

The Impact of a Gamified Orientation Program on Underrepresented Minority STEM Students -
A Qualitative Case Study

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Chapter 1: Introduction to the Study

Introduction

Universities across the United States are using gaming design elements as an alternative educational tool to diversify their pedagogy strategies to help increase learners' engagement, motivation, and momentum among struggling students who fail to the initiative through traditional teaching channels. Practitioners consider the gamification concept, not a new teaching concept, but how to take the full advantage of incorporating gaming design elements into a lesson plan. Deterding, Dixon, Khaled, and Nacke (2011) describe gamification as the transfusion of game elements in non-game situations. Educators from K thru higher education have been using these methods far in advance of the first documented case of gamification in 2008 (Deterding et al., 2011), and the concept of taking tasks that may be routine and adding some fun and competition to them is what drives the widespread use.

Game-based design elements like badges, rewarding points, and leaderboard scoring (Marrs, 2017) have been around to get students more active, involved, and engaged. Anyhow, the education field started to develop the awareness of the gaming design technique in a non-gaming context. Students compete with each for the leaderboard standings through applications such as Kahoot and Quizlet to earn points and badges for knowing the material taught previously. One area in higher education that has limited use of game design elements is in college orientation programs—the formal orientation program linked to the thriving college transition both in student accomplishments and retention.

Orientations have been a critical fixture of American university traditions since 1888 (Fitts & Swift, 1928). The typical orientation program covers academic program overview, study skills expectation, available support services, and a campus tour of the available facilities.

Another objective of the orientation program is to provide a meet and greet of classmates. Relationships developed help to form a community feeling and later use as a support system for the students (Martin, 2014).

A new approach applied for the May 2020 gamified orientation to take place from the home setting due to the restriction placed by the state of New Jersey during the COVID-19 pandemic. This event welcomes accepted incoming sophomore students into the inaugural STEM Success Academy to acquire knowledge and skills through a gamified orientation experience. The STEM Success Academy is a program designed to emphasize study areas that will assist in improving graduation and retention rates among the underrepresented minority students. NJCU awarded a grant titled Proyecto STEM: Evidence-Based Approaches to STEM Enrollment, Retention, and Graduation at an Urban Public Hispanic-Serving Institution by the United States Department of Education to create intervention programs. The grant directed to improve the number of Hispanic and low-income students to pursue and attain degrees of the STEM-related fields (Grew, 2016).

The orientation committee team decided to use the mobile application Social Scavenger to gamify the orientation. Social Scavenger's (2020) mission is to facilitate the positive experience, included features to encourage active participation and community building involving were participants working together as a team to solve trivia games, complete challenges submitted through photo and video captures. These gamified covered areas of academics, bonding, support services, study skills, and introduction to campus, club organizations, STEM faculty, and staff. All challenge activities designed to meet at least one of the following objectives: mental, physical, teambuilding, and job-specific skills. To encourage friendly competition by awarding the top leaderboard teams with prizes at the end of the mission.

Statement of the Problem

The drawing attention to bring the underrepresented minority students into STEM college programs continues to be challenging tasks and ongoing open dialogues across American universities (National Science Foundation, 2017). Historically, college completion rates among underrepresented minority students have fallen enormously behind other groups in the STEM-related fields (Swail, 2003). The disparities result from the early level of the educational pipeline from elementary school, resulting in reduced access to good education and a lack of opportunities. Blacks, Hispanics, and American Indians continue to increase their share of science and engineering degrees (S&E). However, they remain underrepresented in S&E educational accomplishments and workforce (National Science Foundation, 2017).

Past researches revealed that underrepresented minority students fail to advance even when students have intense academic preparation (Bean & Metzner, 1985; Hrabowski, 2005). Hrabowski (2005) hypothesizes the root cause could be of negative stereotypes, discrimination, and inaccessible to peer mentoring. This study looks to explore how the intervention of a gamified orientation, a combination between traditional orientation and the use of an alternative meetup approach through the use of gamification to help reduce attrition and to increase the engagement and motivational level.

Purpose of the Study

Gamification has proven to improve engagement in an assortment of applications (Hamari, Koivisto, & Sarsa, 2014) as orientation programs have shown to improve retention rates (Tinto, 2001). The purpose of this case study was to explore the benefits of a virtual gamified orientation from home, instead of running the traditional in-person orientation from on-campus. The research probes whether those benefits reflected in student behaviors and the

retention rates among the underrepresented minority STEM; students received the gamified orientation intervention.

