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# **An Action Research Mixed Methods Study for the Development Of Information and Communication Technology (ICT) Programming For First-Year Students at a Historically Black University**

Krystinq McCauley

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AN ACTION RESEARCH MIXED METHODS STUDY FOR THE DEVELOPMENT  
OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) PROGRAMMING  
FOR FIRST-YEAR STUDENTS AT A HISTORICALLY BLACK UNIVERSITY

by

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Submitted in Partial Fulfillment of the Requirements

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## DEDICATION

I dedicate this dissertation to my family. They were instrumental in supporting me and believing in me as I began and completed my dissertation journey. My dad (Joel Sr.), mom (Andrel), brother (Joel Jr.), and two grandmothers began the journey with me. Although my grandmothers were not alive to see me complete the journey, I know they would both be very happy that I accomplished my goal. To my fiancé, Trent, who joined me halfway through the journey, thank you for your support and motivation. Also, to my aunt (Darcel) and godsister, Andria, thank you both for reminding me to keep pushing. I am so thankful that my parents set the foundation for me to strive for excellence and to do something meaningful with my life. I hope that my journey will inspire others to hold fast to their dreams.

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## ABSTRACT

The purpose of this action research was to explore the information and communication technology (ICT) literacy skills of first-year minority students at Saint Augustine's University in order to develop a plan for an ICT professional development program. ICT skills are essential in our rapidly changing and technology-driven society. While there is a growing awareness of the importance of ICT, universities are lagging behind in their approach to provide students with the much-needed digital competencies (Murray & Perez, 2014). This study focused on three research questions to determine (a) the ICT skills of first-year minority college students at Saint Augustine's University, (b) what faculty and students thought should be included in an ICT program for minority college students, and (c) how faculty integrated ICT skills into their courses for first-year minority college students at Saint Augustine's University.

This study incorporated a mixed-methods approach, informed by the ICT framework. Participants in this study included faculty and students from Saint Augustine's University, a historically Black private university. Quantitative data was collected via surveys concerning students' ICT skills, what should be included in an ICT program, and how faculty integrates ICT skills into their curriculum. Qualitative data was collected from open-ended survey questions, student focus groups, and faculty interviews. The student focus groups addressed their ICT skills and what they believe should be included in an ICT program. The faculty interviews addressed what faculty thought should be included in an ICT professional development program and how faculty

integrates ICT skills in their curricula. It was determined that faculty and students value ICT and would like to be included in the development of a program. Students self-reported that they were proficient in all areas of ICT, but 13 of 41 survey respondents stated that they knew nothing about ICT skills. Sixty-eight percent of students reported that they did not receive ICT instruction in high school and sixty-six percent of students reported that they did not receive ICT instruction in college. The findings from this study are important for future ICT research initiatives related to ICT acquisition and minority students. The results from this research will be used as a foundation for the future development of an ICT program for first-year minority college students at Saint Augustine's University.

## TABLE OF CONTENTS

Dedication .....	iii
Acknowledgements .....	iv
Abstract .....	v
List of Tables. ....	ix
List of Figures .....	xii
List of Abbreviations .....	xiii
Chapter 1 Introduction .....	1
Chapter 2 Literature Review .....	15
Chapter 3 Methods .....	34
Chapter 4 Analysis and Findings .....	55
Chapter 5 Discussion .....	104
References .....	146
Appendix A: IRB Approval .....	164
Appendix B: Information and Communication Technology Literacy Student Survey Email .....	165
Appendix C : Information and Communication Technology Literacy Student Survey .....	166
Appendix D: Information and Communication Technology Faculty Survey Email .....	180
Appendix E: Information Communication Technology Literacy Faculty Survey .....	181
Appendix F: Information Communication Technology Literacy Student Focus Group Protocol .....	197



Appendix G: Information Communication Technology	
Literacy Faculty Interview Protocol .....	200

## LIST OF TABLES

Table 2.1 ICT skills and definitions.....	25
Table 3.1 Research questions aligned with data sources .....	39
Table 3.2 Research questions aligned with student survey questions .....	41
Table 3.3 Research questions aligned with faculty survey questions .....	43
Table 3.4 Research questions aligned with student focus group questions .....	46
Table 3.5 Research questions aligned with faculty interview questions .....	48
Table 3.6 Procedures and research timeline .....	49
Table 3.7 Data collection methods and analysis methods .....	51
Table 4.1 ICT Background Table (Student) .....	56
Table 4.2 ICT Background Table (Faculty).....	57
Table 4.3 Student Subscales, Cronbach's alpha .....	58
Table 4.4 Defining a need for information Items, Means, and Standard Deviations (Student).....	59
Table 4.5 Accessing information via technology Items, Means, and Standard Deviations (Student).....	60
Table 4.6 Evaluating online information Items Means, and Standard Deviations (Student).....	61
Table 4.7 Managing digital information Items, Means, and Standard Deviations (Student).....	61

Table 4.8 Integrating information from varied digital sources Items, Means, and Standard Deviations (Student).....	62
Table 4.9 Creating information Items, Means, and Standard Deviations (Student) .....	63
Table 4.10 Communicating information through technology Items, Means, and Standard Deviations (Student) .....	64
Table 4.11 Defining a need for information Items, Means, and Standard Deviations (Faculty).....	65
Table 4.12 Accessing information via technology Items, Means, and Standard Deviations (Faculty).....	66
Table 4.13 Evaluating Online Information Items, Means, and Standard Deviations (Faculty).....	67
Table 4.14 Managing digital information Items, Means, and Standard Deviations (Faculty).....	68
Table 4.15 Integrating information from varied digital sources Items, Means, and Standard Deviations (Faculty).....	69
Table 4.16 Creating information Items, Means, and Standard Deviations (Faculty) .....	70
Table 4.17 Communicating information through technology Items, Means, and Standard Deviations (Faculty).....	70
Table 4.18 Student and faculty means and standard deviations for responses to ICT Framework areas of measure .....	71
Table 4.19 Example of codes, code meaning, and sample quotes .....	75
Table 4.20 Table category, category meaning, and aligned codes .....	77

Table 4.21 Table Theme, Theme meaning, and Aligned categories.....	82
Table 4.22 Student responses to ICT skill ratings and support.....	88
Table 5.1 Desired ICT skills from faculty .....	113
Table 5.2 Student Desires for an ICT Program.....	117
Table 5.3 Direct quotes for ICT skill integration among faculty .....	121
Table 5.4 Faculty ICT Training Experience .....	133

## LIST OF FIGURES

Figure 4.1 Example of open coding in NVivo .....	73
Figure 4.2 Example of In Vivo Coding in NVivo.....	74
Figure 4.3 Excerpt of Categories in NVivo .....	81

## LIST OF ABBREVIATIONS

CRT .....	Critical Race Theory
ETS.....	Educational Testing Services
FYE .....	First Year Experience
HBCU.....	Historically Black College and University
ICT .....	Information and Communication Technology Literacy
IT.....	Information Technology
SME .....	Subject Matter Expert
UNESCO.....	United Nations Scientific and Cultural Organization

CHAPTER 1  
INTRODUCTION  
**National Context**

Information and Communication Technology (ICT) skills have become a necessity as individuals matriculate through higher education and life. As computer technology has increasingly infused most areas of people's lives in recent decades, individual competencies related to the use of ICT have become a necessary precondition for professional success as well as a crucial factor for private life (Blossfeld, 2010; Kozma, 2009; Partnership for 21st Century Skills, 2007). In order to be prepared to compete globally and thrive socially, intellectually, and economically, individuals' acquisition of ICT skills is vital. A lack of ICT skills in higher education is problematic because ICT skills are needed to function in a technological society. Currently, ICT plays an important role in improving individuals' quality of life. Without the essential ICT skills, it will be difficult for individuals to thrive in a globally competitive market.

Therefore, it is essential that colleges and universities wwlodge the disparity among these skills for minorities and equip minority college students with the necessary ICT skills to be successful in life. While there is a growing awareness of the importance of ICT, universities are lagging behind in their approach to provide students with the much-needed digital competencies (Murray & Perez, 2014). Furthermore, English (2016) asserted that although the development of digital competencies has become increasingly

important in higher education, integrating digital literacies in the college classroom has occurred at a slow pace.

The lack of ICT skills is evident throughout universities. A 2011 study of 3,000 undergraduate students from 1,179 colleges and universities found that many students lacked confidence in their ability to use basic software and resources such as spreadsheets (41%), E-books or e-textbooks (39%), presentation software (32%), course or learning management systems (32%), the college/university website (27%), and word processing (15%) (Dahlstrohm, de Boor, Grunwald, & Vockley, 2011). A Northwestern University study of young adults' ability to evaluate web content found that many did not understand the fundamentals of a basic Google search (Hargittai, Fullerton, Menchen-Trevino, & Thomas, 2010). College students' lack of ICT skills is a national issue. Accordingly, institutions of higher education are expected to address the needs of students with varying levels of technological readiness, because a lack of ICT skills has been proved to be a hindrance to student success (Muna, Magdi, & Hwei, 2018).

Although poor ICT skills among college students is a national problem, it has become a longitudinal problem for Blacks. Historically, Blacks have fallen behind their racial counterparts in the area of technology. The digital divide, which affects ICT skill acquisition, remains a significant concern in the United States, with race/ethnicity, income level, and education contributing to inequalities with use of computers and reliable and expedient access to the Internet (Morgan & VanLegen, 2005).

According to Snipes, Ellis, and Thomas (2006), a digital divide exists between people with access to technology and those without it. Computer ownership and internet usage is lower among Blacks. Roughly 6% of 58 million Americans using the internet are Black, with less than one third of all Black homes owning personal computers (Snipes et



al., 2006). Numerous efforts have been made to increase internet access to bridge the digital divide down and increase ICT skills. Theoretical frameworks extending the concept of digital divide beyond physical access have all identified digital skills as a crucial tool for the social inclusion and professional development of individuals (Mossberger, Tolbert, & Stansbury, 2003, DiMaggio & Hargittai, 2004; Liff & Shepherd, 2004; van Dijk, 2005). Digital skills differences are a primary aspect of what has been called the second-level digital divide (Hargittai, 2005).

According to Allen (1987), Black students who attend Historically Black Colleges and Universities (HBCUs) come from lower socio-economic backgrounds and are less prepared than Black students attending traditional majority White institutions. According to Bauer and Flagg (2010), this digital divide separates the have nots (HBCUs) from the haves (other majority institutions). HBCUs have less advanced technology, less resources, and lower budgets than other universities (Miah & Omar, 2011). These factors limit the ability for HBCUs to effectively administer ICT programs or incorporate ICT initiatives via leadership and faculty.

Since the rapid advancement of technology over the last two decades has changed the dynamics of teaching and learning in the 21st Century, educators are now expected to integrate technology in the classroom to meet the needs of today's learners (Henderson & Chapman, 2012). Therefore, faculty must learn strategies to engage college students, especially at HBCUs, by promoting digital learning.

HBCUs are known for their role in educating and preparing Black students for the future. The increase in college attendance is evidenced by the percentage of Black college students rising from 11.7% to 14.1% between 2000 and 2015 (National Center for Education Statistics, 2017). The education of Blacks began with the establishment of

Historically Black Colleges and Universities (HBCUs). The Higher Education Act of 1965, as amended, defines a HBCU as: "...any historically black college or university that was established prior to 1964, whose principal mission was, and is, the education of black Americans" (United States Department of Education, 2020). The 103 HBCUs in the United States were founded in the mid- to late-19th century, during a time of segregation and economic restrictions for Blacks (Trent & Hill, 1994).

HBCUs enroll 11% of Black students in the United States, yet they represent less than 3% of colleges and universities in the country (NCES, 2011). HBCUs, on average, have a 30% graduation rate (NCES, 2011). When considering graduation rates, it is important to keep in mind that the majority, but certainly not all, of HBCU students are low-income, first-generation, and Pell-Grant-eligible (Mercer & Stedman, 2008). Toven-Lindsay (2017) asserted that the digital divide and educational inequalities impact low-income, first-generation, and minority learners more than their counterparts.

