculty who are employed at an aviation higher education institution to identify prominent aspects and patterns that aviation higher education faculty recognize as the significance of academic support. The research focused on the theory of teaching, which helped explain the relationship between teaching and learning, and identify the factors related to the concept of teaching. The research was conducted as a qualitative study as it was the most suitable method of data collection and delivery of findings. After the data collection and analysis, the results showed that faculty members value understanding when to intervene, acknowledging perceived challenges and needs, and providing academic support. These themes were identified among the seven faculty members who have participated in the interview. The findings of this qualitative research aimed to better serve underrepresented students in aviation and provide meaningful guidance to current faculty on how academic support can be better provided. As the number of female pilots in the industry increases, more students will enroll in these programs, providing a reason for a better academic support system.

Practical Contributions

The findings of this study have theoretical and empirical significance, along with practical implications, higher education administrators, faculty members, and aviation students. While there have been various studies that explored aviation attrition (Karp et al., 2001; Turney et al., 2002) and predictive

factors of academic performance in higher education (Turney, 2000; Wilton, 2019), there is scant literature focusing on the significance of faculty academic support provided to first-year female students in aviation. Therefore, this research's empirical findings can be used to understand better the impact of faculty academic support and its impact on students. Not only does the study have practical significance for aviation educational leaders and female students, but it also provides essential insight into faculty knowledge, willingness, and ability to provide academic support to aviation female students. The present study strives to increase understanding of academic support services necessary to promote educational initiatives that support and retain females in aviation education.

Conclusion

Starting out as a first-year student in higher education is not easy, especially for female flight students. It is critical that different factors that impact the student's learning experience be examined and further incorporated into the faculty's academic support, as discussed in this study. Similar research can be conducted focusing on a different selected group of participants, such as studying the administration side of higher education. In addition, more research can be conducted on how faculty's academic support impacts first-year students and students enrolled in graduate or doctorate programs in the aviation sector. Different groups and perspectives of higher education must be included in order to improve the retention rate of female students enrolled in STEM studies.

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