The qualitative exploratory case study research investigated whether the benefits of this nonconventional approach led to higher student retention, success. The research aim is to explore the participants' perceptions and feelings about the overall experience and its impact on their performance in the STEM Academy program. Collected data from several students who continued from Summer Success Academy to completion of the fall semester also provide additional insight into the effectiveness of the treatment.

This research reinforces two main theories that served as a framework to move this study forward. The first theory that bolsters the use of a gamified orientation is Ryan and Deci's (2000) Self-Determination Theory. This ideology supports the concept that a game that yields extrinsic rewards can move the participant from extrinsic motivation to intrinsic motivation. Ryan and Deci (2000) propose that activities become intrinsically motivating when their innate satisfaction drives the participants. The conducted research has shown that those who game with intrinsic motivation revealed with enhanced performance, persistence, and liveliness (Ryan & Deci, 2000) as game success translating in creating skills and relationships which will assist participants in their studies in the STEM Academy.

Lave and Wenger's (1991) Theory of Situated Learning, where the participant in the gamified orientation becomes involved in the community and therefore becomes more active and engaged with the university program, is also a leading framework for this study. The design of the gamified community provides for team challenges in which participants randomly placed with other classmates from the program. The tackling of problems designed to promote community-building, as well as the collective experience of the orientation event amongst all

STEM Success Academy participants, allow for a feeling of belonging to the community.

Students form a commonality through the tight bond established when solving the challenges together. The commonality carried throughout the cohort experience and to create a foundation for community support.

Research Questions

This study evaluates the impact of a gamified orientation on the underrepresented minority student, success, retention, and persistence in a STEM Academy program. Also, the researcher wants to develop a better understanding of student perceptions of a gamified orientation. The following three research questions guide the study:

- 1) How do underrepresented minority students at a public urban university perceive the impact of a gamified orientation program on their college experience?
- 2) Do underrepresented minority students feel more prepared to finish the STEM Academy program after having participated in a gamified orientation?
- 3) What ways did the gamified orientation affect the creation of communities of practice among the underrepresented minority students?

Limitations & Delimitations

This study has the following limitations: The collected data limited to students who applied and were selected as part of the STEM Success Academy and attended the virtual gamified orientation event from home during the Summer I semester at New Jersey City University in 2020. The study timeframe covered from May 2020 through December 2020. There are few prior types of research done in the gamified orientation program. Technical issues involving the functionality of the mobile application, network connectivity, or the participants did not have access to a smartphone.

The delimitations for the study are the collected data from the interviews and focus groups constraint of asked questions and limited responses from the participant. STEM Success Academy may have another intervention program that was not part of this study that may have affected retention and success. Also, students have extracurricular activities during the remaining schedule, not part of this research.

Assumptions

It assumed that students' responses were truthful to the interview questions and focus group topics. All participants identified as sophomore undergraduate students. Also, it concluded that all STEM Academy students would agree to participate in the virtual gamified orientation event from home exciting and enjoyable.

Conclusion

This introductory chapter provided an overview of the research study and the problem that can affect a traditional university facing enrollment with the underrepresented minority students of STEM fields. An exploration of how gamified orientation can impact student perceptions on the continuation and success in the STEM Success Academy program. This research guided by two theories: self-determination theory and the theory of situated learning. Also, cover the limitations, delimitations, and assumptions for this research.

Chapter II - Review of the Literature

Introduction

A familiar trend experienced by many universities is the rising attrition of underrepresented students among the STEM fields. Universities across the nation are learning to

innovate ways to address the dire issue. A few options include tutoring, pre-course seminars, and mentorship to aid in student retention. Also, an alternative design is the approach of gamified orientation to see whether it will benefit the students to increase the motivation and persistence of students continuing to pursue STEM fields. The review of current and historical literature conducted to explain the presented problem and the significance need to move with the study.

The chapter includes a critique of the theoretical framework literature, student orientations, the needs for undergraduate STEM students, the barriers affecting STEM fields, and the application of gamification in the non-educational environment.