### **Local Context**

Saint Augustine's University (SAU) is associated with the Episcopal Church and began as a school for former slaves. Currently, SAU offers 38 disciplines of study and has a special emphasis on preparation for graduate studies and careers in chosen professions. Saint Augustine's University is a private HBCU located in Raleigh, North Carolina. The university has a total of 944 students, which includes 434 females and 510 males. The racial composition of the school consists of 90.2 percent African Americans, 6.4 percent unknown, 1.5 percent Whites, 1.1 percent Hispanics, 0.1 percent Asian, and 0.6 percent American Indians, and offers more than 25-degree programs as a university that is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (Saint Augustine's University, 2018). Ninety-seven percent of students

attend school full time and are enrolled in one of the 25-degree programs. The majority of the student population relies on financial assistance to cover college tuition. The student population is composed of 76 percent of students who receive grants and scholarships, 97.7 percent who receive Pell grants, and 72 percent who receive federal student loans.

Saint Augustine's University students face challenges academically, socially, and economically. Academically, most students entering SAU are labeled as C+ students with an average GPA of 2.37 (Saint Augustine's University, 2018). In addition, many SAU students are first-generation college students. This was highlighted by the school hosting a first-generation celebration in November of 2020. Economically, a majority of students from SAU derive from low socio-economic backgrounds, which is evidenced by the high percentage of Pell grants. The students enter SAU lagging behind in ICT skills, with their academic and socio-economic background being a factor in the disparity.

Based on my professional experience and work with the university, the Program Coordinator for the First Year Experience (FYE) and the Director of Information Technology (IT) reached out to me to develop and lead a seminar for students at SAU. I introduced students to the university's collaboration tools. There were 20 freshman students who participated. Students were asked questions regarding their comfort, knowledge, and frequency of technology usage via a web-based Google survey. The results of the survey indicated that although students could use social media on a personal level, they lacked other ICT skills, such as the use of collaboration tools (Saint Augustine's University, 2017). Some of the students had never heard of Google Docs and were unaware what a collaboration tool was.

When I conducted the seminar in 2017, I discovered the disparity in the area of ICT among SAU students compared to students at other universities where I had

previously presented seminars. I also discovered that students believed in the importance of collaboration tools and were interested in learning more, which is a part of ICT literacy. All respondents stated that they believed collaboration tools were an important part of college and 70 % wanted to learn more about how to use collaboration tools. After the seminar, I continued discussions with the FYE Program Coordinator and Director of IT at the university based on post-test results and student feedback. These conversations unveiled more information about the students. There was no data confirming computer or tablet ownership; however, the Program Coordinator and Director of IT stated that there was a significant amount of the students who do not have personal computers or tablets.

Therefore, these students rely on smartphones for typing papers. Many students use the notes function on their phones and do not know how to retrieve the content to provide the professor with the finished product. Students are also unfamiliar with how to properly use Microsoft Office products, such as Word and PowerPoint. In addition, the Director of Technology stated that IT receives tickets from students on a daily basis requesting help with basic technology functions, such as accessing emails and using Microsoft Word products, but in November of 2020, all IT ticket data was lost. This was This was due to a non-cloud-based IT ticketing system. Lack of resources and access to technology necessitates instituting an ICT program that can be measured and tracked to determine effectiveness and overall student impact. It was determined by the IT department that some of the issues that were reported to be IT tickets were a result of lack of ICT skills.

As a result of my expertise and passion, the Director of IT requested my assistance with university projects. I have assisted with training development and quality

assurance. I have also served as a consultant concerning Blackboard's Learning Management System (LMS) functions. Consequently, I was asked to develop an ICT initiative that would begin with a plan to be presented to university leadership. According to the Director of IT, based on conversations with faculty, staff and students, the lack of ICT skills is a campus-wide challenge necessitates the need for ICT skills. Developing an ICT program can have a lasting effect on student matriculation and job placement for the university. In such, the staff is becoming more cognizant regarding the benefits of a strong ICT initiative.

### **The Statement of the Problem**

Minority college students at Saint Augustine's University are struggling with ICT skills needed to be successful intellectually, socially, and economically. According to Pew Research studies, 96% of working Americans use new communications technologies as part of their daily life, while 62% use the Internet as an integral part of their jobs (Madden & Jones, 2008). A lack of ICT skills poses a problem for minorities because ICT assessments show that in regard to digital inclusion and equity, there are gender, race, and immigrant status disparities (Dean, 2015). Therefore, it is important that colleges and universities acknowledge the disparity among the ICT skills for minorities and equip minority college students with the necessary ICT skills to be successful.

### **Purpose Statement**

The purpose of this action research was to explore the information and communication technology (ICT) literacy skills of first-year minority students at Saint Augustine's University in order to develop a plan for an ICT professional development program.

Three research questions that guided this study were:

1. What are first-year minority students' information and communication technology literacy knowledge and skills at Saint Augustine's University?
2. What do faculty and students think should be included in an information and communication technology literacy program for first-year minority students at Saint Augustine's University?
3. How do faculty integrate information and communication technology literacy skills in their courses for first-year minority students at Saint Augustine's University?

### **Research Subjectivities and Positionality**

I have several years of experience working in higher education and developing curriculum as an instructional designer and online college instructor. In addition, I am a racial minority, and I am passionate about ensuring that other minorities are afforded equal opportunities to secure and retain employment. Information and communication technology skills are crucial, not just for minorities in higher education, but also for all college graduates to be prepared for a competitive workforce. As an instructional designer and online college instructor, I understand how the explicit development of ICT skills in a college setting can be overlooked. It is essential that minority students attain proficient ICT skills while matriculating through higher education.

As a minority, my experience has shaped my views of education and access to employment. I have personally experienced the challenges that racial minorities face when pursuing higher education opportunities and attempting to gain employment. I have observed challenges from friends and colleagues who have been denied access to employment based on lack of skills needed to perform jobs. Situations have been further

complicated by HBCU attendance. Historically Black Colleges and Universities are known for historically educating Black students. I have friends and family members who have graduated from HBCUs, only to be subjected to unemployment or underemployment. I have been subject to verbal commitments for jobs that have been revoked ironically after employers conduct a video chat or after I have filled out paperwork disclosing my race.

Although I have had the opportunity to pursue higher education, I have worked with and encountered many minorities who have not been afforded the same opportunities. I had the strong support of parents and a brother who also completed higher education. As a member of a marginalized group, I would like to conduct research that relates directly to them. This is based on personal experience regarding social inequalities that are relatable.

I conducted insider research. Insider research refers to when researchers conduct research with populations of which they are also members (Kanuha, 2000). The researcher shares an identity, language, and experiential base with the study participants (Asselin, 2003). I identified with my research participants because of my race, language, and experiences. I am not foreign to my research participants' experiences and challenges.

My angle for using insider research also aligns with transformative research and critical race theory. As a Black female, I sought reciprocity for my participants by allowing them to use surveys, focus groups, and interviews to vocalize their opinions along with encouraging them to participate in various facets of the research process. Additionally, I educated the participants on the process, make sure the results are relevant to SAU, and use a sound and appropriate research methodology (Herr & Anderson,

2005).

Although I conducted insider research, I also acknowledged the outsider perspective due to my educational, socio-economic, and academic backgrounds, in addition to power dynamics. I will use my paradigms to address the needs of marginalized individuals. I will make a concerted effort to impact the marginalization of racial minorities by conducting research to lead to the development of a program to increase ICT skills for students and allow faculty and students to contribute to the process.

My research utilized the ICT Framework developed by Educational Testing Services. I have always been passionate about addressing the needs of marginalized populations. As a racial minority, higher education professional, and community servant, my paradigms and beliefs are based on my experiences and observations. I have observed how race and socio-economic status can impact an individual's future. As a racial minority, I have often wondered what I can do to address the needs of marginalized populations. Despite the fact that my upbringing did not classify me as a member of a lower socio-economic status, I know the plight that many racial and ethnic minorities face. Thus, the aforementioned research methods and paradigms align with my interests and beliefs.

Transformative research serves to unite the voice of the marginalized population to promote change and reform (Creswell, 2014). The transformative worldview provides a mechanism to tackle social oppression of any marginalized population at whatever level it occurs (Mertens, 2009). Within the transformative paradigm, I addressed issues related to ICT within a marginalized population by using mixed-methods research.



Combining mixed methods and social justice has implications for the researcher's role as well as the choice of specific paradigmatic perspectives (Mertens, 2007). A qualitative perspective was needed to gather information and understand more about how faculty integrated ICT skills into their courses and thoughts on what should be included in a program, while a quantitative component provided credibility to the outcomes (Mertens, 2007). For the quantitative aspect of my research, I analyzed survey results.

Ladson-Billings (2005) emphasizes how critical theory and transformative research can be applied and contribute to educational research studies. In doing so, the research serves as an imperative way to promote awareness and highlight moral and political emancipation. In order for researchers to conduct responsible studies, it is imperative to understand the critical perspective. There is a significant cultural aspect that must be acknowledged for researchers to conduct responsible studies. Questions should be presented to enhance further educational research.

My educational research focused on exploring the ICT skills necessary for an ICT program for minority college students. I conducted my research on students' ICT perceived skill level and helped determine what should be included in an ICT program at SAU. I would like to help ensure that minority college students can be equipped with the necessary ICT skills to be prepared for, and successful in, higher education and beyond.

My research necessitates addressing the issue of power and trust. To address the factors of trust and power, a collaborative approach was utilized through ongoing communication with the participants and stakeholders. In addition, I relied on participants and stakeholders for integral feedback regarding program development and future implementation. It was essential that my plan encompass ways to overcome the fundamental trust and power issues that exist within marginalized populations. I used

validated survey instruments to gather key information. A major part of my role was to always be aware of how inequities in technology may impact the thoughts and skill acquisition of the participants. Awareness and impact assessments are crucial as it relates to the data and results that are yielded.

### **Definition of Terms**

**Information and Communication Technology (ICT) Literacy:** Information and Communication Technology literacy involves the use of digital technology, communications tools, and/or networks for the purpose of defining a need for information, accessing information via technology, evaluating online information, managing digital information, integrating information from varied digital sources, creating information, and communicating information through technology (Katz, Williamson, Nadelman, Kirsch, Almond, Cooper, Zapata, 2004; Katz, 2007).

**Minority:** Minority is interchangeable with the term “nonwhite” to reflect a focus on populations that do not have European ancestral origins (described, using current conventions, as White), and would not describe themselves, or be perceived as, White (Ranganathan & Bhopal, 2006).

**Historically Black Colleges and Universities:** Historically Black Colleges and Universities (HBCUs) are those that were established prior to 1964 and have the principal mission of educating Black Americans (National Center for Education Statistics, 2010).

**First Year Experience:** The First Year Experience (FYE), consists of freshmen and transfer students (sophomore, juniors, and seniors) who are completing their first year at SAU.

**Ontology:** Ontology describes the nature of reality while paradigms suggest that there is a single reality in which each individual has their own unique interpretation of

reality (Guarino, Oberle, & Staab, 2009). From a transformative view, ontology rejects cultural relativism and various versions of reality are based on social positioning (Mertens, 2009). This is reflective of participants in my study as they self-identified as racial minorities and experienced systemic racial barriers.

**Epistemology:** Epistemology describes the relationship “between the knower and would be known” (Mertens, 2009). In the transformative view, epistemology serves as a link between the researcher and participants. This resonated with me as I considered my role. My role as a researcher consisted of student and faculty interaction. Interactivity is a way to build and foster collaboration, which is key when working with marginalized populations.

**Methodology:** Methodology serves as an approach to systematic inquiry (Lawrence & Murry-Orr, 2017). This approach involves employing historical and conceptual factors related to oppressed populations. For data collection, mixed methods were utilized and included both qualitative and quantitative methods. In addition, specific questions related to race and experience were integrated into the student focus and faculty interviews.