Self-Determination Theory

This research reinforces two main theories that served as a framework to move this study forward. The first theory that bolsters the use of a gamified orientation is Ryan and Deci's (2000) Self-Determination Theory. This ideology supports the concept that a game that yields extrinsic rewards can move the participant from extrinsic motivation to intrinsic motivation. Ryan and Deci (2000) propose that activities become intrinsically motivating when their innate satisfaction drives the participants. The conducted research has shown that those who game with intrinsic motivation revealed with enhanced performance, persistence, and liveliness (Ryan & Deci, 2000) as game success translating in creating skills and relationships which will assist participants in their studies in the STEM Success Academy.

Theory of Situated Learning

Lave and Wenger's (1991) Theory of Situated Learning, where the participant in the gamified orientation becomes involved in the community and therefore becomes more active and engaged with the university program, is also a leading framework for this study. The design of the gamified community provides for team challenges in which participants randomly placed

with other classmates from the program. The tackling of challenges designed to promote community-building, as well as the collective experience of the orientation event amongst all STEM Success Academy participants, allow for a feeling of belonging to the community. Students form a commonality through the tight bond established when solving the challenges together, and the commonality carried throughout the cohort experience and to create a foundation for community support.

Communities of Practice

Also, Lave and Wenger's (1991) Theory Situated Learning supports the idea of forming communities of practice (CoP). In which individuals engage in the process of collective learning in a shared realm (Wenger, 1998), groups collaborate in education, with a focus coming together to discuss their shared practices, meaning people regularly interact on a shared passion for learning to make it better.

A learning partner focuses on the aspect of practice together to creates higher learning potential, a trust that forms out of the partnership. The Summer Success Academy focuses on having the participants forming a learning partnership with other classmates and with the working learning relationship with STEM faculty and supporting mentor staff to increase retention and engagement (Grew, 2016).

Student Orientations

University student orientations are to facilitate the transition of new students (Groccia & Hunter, 2012). When students spoke about their collegiate experiences, they recall their orientation experiences as a highlight for their time spent in college (Upcraft, Gardner, & Barefoot, 2005). Many research studies support the idea of incorporating activities directed at campus involvement in orientation activities to help improve social engagement and improve

their transition phase into the university setting. They are giving them a sense of belonging, a community-building of support motivating them to be active participants.

Mathew (2017) examined academic success and retention of the summer bridge programs offered by many universities for incoming first-year students, as interventions to aid student commitment to excellence, integration with the university's setting, academic expectations, social opportunities, a time of self-discovery, and the preparation to reach potential in the years ahead. The collected sample included minority and low-income students who were surveyed before entering the first fall semester and again in the spring of their freshman year. Data analysis showed that the students' participation in the summer bridge program was a positive predictor of a higher GPA among the first year and a retention influencer for the spring enrollment (Mathew, 2017). However, the study fails to explain correlations between continuance beyond the first year. Many reviewed literatures connected to student orientations involves students in their first year of academic pursuit as colleges try to reduce the first-year dropout or failure. However, it has a limited range of data available relative to successive years—a significant gap in the literature, offering opportunities for future studies.

The Needs for Undergraduate STEM Students

Increasing the number of American university students who complete degrees in STEM fields is of national interest, with the shortfall of several workers capable of filling the available scientific and technical careers threatens United States global competitiveness and national security. To address the shortage of STEM students, focus directed towards the K-16 STEM education (National Science and Technologies Council, 2013). The research focused on the challenges facing the educational systems to bolster the number of students successfully graduating from the STEM education system (Singer, Nielsen, & Schweingruber, 2012). Our

focus pertains to higher education, where the primary goal is to increase student success and retention in new gateway STEM courses (Bradforth et al., 2015).

Barriers Affecting Underrepresented Students in STEM field

African Americans and Latino students continue to be part of the underrepresented minorities (URM) group in the STEM fields (National Science Foundation, 2017).

Undergraduates express initial intentions to major in STEM, however, switch out of STEM fields within their first two years of study. URMs are more likely than whites to leave the STEM field (Center for Institutional Data Exchange and Analysis, 2016). The alarming trend has scholars devoted significant resources to understanding why some undergraduates leave STEM fields.

A study found that URMs experienced barriers to their success in STEM fields during the interviews, expressed the feeling of loneliness, invisible, lack of same-race peers and faculty members, struggling to apply theory to practice, and the lack of access to preparatory courses needed to succeed in STEM fields (Strayhorn, Long, Kitchen, Williams, & Stentz, 2013).

Strayhorn (2018) emphasizes family, peer, faculty, and mentor support affect academic success, especially among the African American males. The STEM Success Academy helps to address the lack of pre-college preparation for URM students who needed additional exposure to STEM coursework (Grew, 2016).