**Axiology:** Axiology is described as the nature of ethical behavior and, in terms of the transformation approach, requires the promotion of social justice and reform (Mertens, 2009). There are several factors related to action research methodologies, such as collaboration, power sharing, respect, reciprocity, and inductive research. The goal is to produce change and action related to the positive outcomes of the study. As a researcher, it is important to acknowledge and reflect throughout the continual and cyclical process (Israel et al., 1998; Altrichter et al., 2002; Denscombe, 2008; Taylor et al., 2008; Grimes, 2011). Utmost value is placed on the voices and perspectives of

participants, and on participants using the knowledge gained in the evaluation process to find their own solutions or pathways to improvement (McNiff et al., 1996; Brydon-Miller et al., 2003; Kindon et al., 2007). It is imperative to be considerate of the participants' perceptions regarding outcomes and personal gains and how this relates to reciprocity. Merriam Webster defines reciprocity as a mutual exchange of privileges. Through constant communication, I plan to continue to collaborate and empower the participants throughout the process. In doing so, the participants will have ownership and will understand the personal benefits of acquiring ICT skills.

Building on the concept of reciprocity, an ICT initiative is an attempt to aid in the liberation of racial minorities by equipping them to be competitive. The acquisition of ICT skills is a matter of economic, social, and intellectual equality. I believe it is my ethical responsibility to do what is best to enhance the lives of minorities due to their marginalization.

## CHAPTER 2

### LITERATURE REVIEW

The purpose of this action research was to explore the information and communication technology (ICT) literacy skills of first-year minority students at Saint Augustine's University in order to develop a plan for an ICT professional development program. The purpose of this research study was to explore the following research questions:

1. What are first-year minority students' information and communication technology literacy knowledge and skills at Saint Augustine's University?
2. What do faculty and students think should be included in an information and communication technology literacy program for first-year minority students at Saint Augustine's University?
3. How do faculty integrate information and communication technology literacy skills in their courses for first-year minority students at Saint Augustine's University?

Several sources were utilized to conduct this literature review on Information Communication Technology (ICT). My research was conducted by examining dissertations, abstracts, peer-reviewed research journal articles, governmental publications, database resources, and Internet literature based on the author's specific research topic and keywords. Some of the specific databases I utilized included Google

Scholar, ProQuest, JSTOR, and ERIC. These databases allowed me to enter keywords and search terms to narrow down my literature. Search terms that I used included: ICT skills, technology skills, Historically Black College and University, HBCU, first-year students, ICT Framework, computer skills, first-year minority students, ICT assessment, and ICT needs assessment. I also mined sources to discover more articles to use in my research by searching for references in the bibliographies of articles. Through my research, it was discovered that the terms for information communication technology literacy, digital literacy, and information literacy were used interchangeably. For the purposes of this study, the term ICT will be utilized to refer to both information literacy and digital literacy. In addition, I conducted a general Google search using information communication technology literacy, digital literacy, information literacy, and Historically Black Universities as the keywords to review .gov and .edu sites.

The major variables and elements of this review are (1) ICT literacy, (2) the value of ICT in higher education, (3) ICT framework, (4) minority first-year college students' ICT knowledge and skills, (5) faculty and student views on what should be included in an ICT program (6), and ICT plans of action. Section one, ICT in higher education, explores the various definitions of ICT, the ICT framework, as well as faculty and first-year students' ICT knowledge and skills, needs assessments, and ICT assessments. Section two focuses on minorities and ICT, which includes disparities, and HBCUs. Section three shares information regarding ICT plans of action that have been utilized in other college and university settings.

## **Information and Communication Technology Literacy**

ICT has been defined in many ways; however, two major constructs of the definition are information literacy and digital literacy. Information literacy has been defined as the ability to search, select, and evaluate information (Buzetto, 2018). Cornell University defines digital literacy as the ability to find, evaluate, utilize, share, and create content using information technologies and the Internet (Cornell University, 2015). It is quite evident that information literacy, digital literacy, and ICT literacy share similarities, as it relates to the use of skills and technology needed to manage information.

As the topic of ICT evolves, researchers and scholars have provided a variety of definitions. Educational Testing Services (ETS) developed a definition based on collaborative efforts by a group of scholars in which they determined that ICT literacy involves the use of digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society (ETS, 2007). Similarly, UNESCO defines ICT as a diverse set of technological tools and resources used to communicate and to create, disseminate, store and manage information (UNESCO, 2011). Both definitions include the importance of ICT as a tool for creating and managing information.

In addition to creating and managing information, Chang, Zhang, Mokhtar, Foo, Majid, Luyt, and Theng (2012) asserted that information literacy can be used as the key ability to solve problems, reasonably and effectively communicate, and interact with the outside society by being a lifelong learner. Allen and Seaman (2014) also highlighted the importance of ICT by defining information literacy as the necessary skills and fundamental human rights for lifelong learning in the information era. The research

validates that ICT skills are essential not only in higher education, but throughout one's life.

Problem-solving, training, and usage of tools are necessary entities within the realm of ICT literacy. Koppa, Matteuccib, and Tomasett (2012) regarded information literacy as the key ability to solve problems by using ICT tools. This can be obtained with proper education and training (Weidert, 2012).

Lee and So (2014) explained information literacy as an important tool for presenting knowledge and skills. This is applicable for work as well as daily life and can be accomplished through the use of computer software, hardware, and network applications in an ethical manner (West, Moore, & Barry 2015). Thus, integrating computers can be paramount in defining and conceptualizing ICT in the presentation of knowledge and skills.

Other researchers emphasize the significance of the technological aspect of ICT. Zhang, Aikman, and Sun (2008) define ICT as technologies that provide access to information through telecommunications. Based on their definition, ICT is similar to Information Technology (IT), but focuses primarily on communication technologies such as the internet, wireless networks, cell phones, and other communication mediums.

ICT literacy has drawn on principles from the field of information literacy and focused on the use of these information technologies to locate and collect information, evaluate information, transform (analyze and create) information, and communicate ideas (Catts & Lau 2008). Catts and Lau (2008) further argue that, although these processes have been seen traditionally as part of information literacy, they have been substantially



changed by digital technologies given the volume and variable quality of digital information.

Binkley, Erstad, Herman, Raizen, Ripley, Miller-Ricci, and Rumble (2011) succinctly stated that ICT literacy combines technological expertise with information literacy. Binkley et al. (2011) have synthesized and documented the operational definitions of the ICT literacy construct that have developed over the past decade. The similarities over the past decade led to the commonalities of information, technology, and communication when defining and synthesizing the term ICT and assessing ICT skills.

### **Value of ICT in Higher Education**

ICT has been addressed as a part of the transition to prepare students in higher education for 21st Century learning (Katz, 2007). Information and Communication Technology's presence has been evolving in the higher education sector (Verhoeven, Heerwegh, & De Wit, 2014). Faculty and students contribute to this by their knowledge regarding the value of ICT. To respond to the need, ETS developed a widely used ICT Framework that has been implemented to measure ICT skills (ETS, 2007).

Several studies have been conducted to investigate how ICT is valued in higher education. Perez and Murray (2010) argued that a better understanding and more effective measurement of ICT literacy is needed to gauge student readiness to both pursue higher education and enter the workforce. In addition, it is important to ensure that students are equipped with general ICT knowledge and skills to perform effectively and efficiently in higher education academic settings Chetty (2012). A review by Lohnes and Kinzer (2007) indicated that students are more interested in the utilization of ICT skills in their home or community settings than in educational settings.

Information and Communication Technology skill acquisition is essential within higher education environments. These programs and initiatives can be effective means for ensuring that students know how to navigate digital spaces. Information and Communication Technology can also be beneficial for the support of student-centered and self-directed learning (Fu, 2013). The acquisition of ICT skills is not merely reliant upon specific program development. The use of instructional web technologies and applications serve a vital role in incorporating ICT in universities' existing curriculum (Clarke & Minocha, 2009; Czerniewicz and Brown, 2007; Jimoyiannis, 2008; Ohei, 2019).

The field of ICT has recently begun to focus more on critical inquiry and instructional design. Swanson (2004) and Elmborg (2006) explored the concept of critical information literacy. These approaches coexist with conventional instructional design models. As a result, researchers emphasize the importance of introducing web technologies for educating students on the importance of ICT skills in order for them to be successful in higher education (Sarkar, 2012). Hargittai (2005), explained that students possess an inflated sense of confidence in their ICT skills based on their mastery of common technologies that they use daily. Many students have been using technology since high school; however, in a study, it was determined that students do not attain ICT skills in high school and enter their first year of college lacking vital ICT skills (Nataraj, 2014).

Nataraj's (2014) research serves as motivation among higher education institutions to ensure that graduates gain the much-needed ICT skills as they matriculate through colleges and universities. Higher education institutions have a pivotal role in

ensuring that graduates demonstrate proficiency in ICT literacy upon graduation (McCausland, Wache, & Berk, 1999). ICT skills are needed for students to function after college.

Since society has placed a focus on the essential need for graduates to be equipped to function in a highly technical and information-driven society (Department of Education, 2001), it is noted that ICT skills obtained in college can translate into effective workforce skills for economic growth and sustainability (Davis & Tearle, 1999; Lemke & Coughlin, 1998). By incorporating ICT skills, individuals can stay abreast of developing information and technological trends (Plomp, Pelgrum, & Law, 2007). Information and Communication Technology is valuable and effective for navigating all aspects of life because of the increased availability and use of information (New Media Consortium, 2007).

With our evolving global and technological economy, more is expected from a college graduate as it relates to an information-driven society (Braun, 2004; Feast, 2003). Thus, for several years, more colleges and universities have been evaluating their programs and designing their curriculum to meet that expectation (Feast, 2003; Lambrecht, 2000).

### **Addressing ICT Skills Through Needs Assessments**

Needs assessments are an integral part of developing ICT programming in higher education. They serve as an evaluation mechanism for comparing an organization's current environment to its desirable environment, with the difference between the two identified as the organization's needs (Szuba et al., 2005).

The amount of time allotted to needs assessments can be attributed to the work required to determine who is involved in the process, what the process will look like, and the desired outcomes. Needs assessments can include data collection from many sources including, existing documentation, such as historical budgets, student achievement, and target population demographics. Interviews, focus groups, and environmental scans that are implemented during a needs assessment can provide additional information on current climate and practice. Surveys, however, remain the most common form of needs assessment, as they are relatively easy to administer and provide data in an accessible format (Southwest Comprehensive Center, 2008).

Needs assessments help colleges and universities in identifying gaps and providing direction for programs, projects, and activities; allowing staff to determine priorities and allocate limited resources to activities that will have the greatest impact; create cohesion through the alignment of goals, strategies, professional development, and desired outcomes; enable benchmarking and monitoring of implementation and impact; and assist with continuous improvement activities by helping staff identify change, which instructional and other practices are working, and the strategies associated with the greatest success (Southwest Comprehensive Center, 2008, p. 7). Research confirms the value of ICT needs assessments for faculty and students in the areas of hardware and software procurement and ongoing professional development (Anaya, 1999; Kanaya et al. 2005; Kocher & Moore 2001. Developing and executing the needs assessment is often the most important and time-consuming step in the process of setting ICT related goals for a specific educational program (Szuba et al., 2005).

### **Faculty and first-year students**

The first year of college or university attendance serves as the foundation for the future. At this stage, students are entering from a variety of backgrounds and high school settings. It has been concluded that students do not attain ICT skills in high school and enter their first year of college lacking vital ICT skills (Nataraj, 2014). It was later discovered that while students are generally proficient in locating information online through search engines, they are less skilled in the use of productivity software (Mishra & Koehler, 2006).

The majority of first-semester college students have not taken any type of computer course in high school (Reese, 2016). However, first-semester college students self-report high skill sets in spreadsheet, word processing and presentation applications (DuFrene, Clipson, & Wilson, 2010). Research indicates inconsistencies between students' perceptions of computer skills and their actual levels of competence (Kilcoyne, McDonald, Hanson, Champion, Garland, & Maples, 2009). Many students assess their level of technology competence as higher than actual reality (Hanson, Kilcoyne, Perez-Mira, Hanson, & Champion, 2011). As a result, many students do not perceive when they have a deficiency (Grant, Malloy, & Murphy, 2009). Furthermore, 21st century college students favor a more independent, autonomous learning style and are less likely to self-report when having difficulty with class instruction or educational directives (Carlson, 2005).