The application of gamification in educational environment

The traditional teaching methods are struggling to get across students who learn the concept best in the non-traditional format. A review of multiple studies found that gamification in instruction helps with in-class participation and motivation (Kapp, 2012). Several studies have found gamification helps learners improve their mentality who approach the idea with positive expectations (Kapp, 2012). Also, McFarland (2017) explored the perspectives of high

school teachers who used gamification in their curriculum. Teachers concluded that their students felt greater satisfaction about completing game challenges and achieving to next levels. The external recognition for their achievements, autonomy in choosing the games to complete, and how to engage with the content, increased their sense of control over their educational experience, leading to more self-determination.

Stott & Neustaedter (2013) refer to numerous educators have tried various ways, with different degree of success, to create effective use of game dynamics to improve learning, help with student motivation and class achievement. They review past case studies done from the use of gamification in a post-secondary environment. Their assessment revealed that the underlying game dynamics that made it engaged already preset in current pedagogical trends. The game design is an essential element to consider where the participants are going to benefit or become disengaged due to its simplistic—for instance, certain game design concepts having lasting learning impression when applied to learn environments. One highlighted feature is the freedom to fail, where players have multiply lives and allow to continue and return to the most recent play point, incorporating this element into classroom design, increased student engagement (Stott & Neustaedter, 2013). This concept translated to success when students focused on learning the idea without hesitation since they are not afraid to take the risk, know that we will not be out just because they didn't get the answer correctly, a second opportunity is there for them. Another learning opportunity taken from this gaming design is that players take the opportunity to select the game path, leaving students the option to choose the approach to take on the assignment, resulting in the student becoming more proactive and engaged with their choices on finishing up the job.

In higher education, undergraduate college students who are experienced gamers love the concept of using games to learn and look forward to the social interaction that takes place within games. This social interaction is an element in creating a sense of connection and belonging to the college, which leads to higher retention and success (Tinto, 1993). The value of gamification has proved to be effective in providing an alternative solution to students who are struggling. For underrepresented students who struggle in the first year of STEM classes resulting from past failure to prepare core classes properly. Leaving them to fall behind others, requiring them to enroll in prerequisite courses to catch up, may be helpful to introduce a gamified curriculum as a way to retain and engage in the advanced course work.

Conclusion

The chapter provided an overview of the previous research concerning the pertinent topics that are relevant to this research study. It gave a brief review of the current literature, identifying gaps for further research for the underrepresented minority in STEM and the use of gamified orientations.

Chapter III: Methodology

Introduction

The focus of this qualitative exploratory case study is to understand the impact of gamified orientation among underrepresented minority students at a public urban university in New Jersey for their college experiences, the mission to complete the STEM Success Academy program, and the creation of communities of practice. The researcher is looking to explore the elements of the gamified orientation that impacted the student's success, persistence, and retention in the STEM Success Academy program. Three research questions addressed, and the following chapter outlines the methods to collect the data for the analysis.

Philosophical Worldview

The philosophical framework that guides this study is the social constructivism worldview. Social constructivism is a typical perspective approach used for qualitative research (Creswell & Creswell, 2018, p. 9), where individuals seek to understand the world around them through the lens of their work and live.

Research Design

The research design is a qualitative exploratory case study. Creswell & Creswell (2018) explain a case study involves the process of understanding a single one or more individuals through multiple types of data collections over some time. For this study, one case explored throughout a period, with various data collection methods that are in line with Creswell & Creswell's definition of the case study.

The researcher continues to review literature that is relevant to the study, including the theory of self-determination, the theory of situated learning, communities of practice, student orientations, the needs for undergraduate STEM students, the barriers affecting STEM fields, and the application of gamification in the non-educational environment. The covered literature review is to understand what has done and what other research topics remain open for exploration.

Researcher's Position

The researcher participated in the STEM Success Academy for the second year. During the first year, the researcher volunteered to help out for the past NJCU orientation day. As a STEM educator, I am looking to explore different ways to reach out to the underrepresented minority group as they continue their journey in the STEM-related fields. The use of gamification during the orientation day has given me ideas to bring the concept into the

classroom teaching, which the researcher currently use Kahoot to test out knowledge retention rate of covered week lesson.