Incoming college freshmen do not demonstrate high levels of computer self-efficacy (Wilkinson, 2006). Concurrently, there has been a decrease in the number and types of classes offering remediation or tutoring in basic computer skills. Students who

do not possess basic computer skills for college level are often overlooked. Most colleges and universities do not assess students for basic technology skills upon admission (Grant et al., 2009). In addition, colleges and universities have been closing computer labs, and expecting students to provide their own devices instead, which emphasizes the need for self-efficacy (Poggi, 2018).

### **ICT Framework**

An international panel of experts was developed by ETS in 2001 to study ICT literacy skills and communication technologies (Katz, 2005). The panel embarked on a fifteen-month project that highlighted the important role of ICT in academics, workforce, and society. Recognizing the need for an ICT higher education assessment, seven colleges and universities formed the National Higher Education ICT Literacy Initiative (Katz, 2005). The consortium collaborated with ETS staff to design and develop the iSkills assessment. Through the use of subject matter experts (SMEs), the panel redefined the definition of ICT and adopted the following ICT definition to include using digital skills, communication tools, and networks for solving problems for functioning in a student information-driven society (Katz et al., 2004). Collaboration among higher education institutions across the United States further expanded the definition of ICT literacy to include seven key performance areas and definitions as seen in Table 2.1 (ETS, 2007). The primary focus of the seven areas was related to ensuring ICT proficiency for addressing the technological challenges of today.

Table 2.1 *ICT skills and definitions*

<b>ICT Skill</b>	<b>Definition</b>	<b>Example of ICT Skill</b>
Defining a need for information	Using digital tools to identify and represent an information need	Develop a research topic to fit a particular information need.
Accessing information via technology	Collecting and/or retrieving information in digital environments	Generate and combine search terms (keywords) to satisfy the requirements of a particular research task.
Evaluating online information	Judging the degree to which digital information satisfies the needs of an information problem, including determining authority, bias, and timeliness of materials	Judge the relative usefulness of provided Web pages and online journal articles.
Managing digital information	Using digital tools to apply an existing organizational or classification scheme for information	I am able to categorize emails into appropriate folders based on a critical view of the emails' contents.
Integrating information from varied sources	Interpreting and representing information, such as by using digital tools to synthesize, summarize, compare, and contrast information from multiple sources	I know how to compare advertisements, emails, or websites from competing vendors by summarizing information into a table.
Creating information	Adapting, applying, designing, or constructing information in digital environments	I am able to edit and format a document according to a set of editorial specifications.
Communicating information through technology	Disseminating information relevant to a particular audience in an effective digital format	I know how to format a document to make it more useful to a particular group.

## **The iSkills Assessment**

The iSkills assessment served as one avenue for applying the ICT framework and developing a standardized assessment. The iSkills assessment is an Internet-based measurement of one's ability to use technology to research, organize, and communicate (ETS, 2007). The assessment is broken into two levels: Core and advanced. The core level was designed for high school seniors and first-year college students to assess their readiness for the ICT literacy demands of college (Katz et al., 2004). The advanced level was designed for higher-level college students to assess readiness for the ICT literacy challenges related to college coursework transition. Online reports were available for the institutions, as well as for the individual students (Almond, Steinberg, & Mislevy, 2002).

According to a report by Educational Testing Service (2007), almost 6,400 students at 63 institutions participated in the core and advanced level iSkills assessments between January and May 2006. A total of 1,016 high-school students and 753 community college students participated. Both sections of students performed poorly with students only scoring 50 percent of the possible points (Mislevy et al., 2002).

Students completed self-assessments of their ICT literacy skills, which aligned with their scores on the iSkills assessment (Katz, 2007). However, the reported frequency of utilizing ICT skills did not align. This result supports librarians' assumptions that the frequency of use doesn't translate into proficient ICT literacy skills and indicates the need for continued ICT literacy instruction (Hawkins & Oblinge, 2006; Rockman, 2002). The first iSkills assessment was effective in informing ICT literacy instruction being used to strengthen vital twenty-first-century skills for college students and society (Katz, 2007).



## **Minorities and ICT**

Although ICT skills have been addressed on a global scale in higher education, disparities exist with minorities, mainly Blacks, still lagging behind in this area. Research shows that lack of ICT skills impact Blacks in school, the workforce, and life (Buzzetto-More, Ukoha, & Rustagi, 2010). The analysis of minorities and ICT includes (1) disparities, and (2) HBCUs.

### **Disparities**

Black students who attend HBCUs come from lower socio-economic backgrounds and are less prepared for college than Black students attending traditional majority institutions (Allen, 1987). Building upon Allen's research, one rationale for this is the digital divide. The digital divide remains a significant concern in the United States, with race/ethnicity, income, and educational Internet access being primary factors (Morgan & VanLegen, 2005). Research shows that minority students are less technologically literate as evidenced by African Americans and Hispanics being less likely to use the Internet to search for news and/or conduct informational searches (United States Department of Commerce, 2002). Sax, Ceja, and Teranishi (2001) conducted a national survey of college freshmen where an inequity in technological preparedness was discovered between minority students and their racial counterparts. There were significant differences discovered by race, class, and academic background. Variables such as parent's level of education, income, and type of high school impact ICT level among students. Lower socio-economic status, minority race, and parents without a college degree led to lower ICT skills (Pearson, 2002; Hoffman & Novac, 1999). Empirical findings demonstrated that students' use of ICT is driven by several factors, including

age, socioeconomic status, living situation, and locality (Valadez & Duran, 2007). The aforementioned factors potentially impact a student's overall academic success.

Generally, minority students have challenges when it comes to basic technology skills, as minority students are less likely to have a computer at home (Fairlie & London, 2011) and are more likely to have their first interaction with ICT at a later age than majority students (Buzzetto-More et al., 2010; Chisholm, Carey, & Hernandez, 2002). For example, Hispanic students have more barriers to being college ready and have a lower level of digital literacy compared to majority students (Kirk, Chiagouris, Lala, & Thomas, 2015; van Slyke & Hammonds, 2003).

Despite progression, there is no consensus regarding understanding students' utilization of ICT (Bennett, Maton, & Kervin, 2008). There is a body of evidence that indicates that the actual uses of ICT by students are more limited in scope than indicated by students (Selwyn, 2009). To follow up on previous assertions, a study was also conducted at two Historically Black Universities in which technology ownership, usage, and the information acquisition habits of freshmen were analyzed (Buzzetto-More & Sweat-Guy, 2006). The results of this study have shown that technology access and ownership is less prevalent compared to what has been reported out of other major institutions. It was also noted that HBCU freshmen are ill-prepared when it comes to utilizing the Internet and libraries for scholarly functions.

Regardless of various arguments, researchers continue to emphasize the importance of educating minority youth as a major concern for education and the importance of technology and ICT (Bennett et al., 2008). Research suggests students' use of ICT may be more a matter of digital literacy and access rather than a generational trait;

thus, technology in education will make schools more productive and efficient, improve teaching and learning, provide authentic and engaging learning experiences, and better prepare students for the workforce (Cuban, 2001). Minority student access to technology is an important part of the education experience.

### **Historically Black Colleges and Universities**

Educational inequity among minorities is not a new phenomenon. Historically Black Colleges and Universities (HBCUs) are institutions founded primarily for the education of minorities, specifically filling the gap for Black students to receive vital educational access. The purpose of HBCUs was to educate African Americans at a time when HBCUs were the only option for most Blacks. Historically Black Colleges and Universities have evolved into an environment equipped to promote college success for African Americans. Past research shows that Black students attending HBCUs are better integrated academically and socially than their peers at Predominately White Institutions (PWIs) (Allen, 1992; Fleming, 1984; Fries-Britt & Turner, 2002). Other researchers note that HBCUs are also instrumental in preparing African American students to actively function in society (Arroyo & Gasman, 2014). Historically Black Colleges and Universities provide an environment that encourages student engagement, retention, and success (Laird et al., 2004). Studies have demonstrated that going to a HBCU impacts student outcomes in a positive manner (Flowers, 2002; Outcalt & Skewes-Cox, 2002).

Historically Black Colleges and Universities are challenged to meet the needs of students with varying levels of technological readiness, as deficiencies in information and digital literacy are shown to be a hindrance to student success. To address this need, a historically Black university in Maryland developed an institutional commitment to the

digital and information literacy of their students (Buzzetto, 2018). According to Buzzetto (2018), these efforts have included the adoption of an international certification exam used as a placement test for incoming freshmen, creation of a Center for Student Technology Certification and Training, course redesign, pre- and post-testing in computer applications courses, and a student perception survey about digital literacy (Buzzetto, 2018). Buzetto further asserted that the digital divide is a serious concern for higher education, especially as universities search for ways to meet the needs of underserved populations. That, combined with the results of this study, demonstrates that students entering minority-serving institutions are not equipped with the technological skills needed for academic success.

### **ICT Plans of Action**

Several researchers have investigated ICT, first-year students, and first-year minority students. As a consideration to inform my plan of action, I reviewed two first-year studies and three minority first-year studies where similar professional development programs were developed and implemented for students. All provided vital information related to the topic of ICT and higher education. There were several systemic factors specifically related to minority students, especially African Americans' environment and socioeconomic background. In addition, the culture, and experiences at an HBCU, as well as faculty and students, can also impact what is perceived to be needed in an effective ICT program for first-year minority students.

Buzetto (2018) conducted a study related to minorities and ICT. The study was conducted at two institutions that served minorities. The purpose was to examine the pre-college preparation of minority students and whether differences would exist between the

responses of the male and female participants. The respondents reported that they did not come to college with adequate programming skills and/or prior training to succeed as a Computer Science major, with females found to be less prepared than males (Buzzetto & Ukoba, 2010). This was the first step in the program development for the university.

In a study of integrating ICT into a first-year class, Macklin (2008) conducted a study of first-year students that explored the utilization of a problem-based learning (PBL) approach for teaching information and communication technology (ICT). The first question for this study inquired about how to address the ICT skill needs of 20 students enrolled in a first-year composition course. The second question targeted the use of PBL to facilitate ICT skill acquisition. Data was captured qualitatively and quantitatively, and results demonstrated that ICT instruction was most useful. Macklin (2008) used four factors: (1) Recollection of information regarding knowledge and experiences, (2) testing of interpretations, (3) access for utilizing resources and tools, and (4) impact of formative feedback related to critical thinking and the information retrieval process. These findings provided important insights into using PBL to facilitate and reinforce ICT skills and learning, as well as served as the beginning stages for a plan for developing a college ICT program.

In another study of first-year students in the Master of Library Science program, Rutgers University and Valeis et. al (2013) conducted a needs assessment and through observation and collaboration with high school librarians, it was determined that high school students entering their first year of college presented with poor research skills. The purpose of the study was to understand factors affecting information communication literacy skills of high school students who enter college. For data collection, the students

who participated were scored in five areas. The limitations with this study included not having data regarding skills and lack of knowledge regarding what resources high school librarians provided to assist with using ICT skills for researching (Valeis et al., 2013). This study concluded that students entering college already have an ICT skill deficit.

Even though historically Black colleges and universities (HBCUs) play a crucial role in ensuring higher education for Black students, traditionally, they are equipped with inferior technology, fewer resources, and lower budgets than other universities (Flowers, 2008). These limitations make it challenging for HBCUs to implement ICT-focused programming. The lack of recruitment and retention for highly trained technology staff and inferior infrastructure exasperates the challenges for implementing ICT initiatives (US Department of Education, 2017).

Although there is a wealth of information regarding ICT skills and higher education, more research regarding the impact on minorities needs to be conducted. Researchers such as Buzzetto-Moore (2018) and Flowers (2008) acknowledge the research gap and the need for more studies regarding minorities and ICT in higher education. In addition, more research regarding HBCUs would add to the knowledge on how to address the needs of Black learners within a homogenous learning environment, as students attending HBCUs do not come to school with integral ICT (Buzetto & Alade, 2018; Flowers, 2002; Outcalt & Skewes-Cox, 2002). There needs to be better understanding and more effective measurement of ICT literacy is needed to gauge readiness to both pursue higher education and enter the workforce (Perez & Murray, 2010).

To address quality education delivery, the importance of the use of ICT in fostering a paradigm shift for the provision of quality education within the higher education sector has been advocated by Yang (2008). As a result, it is necessary that higher education institutions themselves search for ways to effectively train the students in the required skills, and to guarantee that the students who graduate will be creative, competitive, and critical thinkers (Yang, 2008).

### **Chapter Summary**

This literature review examined the concepts of ICT literacy and skills for minority college students and faculty. It explored ICT in higher education by defining ICT and specifically addressing ICT skills via needs assessments, ICT assessments, and courses. The literature presented replicable steps for developing a program, which begins with a needs assessment. It was determined that focus groups and surveys are viable options for providing valuable information for the development of an ICT program. Literature showed that a deficit exists among first-year students and minorities. It also showed that students' perceptions differ from their actual skills. The feedback and input from both faculty and students will also contribute to the success development of a workable plan. Due to the historic marginalization of minorities, especially Blacks, it will be essential to conduct responsible research that is sensitive to the needs of the population. It is also helpful to build upon programs that have already been instituted at similar colleges and universities. The benefits of ICT extend from higher education and beyond; therefore, leaders of colleges and universities must emphasize the need for program development, professional development, and ICT skill acquisition.

## CHAPTER 3

### METHODS

ICT is a critical aspect of matriculation through higher education and entry into the workforce. To address this, I conducted research regarding ICT. The purpose of this action research was to explore the information and communication technology (ICT) literacy skills of first-year minority students at Saint Augustine's University in order to develop a plan for an ICT professional development program. The following research questions guided this study:

1. What are first-year minority students' information and communication technology literacy knowledge and skills at Saint Augustine's University?
2. What do faculty and students think should be included in an information and communication technology literacy program for first-year minority students at Saint Augustine's University?
3. How do faculty integrate information and communication technology literacy skills in their courses for first-year minority students at Saint Augustine's University?

#### **Research Design**

Action research is applicable for my study because it sets the premise for me to test ideas and theories in practice (Kock, Avison, & Maularent, 2017). Since I have been worked with the university and am a racial minority, I have a personal desire and



commitment to assist students with acquiring the skills they need to thrive and be successful. One aspect of my pursuit includes acknowledging that I would be remiss if I did not address the racial composition of my population.

Racial minorities face digital and technological challenges that their counterparts do not. The lack of both access to and the desire to use technology among economically disadvantaged racial and ethnic minorities exacerbates their ability to function as citizens in a democratic society and in a computer- and information-based global economy (Crews & Feinberg, 2002; Selwyn, 2003; Shelley et al., 2004; Wilson, Wallin, & Reiser, 2003). Thus, action research is applicable because it can be used to address social justice and marginalized populations (Mertler, 2017).

ICT literacy is a social justice issue because a lack of the necessary skills is detrimental to a population that is already marginalized. Due to the makeup of my population, as a researcher, I should not only be cognizant of the social and cultural impact of ICT, but I must also consider why action research was the optimal option. The cyclical nature of action research allowed me to plan, act, observe, and reflect (Carr & Kemmis, 1986). Therefore, I developed and refined a solution to a real-life problem during my future development and implementation of an ICT program (Mertler, 2017).

An action research method is a process that allowed me to examine my ideas about education and ICT at Saint Augustine's University. I researched ICT at a private Historically Black College and University (HBCU). Through past conversations with staff and administration and the development and delivery of seminars, I discovered that ICT skills are lacking for students. As a result, my plan was to explore first-year minority students' information and communication technology (ICT) literacy skills at Saint

Augustine's University in order to develop an information and communication technology program for this specific population.

I implemented a triangulation mixed-method design to address the ICT skills problem. Mixed methodology is defined as collecting and analyzing data, either synchronously or sequentially, derived from both quantitative and qualitative data collection methods (Creswell, 2014). A mixed-methods approach enabled me to concurrently explore concrete data and students' ICT knowledge and skills to determine what should be included in an ICT program. A quantitative study solely would not have provided me with the opportunity to discover the breadth of ICT skills and knowledge of students and to determine what students and faculty believe should be included in an ICT program. Through the mixed-methods design, I analyzed students' knowledge and skills and integrated faculty and students' feedback regarding what should be included in an ICT program at Saint Augustine's University.

As Creswell (2014) asserted, a mixed-methods design and evaluation are typically characterized by six core features: the collection of both qualitative and quantitative data, the analysis of that data, persuasive and rigorous procedures for both sets, the integration of these two data sources, the use of a specific mixed-methods research design that involves a concurrent or sequential integration with equal or unequal emphases, and an approach to research that has a sound philosophical foundation. Therefore, I used Creswell's mixed-methods design to conduct surveys regarding students' ICT skills and faculty members' integration of ICT knowledge and skills in courses. In addition, I implemented the qualitative element that addressed student ICT knowledge and skills and what faculty and students thought should be included in an ICT program. The results of

my study will inform future university decisions on how to address ICT skill acquisition for students and develop ICT programming for first-year students.

### **Setting and Participants**

The research took place at Saint Augustine's University (SAU). The institution is a predominantly Black, four-year university that consists of an almost-even distribution of male and female students. The majority of the students utilize financial assistance to pay for tuition and fees. The university did not have consistent programs, courses, or seminars to emphasize or teach ICT literacy skills. Saint Augustine's University offered limited online courses, and university leadership adopted a Learning Management System (LMS), Blackboard, within the past four years at the time of my research. Administrators, Information Technology (IT) department leaders, and faculty articulated their concern regarding the lack of ICT skills, namely computer and information skills, among the student body.

The ICT component will be a part of the First Year Experience (FYE) program. The FYE program supports all students in their first year at the university, namely freshmen and transfer students (i.e., sophomore, juniors, and seniors). The study participants were selected based on a mass email that was sent out requesting volunteers. The email was sent to all students enrolled in the FYE program, and the first students to sign up were selected to participate. No minority FYE student was denied participation.

Students met designated criteria to participate in the study. These requirements for student participation included maintaining full-time student status as a first-year student to the university (with a classification of freshman, sophomore, junior, or senior), self-identification as a racial minority, and participation in the FYE program.

The participants in this study self-identified as male, female, or non-binary and as a racial minority. The research was conducted virtually, allowing participants to access surveys and study groups from their natural setting. Research conducted within participants' natural settings is a characteristic of qualitative research (Creswell, 2014).

The student survey respondents included 20 males, 20 females, and 1 non-binary respondent. All 41 respondents self-identified as racial minorities. There were 36 freshmen, 3 sophomores, 1 junior, and 1 senior. Respondents' ages ranged from 17 to 26 years old. The majors included: Exercise Science, Business Administration, Psychology, Public Health, Sports Management, Biology, Visual Arts, Sociology, Criminal Justice, Business Management, Film, Computer Information, Mass Communications, Mathematics, Engineering Mathematics, and Political Science. All respondents were full-time students. Twenty-eight were enrolled in the first-year experience program, while thirteen were not.

The faculty participation was based on voluntary participation as well. A mass email was sent to faculty requesting voluntary participation. The process was initiated using purposeful sampling, which allows the researcher to obtain data that will aid in understanding the research questions (Creswell, 2014). The research questions were specifically designed to address needs of first-year students.

The faculty survey respondents included 7 males and 2 females. All 9 respondents self-identified as racial minorities. There were 7 full-time faculty members and 2 part-time faculty members. The academic departments included: General College, General Education/ Elementary Education, sports management, Biological and Physical Sciences, School of Business, Sports Management, and Technology, Media and Communications,

Humanities/Music, and Public Health and Exercise Science. Seven faculty members taught first-year students, while two did not.

The target population consisted of 400 undergraduate students and 17 faculty members (Saint Augustine's University, 2020). Due to Covid-19 and remote learning, IT staff was not available to assist with tech support for the research sessions.

### **Data Collection**

Data collection involved quantitative and qualitative data from surveys, focus groups, and interviews. Table 3.1 displays the alignment between research questions and data collection methods.

Table 3.1 *Research questions aligned with data sources*

Research Question	Data Collection Methods
1. What are first-year minority students' information and communication technology literacy knowledge and skills at Saint Augustine's University?	<ul style="list-style-type: none"><li>• Student survey</li><li>• Student focus groups</li></ul>
2. What do faculty and students think should be included in an information and communication technology literacy program for first-year minority students at Saint Augustine's University?	<ul style="list-style-type: none"><li>• Student survey</li><li>• Faculty survey</li><li>• Student focus groups</li><li>• Faculty interviews</li></ul>
3. How do faculty members integrate information and communication technology literacy skills in their courses for first- year minority students at Saint Augustine's University?	<ul style="list-style-type: none"><li>• Faculty survey</li><li>• Faculty interviews</li></ul>

### **Surveys**

Surveys are useful tools for attaining valuable information from research participants. Extending beyond traditional methods, e-mail and Web-based surveys are becoming an increasingly popular research methodology (Granello & Wheaton, 2004). For the purpose of my research, a web-based survey was distributed to participants.

## **Student Survey**

My instruments were validated by experts and utilized a Likert-type scale for skill-based questions. For validation of my survey instruments, I conferred with experts in the field of ICT. I first conferred with, Dr. Macklin Smith, and Dr. Katz. The two had previously implemented the ICT framework within research. The prior research consisted of seven ICT areas as a survey tool to evaluate ICT skills. I also utilized this ICT framework which had already been tested and utilized as an example for creating a survey instrument for this study. The tool, I developed included each of the seven ICT framework areas and included three to four designated items. For further validation, of my survey instrument, I also asked an internal expert at Saint Augustine University Dr. Nevels, who served as the head of Saint Augustine University library to conduct a review of the survey tool prior to administering to students.

Students received the survey request via email (Appendix C). The student survey included questions to determine students' ICT background, perceived ICT skill level, and thoughts regarding what students think should be included in an ICT program.

The student survey was a 22-question survey. It consisted of demographic questions and ICT skills questions with a 5-point Likert scale (1: strongly disagree to 5: strongly agree). The survey also had a question for participants to elect to participate in focus groups. Table 3.2 shows the research question alignment with the student survey questions.

Table 3.2 *Research questions aligned with student survey questions*

Research Question	Student Survey Question Alignment
RQ1 What are first-year minority students' information and communication technology literacy skills at Saint Augustine's University?	<p>What do you know about ICT skills?</p> <p>Defining a need for information</p> <ul style="list-style-type: none"> <li>• I can develop a research topic to fit a particular information need.</li> <li>• I know how to ask questions to clarify the information need.</li> <li>• I am able to ask questions of a “professor” that help clarify a vague research assignment.</li> <li>• I know how to conduct effective preliminary information searches to help frame a research statement.</li> </ul> <p>Accessing information via technology</p> <ul style="list-style-type: none"> <li>• I am able to generate and combine search terms (keywords) to satisfy the requirements of a particular research task.</li> <li>• I am able to efficiently browse one or more resources to locate pertinent information.</li> <li>• I am able to decide what types of resources might yield the most useful information for a particular need.</li> </ul> <p>Evaluating online information</p> <ul style="list-style-type: none"> <li>• I am able to judge the relative usefulness of provided Web pages and online journal articles.</li> <li>• I am able to evaluate whether a database contains appropriately current and pertinent information.</li> <li>• I am able to decide to the extent to which a collection of resources sufficiently covers a research area.</li> </ul> <p>Managing digital information</p> <ul style="list-style-type: none"> <li>• I am able to categorize emails into appropriate folders based on a critical view of the emails' content.</li> <li>• I am able to arrange personnel information into an organizational chart.</li> </ul>

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- I am able to sort files, emails, or data to clarify clusters of related information.