Participants

A purposeful sampling procedure creates this study's sample population. Patton (2015) notes how this type of sampling is typical of qualitative research, to yield the full information about a studied phenomenon. Purposeful sampling allows the researcher to focus on characteristics of a population that are of interest, which is the underrepresented STEM minority undergraduate students who have had the gamified orientation intervention treatment (Creswell, 2015).

The population is of NJCU sophomore students who applied, met the requirements, and were accepted by the STEM Success Academy for the year 2020. The STEM Success Academy is a program that funded through a grant awarded by the United States Education Department to help with the retention rate of underrepresented minorities of undergraduate STEM students and to improve the overall graduation rates.

Data Collection

Collected data in case studies provide a different perspective of the research topic (Tellis, 1997). The various data collection sources offer support for the triangulation and validity of the collected evidence (Patton, 2002; Stake, 1995). The study involves four data collection methods, including participant interviews, program coordinator interviews, focus groups, and archival records. IRB approval required before data collection (See Appendix A).

Participant Interviews

The participant interviews were the primary method for data collection in this research. The format of the interviews is semi-structured questions tied to research questions. The focus on

the questions is the experience of the orientation game, the impact it has on the college experience, the motivation to pursue and continue the STEM program, and the aspect of the community building.

The researcher used the three research questions as a foundation to lay the base for the interview questions. Interview questions vetted out by the researcher's dissertation committee and validity by experts before the start of the data collection. A test run of interview questions, any feedback and inputs were factored into the finalized set of interview questions (See Appendix D).

The interview process starts with the researcher sending emails to individuals who attended the gamified orientation from the roster attendance sheet. The email message included the purpose of the study, including an invitation to schedule a slot to interview a recorded video online session, and the attached informed consent form. Participants needed to complete the informed consent before conducting the interview (See Appendix C).

Program Coordinator Interviews

Having the interviews with the program coordinator assists with the data triangulation of STEM student interviews. Also, an email sent out to the program coordinator to schedule an interview conducted through recorded video online sessions and the attached informed consent form signed before the start of the conversation. A test script and a question guide (See Appendix E).

Focus Groups

The use of focus groups helps to draw out common themes developed through the group discussion. The open-ended group interview helps to explore the group dynamics and to build on the formation of communities of practice. The focus of the conversation was on the community

of building aspects as the gathering was a perfect environment to gather the information—a test script and a question guide (See Appendix F).

Archival Records

The researcher reviews archival records. Data retention from the STEM Success Academy provides a statistical assessment on how many orientation participants continued to roll over into the STEM program from the Summer Success Academy. Also, game data records from the Social Scavenger provide an insight into which challenges accepted, the review of the group dynamics aspect from the captured photos and videos. The chosen path for each team to foster the concept of a community of building. Besides, the direct observation notes from the orientation event from the gamified volunteer committee reviewed. These various channels of data collection points allow for triangulation.

Instrumentation

The researcher will request permission to use the survey developed by Brown (2012), designed to assess enrollment characteristics to predict student persistence and retention. The original instrument survey was tested for reliability and construct validity. The survey instrument measures student demographics, environmental commitment, learning preferences, institutional commitment, individual aptitude, academic intentions, peer relations, and sense of community (Brown, 2012). A letter requesting permission to modify Dr. Brown's survey instrument for this study (See Appendix G).

Data Organization

The management of a large set of qualitative data from the interviews and focus groups and archival records required strong organizational and meticulous skills to keep it organized (Sutton & Austin, 2015). It is essential to keep tags on the data record collection as an easy

reference back to the collection when needed supporting details to draw conclusions and findings. Identification tag applied to each piece of collected data—all collected data labeled with appropriate reference sources. The researcher will use a transcription service like NVivo to transcribe the collected video-recording data from the interviews and focus group sessions, and the powerful analysis tool to draw upon recurrent themes.

Data Analysis

Yin (1994) states the process of data analysis includes categorizing, examining, and rearranging collected data to address the initial propositions of a study. Patton (2015) defines qualitative data analysis as the procedures related to bringing order, structure, and interpretation to assembled data. The process of finding those themes then led to the process of coding. The researcher approached coding set forth by Bazeley (2014); that coding is not just for reducing the sheer number of data, but to stimulate and expedite analysis by allowing the data to be queried and tested. The goal was to keep returning to the data until emerging patterns and explanations were clear.