#### Integrating information from varied digital sources

- I know how to compare advertisements, emails, or websites from competing vendors by summarizing information into a table.
- I know how to summarize and synthesize information from a variety of sources according to specific criteria in order to compare information and make a decision.
- I would be able to re-represent results from an academic or sports tournament into a spreadsheet to clarify standings and decide the need for playoffs.

#### Creating information

- I am able to edit and format a document according to a set of editorial specifications.
- I am able to create a presentation slide to support a position on a controversial topic.
- I am able to create a data display to clarify the relationship between academic and economic variables.

#### Communicating information through technology

- I know how to format a document to make it more useful to a particular group.
- I am able to transform an email into a presentation to meet an audience's needs.
- I know how to select and organize slides for distinct presentations to different audiences.
- I am able to design a flyer to advertise to a distinct group or users.

RQ2 What do faculty and students think should be included in an information and communication technology literacy program for first-year minority students at Saint Augustine's University?

What are the most important ICT skills that you need for college?

What ICT skills do you think that you may need after graduation?

What would you like to see included in an ICT professional development program intended for students at Saint Augustine's University?

What do you think would be the easiest way to learn ICT skills?

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## Faculty survey

The faculty survey was used to discover how faculty integrate information and communication technology literacy skills in their courses for first-year minority students at Saint Augustine's University and to determine what faculty think should be included in an information and communication technology literacy program for first-year minority students at Saint Augustine's University. The faculty survey went through the same vetting process as the student survey. It was developed based on the research of Dr. Katz and Dr. Smith Maclin. It was also reviewed by the experts. Faculty received the survey via email (Appendix E). The survey also had a question for participants to elect to participate in faculty interviews. An adaptation of my student survey was used (Appendix E). Table 3.3 shows the research question alignment with the faculty survey questions.

Table 3.3 *Research questions aligned with faculty survey questions*

Research Question	Faculty Survey Question Alignment
RQ2 What do faculty and students think should be included in an information and communication technology literacy program for first-year minority students at Saint Augustine's University?	<p>What are the most important ICT skills that students need to be successful in college?</p> <p>What ICT skills do you think students need to be successful upon graduation?</p> <p>What would you like to see included in an ICT program?</p>
RQ 3 How do faculty integrate information and communication technology literacy skills in their courses for first-year minority students at Saint Augustine's	<p>What is your perception of ICT skills usage within your courses?</p> <p>What is your understanding of ICT?</p> <p>How do you integrate ICT skills in your courses?</p> <p>Defining a need for information</p> <ul style="list-style-type: none"> <li>• My students can develop a research topic to fit a</li> </ul>

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University?

- particular information need.
- My students know how to ask questions to clarify the information need.
- My students are able to ask questions of a “professor” that help clarify a vague research assignment.
- My students know how to conduct effective preliminary information searches to help frame a research statement.

Accessing information via technology

- My students are able to generate and combine search terms (keywords) to satisfy the requirements of a particular research task.
- My students are able to efficiently browse one or more resources to locate pertinent information.
- My students are able to decide what types of resources might yield the most useful information for a particular need.

Evaluating online information

- My students are able to judge the relative usefulness of provided Web pages and online journal articles.
- My students are able to evaluate whether a database contains appropriately current and pertinent information.
- My students are able to decide to the extent to which a collection of resources sufficiently covers a research area.

Managing digital information

- My students are able to categorize emails into appropriate folders based on a critical view of the emails’ content.
- My students are able to arrange personnel information into an organizational chart.
- My students are able to sort files, emails, or data to clarify clusters of related information.

Integrating information from varied digital sources

- My students know how to compare advertisements, emails, or websites from competing vendors by summarizing information into a table.
  - My students know how to summarize and synthesize information from a variety of sources according to specific criteria in order to compare
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information and make a decision.

- My students would be able to re-represent results from an academic or sports tournament into a spreadsheet to clarify standings and decide the need for playoffs.

#### Creating information

- My students are able to edit and format a document according to a set of editorial specifications.
- My students are able to create a presentation slide to support a position on a controversial topic.
- My students are able to create a data display to clarify the relationship between academic and economic variables.

#### Communicating information through technology

- My students know how to format a document to make it more useful to a particular group.
  - My students are able to transform an email into a presentation to meet an audience's needs.
  - My students know how to select and organize slides for distinct presentations to different audiences.
  - My students are able to design a flyer to advertise to a distinct group or users.
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### **Focus Groups**

One form of qualitative data collection is focus groups. Focus groups are used to better understand how people feel about an issue and to gather opinions (Krueger, 2014). The focus group interviews were semi-structured, open-ended discussions that lasted between 20 and 45 minutes. The focus group protocol is built on work by Krueger (2014), Breen (2006), and the ICT Framework (Katz et al., 2004; Macklin, 2008). I utilized aspects of my survey that was expert-reviewed to develop my protocol. I also had experts review the protocol before it was shared.

I held three focus groups, each composed of two to three students. The focus

groups were assigned based on availability of students during course time. Focus groups are generally between 10 and 12 people (Mertler, 2017; Leedy & Omorod, 2005, but this number could vary depending on the sample size. Students signed up but did not log in for the session. I received two emails later detailing why students did not participate. For my study, I provided focus group time slots. Participants were placed into focus group time slots by faculty for the purpose of sharing their perceived knowledge and skills concerning ICT and what they think should be included in an ICT program. Krueger (2014) asserted that one way to develop a focus group is based on participants having commonalities.

The participants in my study were students who are in some way connected to the FYE program. Focus group interviews took place virtually and included students and myself. The focus groups included specific sections: Welcome, introduction, anonymity, ground rules, warm up, clarification question, key questions, concluding question, and conclusion (Vaughn, Schumm, & Sinagub, 1996), and a model for a successfully implemented discussion guide to assess perceived skills of college students (Rees & Garrud, 2001). By conducting student focus groups, I was able to assess students' perceived knowledge and skills and determine program needs. The focus groups were recorded via audio recording and transcribed for upload to NVivo software. Table 3.4 shows the research question alignment with the student focus group questions.

Table 3.4 *Research questions aligned with student focus group questions*

Research Question	Focus Group Question Alignment
RQ1 What are first-year minority students' information and communication technology	<ul style="list-style-type: none"> <li>• Rank in order, with 1 being your strongest, your ICT literacy skills. <ul style="list-style-type: none"> <li>○ Defining a need for information</li> <li>○ Accessing information via technology</li> </ul> </li> </ul>

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literacy skills at Saint Augustine's University?	<ul style="list-style-type: none"> <li>○ Evaluating online information</li> <li>○ Managing digital information</li> <li>○ Integrating information from varied digital sources</li> <li>○ Creating information</li> <li>○ Communicating information through technology</li> <li>● Share the order from strongest to least.</li> <li>● Why do you think _____ is your strongest and _____ is your least?</li> <li>● What is your understanding of ICT?</li> <li>● Do you know how to research a topic?</li> <li>● How would you rate your ICT skills on a scale from 1-10 with 10 being the strongest?</li> <li>● Why did you rate yourself in that way?</li> <li>● Are you satisfied with your skills and self-reported rating and why or why not?</li> <li>● What is one thing that you wish you knew how to do using ICT skills?</li> </ul>
RQ2 What do faculty and students think should be included in an information and communication technology literacy program for first-year minority students at Saint Augustine's University?	<ul style="list-style-type: none"> <li>● What are the most important ICT skills that you need for college?</li> <li>● What ICT skills do you think that you may need after graduation?</li> <li>● What would you like to see included in an ICT program?</li> <li>● What do you think would be the easiest way to learn ICT skills?</li> <li>● What do you think would be the easiest way to learn ICT skills?</li> </ul>

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### **Faculty Interviews**

Faculty interviews were conducted virtually. I conducted three interviews with faculty. By conducting faculty interviews, I was able to assess what faculty think should be included in an information and communication technology literacy program and discover how faculty integrate ICT skills in their courses (Appendix H). These are elements that facilitate the implementation of educational technology innovations according to (Ely, 1999) and the ICT Framework (Katz, 2007). Based on those outlined

conditions, faculty responses provided insight on the ICT integration status and expected outcomes. These interviews generated institutional dialogue that will result in the emergence of a future ICT program. The interviews were recorded via audio recording and transcribed for upload to NVivo software. Table 3.5 shows the research question alignment with the focus group questions.

Table 3.5 *Research questions aligned with faculty interview questions*

Research Question	Interview Question Alignment
RQ2 What do faculty and students think should be included in an information and communication technology literacy program for first-year minority students at Saint Augustine's University?	<p>Do you think it is important for first-year students to possess ICT skills and why?</p> <p>Do you think lack of ICT skills for first-year students will impact academic success and how?</p> <p>What ICT skills do you think first-year students need to be successful in school?</p> <p>What ICT skills do you think first-year students need to be successful upon graduation?</p> <p>What do you think should be included in an ICT program for first-year students?</p> <p>What do you think would be the best way for students to learn ICT skills?</p> <p>What do you think would be the best way for students to learn ICT skills?</p> <p>Rank in order, with 1 being most important, the ICT literacy skills needed for students.</p> <p>Defining a need for information</p> <p>Accessing information via technology</p> <p>Evaluating online information</p> <p>Managing digital information</p> <p>Integrating information from varied digital sources</p> <p>Creating information</p> <p>Communicating information through technology</p> <p>Share the order from most important to least important.</p> <p>Why do you think _____ is the most important and _____ is the least?</p>
RQ 3 How do faculty integrate information and communication technology literacy skills in their courses	<p>As a faculty member, do you think it is important to integrate technology into your courses for first-year students?</p> <p>How do you integrate ICT skills in your courses for first-year students?</p>

for first-year minority students at Saint Augustine's University?

Do you think it is important for faculty to use ICT tools with first-year students?

1. Please explain why or why not.
2. Does the same apply after the first year?

What tools do you use to integrate ICT skills into the classroom?

## Procedures

The procedures for this study were categorized into three phases. Table 3.6 summarizes the procedures for this study.

Table 3.6 *Procedures and research timeline*

Phase	Activities	Timeframe
Phase 1: Recruitment and Permissions	<ul style="list-style-type: none"> <li>Participants are identified and invited</li> <li>Participants complete consent forms</li> </ul>	2 weeks
Phase 2: Data Collection	<ul style="list-style-type: none"> <li>Students complete ICT survey</li> <li>Faculty complete ICT survey</li> <li>Students complete focus groups (6 sessions offered; 3 sessions attended)</li> <li>Faculty sit for interviews (3 interviews total)</li> </ul>	4 weeks
Phase 3: Data Analysis	<ul style="list-style-type: none"> <li>Member checking</li> <li>Analyze quantitative data and qualitative data</li> </ul>	4 weeks

Phase 1 consisted of sending out invitations to all FYE students to voluntarily participate. Before collecting data, approval from the Institutional Review Board (IRB) was obtained (see APPENDIX A). Throughout data collection, I ensured that students' responses remained confidential. To do this, I applied pseudonyms for the focus group participants. If students elected to be entered in a drawing for a gift card or to complete

the follow-up focus groups after the survey, they were be asked to provide their email address. Prior to data analysis, email addresses were removed from the data to ensure confidentiality. During Phase 1, consent was provided by administration, participants were formally identified, and invited to participate.

Phase 2 involved collection of all data. First, students and faculty participants completed the surveys. Students and faculty completed ICT surveys. The surveys were disbursed virtually using email and Microsoft Forms. There was a question concerning student focus group and faculty interview participation on the last question of both surveys.

In addition to the surveys, Phase 2 also included student focus groups and faculty interviews. Focus groups were conducted virtually. Students were identified to participate based on voluntary acceptance. Students were asked if they would like to participate via the student survey that was completed during Phase 1. The survey and focus groups for students were used to determine student ICT knowledge and skills and what should be included in an ICT program. To circumvent potential issues with scheduling and meeting in person, the focus groups were conducted using Zoom and recorded. After completion, the transcribed interviews were uploaded to NVivo. Phase 2 was also used to determine how faculty integrate ICT literacy skills into their courses and to find out what should be included in an ICT literacy program for first-year students via faculty focus groups.

Phase 3 involved the analysis of quantitative data from the faculty survey and student survey and qualitative data from the student focus groups, faculty interviews, and open-ended survey questions. The quantitative data analysis combined the use of Microsoft Forms, Microsoft Excel, and JASP. I exported responses from Microsoft Forms to Microsoft Excel. Microsoft Excel was used to clean up and organize my data.



JASP was used as a follow up to Microsoft Excel for a more in-depth analysis. The qualitative analysis will involve the use of Nvivo for and Microsoft Excel. In addition, member checking was utilized throughout the process to ensure that data was fully representative of the participants' views, ideas, and beliefs.

### **Data Analysis**

The data analysis process included quantitative and qualitative analysis methods. Due to the mixed-methods nature of my research, different processes were implemented to address each type of data collection. For the quantitative aspect of my research, I utilized Microsoft Excel to clean up my data for descriptive statistics. For my analysis, I used JASP to analyze my quantitative data. I was able to complete all my descriptive statistics. For the qualitative aspect of my research, I utilized inductive analysis. I used Microsoft Forms and NVivo for my qualitative data analysis. Table 3.7 details the data collection methods.

Table 3.7 *Data collection methods and analysis methods*

<b>Research Question</b>	<b>Data Sources</b>	<b>Analysis Method</b>
What are first-year minority students' information and communication technology literacy skills at Saint Augustine's University?	<ul style="list-style-type: none"> <li>• Student survey</li> <li>• Student focus groups</li> </ul>	<ul style="list-style-type: none"> <li>• Descriptive statistics</li> <li>• Inductive analysis</li> </ul>
What do faculty and students think should be included in an information and communication technology literacy program for first-year minority students at Saint Augustine's University?	<ul style="list-style-type: none"> <li>• Student survey</li> <li>• Student focus groups</li> <li>• Faculty survey</li> <li>• Faculty interviews</li> </ul>	<ul style="list-style-type: none"> <li>• Descriptive statistics</li> <li>• Inductive analysis</li> </ul>
How do faculty integrate information and communication technology literacy skills in their courses for first-year minority students at Saint Augustine's University?	<ul style="list-style-type: none"> <li>• Faculty survey</li> <li>• Faculty interviews</li> </ul>	<ul style="list-style-type: none"> <li>• Descriptive statistics</li> <li>• Inductive analysis</li> </ul>

## **Rigor and Trustworthiness**

As a researcher, it is imperative that I ensured rigor and trustworthiness in my research. To accomplish this, I concentrated on (a) member checking, (b) triangulation, and (c) peer debriefing to support my action research. Trustworthiness is the concern of “the accuracy and believability- of the data” (Mertler, 2017, p. 140). Therefore, trustworthiness is an essential feature of action research and qualitative data collection.

### **Member Checking**

One aspect of the research process included member checking. Mertler (2017) asserted that for the member checking process, participants should ensure that the collected data is fully representative of their ideas, views, and beliefs. Additionally, participants should be afforded the opportunity to review the findings prior to public presentation. I shared anonymized focus group transcripts with student and faculty participants. This occurred by assigning students numbers in transcripts instead of displaying names. Participants were also able to review the major findings and themes from the study upon completion of the focus groups and surveys. This occurred through an email of my transcript and coding scheme to ask for verification, clarification, and elaboration (Mertler, 2017). Through the member checking process, a more realistic and richer perspective was offered as it relates to the themes of the interviews. The results become more realistic and added to the validity of the results. The aforementioned process aided in the development of thick, rich descriptions, which adds to the trustworthiness of qualitative research (Creswell, 2014).

### **Triangulation**

I chose to incorporate triangulation because it is one of the most often-used processes to establish rigor and trustworthiness (Creswell, 2014). As previously stated, my study consisted of conducting surveys, focus groups, and interviews. The results of the quantitative data served to inform and further validate the qualitative findings. Themes emerged based on similarities in responses. The examination of different data sources can be used to further build the justification of the themes through the convergence of several sources of data and can assist in enhancing the validity of the study (Mertler, 2017). The emergence of themes was used for further validation and rigor. The implementation of triangulation to establish rigor and trustworthiness supports the verification of individual viewpoints against others (Shenton, 2004).

### **Peer Debriefing**

The final method I used to establish rigor and trustworthiness in my research was peer debriefing. I requested that my doctoral classmates, colleagues at work, and my dissertation chair reviewed my initial findings for accuracy and conducted an external audit to review and assess my final research report (Creswell, 2014). My advisor was an integral part of member checking. After each phase of coding, I met with my advisor. During each phase, my advisor and I reviewed the codes to ensure alignment with my data. We also reviewed the themes to ensure that they were reflective of the data collected. Peer debriefing enabled me to refine my methods and more efficiently explain my research design, while strengthening my argument (Shenton, 2004). Since I utilized a mixed-methods approach, peer debriefing served as an integral aspect of my strategy to ensure the rigor and trustworthiness of my research.

### **Plan for Sharing**

The findings of this research were shared with students who have participated in the study and stakeholders at Saint Augustine's University and with. The results of the study were shared with the FYE students via a presentation and student participants will be able to review results before the results are shared publicly. In the interest of reciprocity, students were provided with updates throughout the research process. A share-out occurred during the final phase of data collection and after the data analysis process was complete.

The results of this research will also be shared with administration, faculty, and staff of Saint Augustine's University during the Faculty Staff Institute. The Faculty Staff Institute occurs twice a year, and this share-out will involve a presentation with a Question & Answer (Q & A) session to discuss findings and implications. In addition, all findings were shared with my dissertation committee in the effort to ensure that the study maintains the highest standards of scholarship and quality.

I also shared my research with peers in my academic program who would provide constructive insight and feedback. Throughout the entire research process, I adhered to confidentiality by ensuring that participant identity is protected. Thus, data compilation included the removal of identifiers. Survey, focus group, and interview results from students and faculty did not include specific names of individuals.

## CHAPTER 4

### ANALYSIS AND FINDINGS

The purpose of this action research was to explore the factors that impact minority college students' information and communication technology literacy skills at Saint Augustine's University and develop a plan for an information and communication technology program for the first-year minority college students. Quantitative and qualitative data were collected and analyzed to answer three research questions: (1) What are first-year minority students' information and communication technology literacy knowledge and skills at Saint Augustine's University? (2) What do faculty and students think should be included in an information and communication technology literacy program for first-year minority students at Saint Augustine's University? (3) How do faculty integrate information and communication technology literacy skills in their courses for first-year minority students at Saint Augustine's University?

This chapter details the data analysis and findings of data collected from a student survey, a faculty survey, student focus group interviews, and faculty interviews. The quantitative data will be discussed, followed by the qualitative data.

#### **Quantitative Analysis and Findings**

Quantitative data were collected via surveys from students and faculty at Saint Augustine's University in Spring 2021. Each section of the survey was composed using established tasks from the ICT Framework (e.g., Katz, 2004; Katz, 2007; Smith-Macklin,

2008). Survey data were collected from 41 students and 9 faculty members. Demographic information, ICT background, and ICT skill-level questions were asked on closed-ended survey questions. The following were subscales from the survey: (a) Defining a need for information, (b) Accessing information via technology, (c) Evaluating online information, (d) Managing digital information, (e) Integrating information from varied digital sources, (f) Creating information, and (g) Communicating information through technology.

### **ICT Background**

Students and faculty were asked questions regarding their ICT background and training and instruction before and during their time at Saint Augustine’s University. Most students reported that they did not receive ICT or digital literacy instruction prior to attending Saint Augustine’s University nor while attending Saint Augustine’s University (see Table 4.1), and majority of faculty members reported that they had received training (see Table 4.2).

Table 4.1 *ICT Background Table (Student)*

<b>Question</b>	<b>Response “Yes”</b>	<b>Response “No”</b>
Did you receive Information Communication Technology Literacy or Digital Literacy instruction before attending Saint Augustine’s University?	13	28
Have you received Information and Communication Technology Literacy or Digital Literacy instruction while attending Saint Augustine’s University?	14	27

Table 4.2 *ICT Background Table (Faculty)*

<b>Question</b>	<b>Response “Yes”</b>	<b>Response “No”</b>	<b>Response “N/A”</b>
Did you receive Information Communication Technology Literacy or Digital Literacy instruction before working at Saint Augustine’s University?	7	1	1
Have you received Information Communication Technology Literacy or Digital Literacy instruction while working at Saint Augustine’s University?	8	1	0
Did you receive Information Communication Technology Literacy or Digital Literacy training before teaching at Saint Augustine’s University?	7	2	0
Have you received Information Communication Technology Literacy or Digital Literacy training while teaching at Saint Augustine’s University?	7	2	0

### **ICT skill level**

When students were asked to rate themselves on a scale from 1 to 5 regarding their ICT skills, with 1 being lowest and 5 being highest, 39% (n=16) rated themselves a 4 or a 5 and 49% (n=20) rated themselves a 3. Only 12% (n=5) rated their ICT skills a 1 or 2. Similarly, faculty rated students’ ICT skills highly.

### **Student Survey Results**

Student surveys also consisted of items related to the ICT framework. Each ICT skills was classified as a subscale with associated items included. The Cronbach’s Alpha was calculated for each ICT skill (see Table 4.3), along with means and standard deviation for each corresponding item.

### ***Description of subscales***

The reliability of subscales in the surveys were measured with Cronbach's alpha. The Cronbach's alpha for the student survey subscales ranged from 0.69 to 0.94 (see Table 4.3). According to Manerikar and Manerikar (2015), Cronbach's alpha values between 0.6 and 0.7 have an acceptable internal consistency. Therefore, the subscale concerning Defining a need for information ( $\alpha = 0.689$ ) will be discussed; however, findings from this subscale should be considered tentative.

Table 4.3 *Student Subscales, Cronbach's alpha*

<b>Subscales</b>	<b>Cronbach's Alpha</b>
Defining a need for information	0.69
Accessing information via technology	0.87
Evaluating online information	0.84
Managing digital information	0.94
Integrating information from varied sources	0.84
Creating information	0.82
Communicating information through technology	0.90

### ***Defining a need for information***

Students were asked to self-report their ability to define a need for information (see Table 4.4). The ICT skill of Defining a need for information focused on using digital tools to identify and represent an information need. Four items were associated with this ICT skill, and each had a Likert scale of (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, and (5) Strongly agree. For these items, the mean responses indicated that the student participants considered themselves proficient. The



strongest skill in this area was being able to ask questions of a professor that helped clarify a vague research assignment ( $M = 4.23$ ,  $SD = 0.63$ ). The ability to ask questions to verify a need ( $M = 4.18$ ,  $SD = 0.76$ ) and the ability to develop a research topic to fit a particular information need ( $M = 3.88$ ,  $SD = 0.75$ ) were also reported highly by students. The ICT skill that students ranked themselves lowest was their ability to conduct effective preliminary information searches to help frame a research statement ( $M = 3.74$ ,  $SD = 0.68$ ).

Table 4.4 *Defining a need for information Items, Means, and Standard Deviations (Student)*

Item	Mean	SD
I can develop a research topic to fit a particular information need.	3.88	0.75
I know how to ask questions to clarify the information need.	4.18	0.76
I am able to ask questions of a “professor” that help clarify a vague research assignment.	4.23	0.63
I know how to conduct effective preliminary information searches to help frame a research statement.	3.74	0.68

#### ***Accessing information via technology***

Student participants were asked to self-report their ability to access information via technology (see Table 4.5). The ICT skill of Accessing information via technology focuses on collecting and/or retrieving information in digital environments. Three items were associated with this ICT skill, and each had a Likert scale of (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, and (5) Strongly agree. For these items, the mean responses indicated that the student participants considered themselves proficient. The strongest skill in this area was being able to efficiently browse one or more resources to locate pertinent information ( $M = 4.15$ ,  $SD = 0.622$ ). Student

participants also ranked high their abilities to decide what types of resources might yield the most useful information for a particular need ( $M = 4.1$ ,  $SD = 0.591$ ) and to generate and combine search terms (keywords) to satisfy the requirements of a particular research task ( $M = 4.05$ ,  $SD=0.639$ ).