Credibility

The researcher employed strategies for validity checks in qualitative studies, as recommended by Creswell (2015). One method includes triangulation from various sources of data collection types, allowing for collected data to be compared and converged. Member checking allowed participants to review their responses for accuracy and to provide further insight into conclusions. Also, committee members discussed the completed study to appraise its accuracy and validity.

Dependability

Patton (2015) explains that the question in qualitative research is whether the findings are consistent. To check out for dependability, researcher careful checking of transcripts for errors, comparing data codes with their definitions regularly to prevent a shift in meaning, and employing the assistance of a cross-checker to check codes for consistency. The use of multiple types of evidence is essential to the dependability of a case study design (Patton, 2015; Stake, 1995). Therefore, four sources of evidence utilized for this research. No single data source should have more influence than the others as they serve the purpose of validating each other (Tellis, 1997).

Ethical Consideration

The qualitative focus groups and interviews conducted using an interview protocol with semi-structured open-ended questions. The potential for interviewer bias can exist during the data collection phase because the researcher was the sole interviewer. To avoid bias possibility, the researcher avoided presenting leading questions or sharing personal views. The use of objective and subjective measures to prevent the inadvertent transfer of own interpretations to participants helped a level of the high standard of research ethics (Creswell, 2015).

Participants were assigned pseudonyms to add another level of privacy (Creswell, 2015), and each response and follow-up numbered. The data gathered from interviews and focus groups stored in a secure location with all distinguishing details removed. Access to this data will be limited and only available to the study's primary investigator.

Conclusion

This chapter provided a detailed overview of this study's research methodology. The interpretative framework of social constructivism shows how it used to guide qualitative research. The case study design explains how it was employed to explore whether the benefits of

a gamified orientation intervention for underrepresented minority STEM students. The participant sample demonstrated and the rationale for a purposeful sample. Four data collection methods were detailed, including participant interviews, program coordinator interviews, focus groups, and archival records. All practices of data organization and analysis described in detail, with coding procedures toward a pattern-matching strategy emphasized. Lastly, standards of quality such as credibility and dependability and ethical considerations addressed to ensure validity and reliability for this research study.

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Appendices

Appendix A: IRB Approval Letter

Appendix B: Letter of Permission to Dean to Conduct Survey in University

Deborah Woo, Ed.D.
Interim Dean
New Jersey City University
2039 Kennedy Boulevard
Jersey City, NJ 07930

Dear Ms. Woo:

I am a doctoral candidate from New Jersey City University, located in Jersey City, NJ. I am conducting dissertation research to examine the impact of gamified orientation among underrepresented minority STEM's student.

I want your permission to research at New Jersey City University, Jersey City, NJ. I will follow all policies set by the university and will share the findings from the research with the university. If this is an acceptable proposal, please reply to my email at swong@njcu.edu. I am looking forward to hearing from you. Thank you.

Sincerely,

Steven Wong

Doctoral Candidate

Appendix C: Informed Consent Form

I agree to participate in a study "The Impact of a Gamified Orientation Program on Underrepresented Minority STEM Students- A Qualitative Case Study," which is conducted by Steven Wong at New Jersey City University. The purpose of this case study was to explore the impact of a virtual gamified orientation, were reflected in student behaviors and in the retention rates among the underrepresented minority STEM students. The collected data will be submitted for publication as a dissertation.

I understand that I will be asked to participate in an interview and / or focus group session as my contribution to the study. The participation will not exceed 60 min for each collection method. I give permission to the researcher to take notes and to record the session with the use of video recording software. I am entitled to withdraw from participation at any point of time.

I understand that my responses will be anonymous, and all collected data will be confidential and the published data no way identified, and my name is not used.

I understand that there are no physical or psychological risks involved in this study, and that I am free to withdraw my participation at any time without penalty.

Signature of Participant

Date

Signature of Primary Investigator

Date

Appendix D: Participant Interview Guide

Purpose:

Participants asked with open-ended, semi-structured questions. These questions were designed to allow for reflection on their own experience in the STEM Success Academy thus far and how they feel the gamified orientation intervention impacted their experience. Participants reminded that their responses will have no bearing on their performance in the program and participation in the interview is voluntary.

Script:

Thank you very much for your participation in this interview today. My name is Steven Wong you may recall me from the gamified orientation event that took part in back in May at the start of Summer STEM Success Academy. I am a doctoral candidate in Educational Technology Leadership at NJCU and I'm conducting a research study for my dissertation. This interview will take no more than thirty minutes and will include questions on your experience with the gamified orientation and how you feel it impacted your experience in the STEM Success Academy.

I would like your permission to video record our interview so I can accurately document your responses. If at any time in the interview, you wish to stop the use of the video recording or stop the interview, please let me know. All of your responses are confidential and will only be used for this research project. Do you consent to the interview? Do you have questions prior to starting the interview?

Sample Question Guide:

1. Tell me your experience about the STEM Success Academy so far.
2. What was the highlight of the program that you can recall?

3. Explain whether or not the gamified orientation had an impact on your academic performance throughout the STEM Success Academy program?
4. What challenges you felt motivated you to continue to pursue the STEM program?
5. What was your experience when going through the challenge?
6. Tell me your experience regarding the interaction with STEM faculty.
7. Tell me about your relationship developed through the STEM program
8. Do you feel the gamified orientation was helpful?

Appendix E: Program Coordinator Interview Guide

Purpose:

In this interview, participants asked open-ended, semi-structured questions. These questions were designed to allow for reflection on their perceptions of how the gamified orientation intervention impacted the participants' experiences in the event and in the STEM Success Academy thus far. Participation in the interview is voluntary.

Script:

Thank you very much for your participation in this interview today. This interview will take about thirty minutes and will include questions on your experience with the gamified orientation event and how you feel it impacted the students' experiences in the STEM Success Academy.

I would like your permission to video record our interview so I can accurately document your responses. If at any time in the interview, you wish to stop the interview or video recording, please let me know.

Do you give your verbal consent to participate in this interview? You may withdraw your participation at any time without consequence. Do you have any questions or concerns prior to our start?

Question Guide:

1. Tell me your impressions of the STEM Success Academy so far.
2. What challenges you saw and feel stand out in the gamified orientation event?
3. What type of challenges you feel will provide the most benefit for student's experience in the

STEM Success Academy?

4. Tell me of any relationship develop during the gamified orientation event.

5. Do you think of having the gamified orientation event for next STEM Academy class?

Appendix F Focus Group Sessions Guide

Purpose:

Participants given open-ended, semi-structured discussion topics. These topics were designed to allow for reflection on their perceptions of their own experience in the STEM Success Academy thus far and how they feel the gamified orientation intervention impacted their experience. Participants will be reminded that their responses will have no bearing on their performance in the program and participation in the interview is voluntary.

Script:

Thank you all very much for your coming today and participating in this discussion. My name is Steven Wong you may recall me from the gamified orientation event you took part in back in May at the start of Summer Academy. I am a doctoral candidate in Educational Technology Leadership at NJCU and I'm conducting a research study for my dissertation. This session will take about an hour. We will be discussing your experiences with the gamified orientation and how you feel it impacted your experience in the STEM Success Academy.

I will be recording our session so I can accurately document your responses. If at any time you wish to leave the session, please let me know. All of your responses are confidential and used for this research project.

Your participation in this focus group session implies your consent, this is voluntary so you may withdraw your participation at any time without consequence. Do you have any questions or concerns prior to the start?

Question Guideline:

1. Tell me about your experience in the STEM Success Academy so far.
2. What part of the gamified orientation event stands out for you?
3. Was members of your team motivated to complete the challenges?
4. Do you feel the gamified orientation impacted your decision to continue STEM Success Academy program?
5. Tell me about any friendship or communities during the gamified orientation event.

Appendix G: Letter of Permission to Use Survey

May 10, 2020

Jennifer L. Brown, Ph.D.
Associate Professor of Educational Foundations Columbus State University
Department of Teacher Education 4225 University Avenue
Columbus, GA 31907

Dr Brown,

I am currently a doctoral candidate, working on my dissertation at New Jersey City University. My research seeks to examine how gamified orientations can have an impact on underrepresented undergraduate STEM students. This requires an exploration of the student experiences during the orientation event. While performing a literature review I can across your study, “Developing a Freshman Orientation Survey to Improve Student Retention Within a College”.

I read your work and the elements of the survey you created for this study. It covers some information I would like to explore in my own research. If possible, I would like to adapt parts of your survey to create my own questionnaire. I ask your permission to re-word and use some of the questions from your freshman orientation survey to create questions for my research instrument.

If these are acceptable terms, please email me back at swong@njcu.edu.

Sincerely,

Steven Wong
Doctoral Candidate