Table 4.5 *Accessing information via technology Items, Means, and Standard Deviations (Student)*

Item	Mean	SD
I am able to generate and combine search terms (keywords) to satisfy the requirements of a particular research task.	4.05	0.64
I am able to efficiently browse one or more resources to locate pertinent information.	4.15	0.62
I am able to decide what types of resources might yield the most useful information for a particular need.	4.1	0.59

### ***Evaluating online information***

Students were asked to self-report their ability to evaluate online information (see 4.6) The ICT skill of Evaluating online information focuses on the ability to effectively judge online material. Three items were associated with this skill, and each had Likert scales of (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, and (5) Strongly agree. For these items, the mean responses indicated that the student participants considered themselves proficient. The strongest skill in this area was being able to judge the relative usefulness of provided Web pages and online journal articles ( $M = 3.98$ ,  $SD = 0.61$ ). Students also ranked their ability to decide to the extent to which a collection of resources sufficiently covers a research area ( $M = 3.9$ ,  $SD=0.67$ ) highly.

Table 4.6 *Evaluating online information Items, Means, and Standard Deviations (Student)*

Item	Mean	SD
I am able to judge the relative usefulness of provided Web pages and online journal articles.	3.98	0.61
I am able to evaluate whether a database contains appropriately current and pertinent information.	3.77	0.77
I am able to decide to the extent to which a collection of resources sufficiently covers a research area.	3.90	0.67

### ***Managing digital information***

Students were asked to self-report their ability to manage digital information using digital tools (see Table 4.7). The ICT skill of Managing digital information focuses on effectively using digital tools to effectively manage information. Three items were associated with this skill, and each had Likert scales of (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, and (5) Strongly agree. For these items, the mean responses indicated that the student participants considered themselves proficient. The strongest skill in this area was being able to efficiently categorize emails into appropriate folders based on email content ( $M = 3.90$ ,  $SD = 0.92$ ). Students' ability to arrange personnel information into an organizational chart ( $M = 3.85$ ,  $SD = 0.83$ ) and students' ability to sort files, emails, or data to clarify clusters of related information ( $M = 3.83$  and  $SD = 0.93$ ) were also rated highly.

Table 4.7 *Managing digital information Items, Means, and Standard Deviations (Student)*

Item	Mean	SD
I am able to categorize emails into appropriate folders based on a critical view of the emails' content.	3.90	0.92

I am able to arrange personnel information into an organizational chart.	3.85	0.83
I am able to sort files, emails, or data to clarify clusters of related information.	3.83	0.93

### ***Integrating information from varied digital sources***

Students were asked to self-report their ability to interpret and integrate information using multiple sources (see Table 4.8). The ICT skill of Integrating digital information focuses on effectively using digital tools to summarize and synthesize information from multiple channels in order to make a decision. Three items were associated with this skill, and each item had Likert scales of (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, and (5) Strongly agree. For these items, the mean responses indicated that students considered themselves proficient. The strongest skill in this area was being able to summarize and synthesize information from a variety of sources according to specific criteria in order to compare information and make a decision ( $M = 3.92$ ,  $SD = 0.66$ ). Students also ranked their ability to compare advertisements, emails, or websites from competing vendors by summarizing information into a table ( $M = 3.76$ ,  $SD = 0.80$ ). The lowest rating was for students' ability to represent results from an academic or sports tournament into a spreadsheet to clarify standings and decide the need for playoff ( $M = 3.68$   $SD = 0.76$ ).

Table 4.8 *Integrating information from varied digital sources Items, Means, and Standard Deviations (Student)*

<b>Item</b>	<b>Mean</b>	<b>SD</b>
I know how to compare advertisements, emails, or websites from competing vendors by summarizing information into a table.	3.76	0.80

I know how to summarize and synthesize information from a variety of sources according to specific criteria in order to compare information and make a decision.	3.92	0.67
I would be able to re-represent results from an academic or sports tournament into a spreadsheet to clarify standings and decide the need for playoffs.	3.68	0.76

### ***Creating information***

Students were asked to self-report their ability to construct and design information using a digital format (see Table 4.9). The ICT skill of Creating information focuses on effectively adapting and applying information in a digital environment. Three items were associated with this skill, and each had Likert scales of (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, (5) Strongly agree. For these items, the mean responses indicated that the participants considered themselves proficient. The strongest skill in this area was being able to create a presentation slide to support a position on a controversial topic ( $M = 4.18$ ,  $SD=0.68$ ). Students' ability to edit and format a document according to a set of editorial specifications ( $M = 3.83$  and  $SD= 0.80$ ). Students also rated themselves highly for the item of being able to demonstrate the ability to create a data display to clarify the relationship between academic and economic variables. ( $M = 3.78$ ,  $SD = 0.80$ )

Table 4.9 *Creating information Items, Means, and Standard Deviations (Student)*

<b>Item</b>	<b>Mean</b>	<b>SD</b>
I am able to edit and format a document according to a set of editorial specifications.	3.83	0.80
I am able to create a presentation slide to support a position on a controversial topic.	4.18	0.68
I am able to create a data display to clarify the relationship between academic and economic variables.	3.78	0.80

### ***Communicating information through technology***

Students were asked to self-report their ability to effectively communicate within a digital environment (see table 4.10). The skill of Communicating information through technology focuses on effectively disseminating information for a specific audience within a digital format. Four items were associated with this skill, and these items had Likert scales of (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, and (5) Strongly agree. For these items, the mean responses indicated that the participants considered themselves proficient. The strongest skill in this area was being able to select and organize slides for a distinct presentation to different audiences ( $M = 3.93$ ,  $SD = 0.67$ ). Students' ability to format a document to make it more useful to a particular group ( $M = 3.93$ ,  $SD = 0.69$ ) and transform an email into a presentation to meet audience's needs ( $M = 3.85$ ,  $SD = 0.70$ ) were also rated highly.

Table 4.10 *Communicating information through technology Items, Means, and Standard Deviations (Student)*

<b>Item</b>	<b>Mean</b>	<b>SD</b>
I know how to format a document to make it more useful to a particular group.	3.93	0.69
I am able to transform an email into a presentation to meet an audience's needs.	3.85	0.70
I know how to select and organize slides for distinct presentations to different audiences.	3.93	0.66
I am able to design a flyer to advertise to a distinct group of users.	3.73	0.91

### **Faculty Survey Results**

Faculty surveys also consisted of items related to the ICT framework. Each ICT skills was classified as a subscale with associated items included. The Cronbach's Alpha

was not calculated due lack of sufficient data. The means and standard deviation for each corresponding item were calculated.

### ***Defining a need for information***

Faculty members were asked to report their students' ability to define a need for information. This ICT skill focused on using digital tools to identify and represent an information need (see Table 4.11). There were four items associated with this skill, and each had Likert scales of (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, and (5) Strongly agree. For these items, the mean responses indicated that faculty members considered their students proficient. The strongest skill in this area was faculty members reporting that their students are able to ask questions of a "professor" that help clarify a vague research assignment ( $M = 3.89$ ,  $SD = 0.93$ ). Faculty members ranked that their students are able to demonstrate the ability to develop a research topic to fit a particular information need ( $M = 3.22$ ,  $SD = 0.68$ ) the lowest of the items.

*Table 4.11 Defining a need for information Items, Means, and Standard Deviations (Faculty)*

<b>Item</b>	<b>Mean</b>	<b>SD</b>
My students can develop a research topic to fit a particular information need.	3.22	0.68
My students know how to ask questions to clarify the information need.	3.56	1.01
My students are able to ask questions of a professor that can help clarify a vague research assignment.	3.89	0.93
My students know how to conduct effective preliminary information searches to help frame a research statement.	3.44	0.88

### ***Accessing information via technology***

Faculty were asked to report their students' ability to access information via technology (see Table 4.12). The ICT skill of Accessing information via technology focuses on students having the ability to collect and/or retrieve information in digital environments. There were three items associated with this skill, and each item had Likert scales of (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, and (5) Strongly agree. For these items, the mean responses indicated that faculty considered their students proficient. The strongest skill in this area was being able to effectively browse one or more resources to locate pertinent information ( $M = 3.56$ ,  $SD=0.73$ ). The lowest rated item was faculty members' responses to the question regarding their students' ability to decide what types of resources might yield the most useful information for a particular need ( $M = 3.11$ ,  $SD=0.93$ ).

Table 4.12 *Accessing information via technology Items, Means, and Standard Deviations (Faculty)*

<b>Item</b>	<b>Mean</b>	<b>SD</b>
My students are able to generate and combine search terms (keywords) to satisfy the requirements of a particular research task.	3.22	0.83
My students are able to effectively browse one or more resources to locate pertinent information.	3.56	0.73
My students are able to decide what types of resources might yield the most useful information for a particular need.	3.11	0.93

### ***Evaluating online information***

Faculty members were asked about their students' ability to evaluate online information (see Table 4.13). The ICT skill of evaluating online information describes the



ability to judge the degree to which digital information satisfies the needs of an information problem, including determining authority, bias, and timeliness of materials. This ICT skill had three items, and each item had Likert scales of (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, and (5) Strongly agree. For these items, the mean responses indicated that the faculty members considered themselves proficient. The strongest skill in this area was faculty reporting their students are able to judge the relative usefulness of provided Web pages and online journal articles ( $M = 3.11$ ,  $SD = 0.78$ ). The lowest rating was faculty responses to students being able to decide to what extent a collection of resources sufficiently covers a research area reported ( $M = 3.00$ ,  $SD=0.87$ ).

*Table 4.13 Evaluating Online Information Items, Means, and Standard Deviations (Faculty)*

<b>Item</b>	<b>Mean</b>	<b>SD</b>
My students are able to judge the relative usefulness of provided Web pages and online journal articles.	3.11	0.78
My students are able to evaluate whether a database contains appropriately current and pertinent information.	3.11	0.78
My students are able to decide the extent to which a collection of resources sufficiently covers a research area.	3.00	0.87

### ***Managing digital information***

Faculty members were asked about their students' ability to use digital tools for application to an organizational or classification scheme for information (see 4.14). The ICT skill of Managing digital information focuses on effectively using digital tools to effectively manage information. This skill was associated with three items, and these items had Likert scales of (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, and (5) Strongly agree. For these items, the mean responses indicated

that faculty members considered students proficient. The strongest item in this area was faculty reporting students' ability to arrange personnel information into an organizational chart ( $M = 3.22$ ,  $SD = .97$ ). The lowest rated item was faculty reporting students' ability to efficiently categorize emails into appropriate folders based on email content ( $M = 3.11$ ,  $SD = 1.05$ ).

Table 4.14 *Managing digital information Items, Means, and Standard Deviations (Faculty)*

Item	Mean	SD
My students are able to categorize emails into appropriate folders based on a critical view of the emails' contents.	3.11	1.05
My students are able to arrange personnel information into an organizational chart.	3.22	0.97
My students are able to sort files, emails, or data to clarify clusters of related information.	3.11	1.00

### *Integrating information from varied digital sources*

Faculty were asked to report their students' ability to interpret and represent digital information from multiple sources (see Table 4.15). The ICT skill of Integrating information from varied digital sources focuses on effectively using digital tools to summarize and synthesize information from multiple channels in order to make a decision. This ICT skill was associated with three items, and each had Likert scales of (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, and (5) Strongly agree. For these items, the mean responses indicated that the faculty members considered students proficient. The tie for strongest skills in this area was faculty responses to students' ability to compare advertisements, emails, or websites from competing vendors by summarizing information into a table ( $M = 3.33$ ,  $SD = 1.00$ ) and students' ability to summarize and synthesize information from a variety of sources

according to specific criteria in order to compare information and make a decision ( $M = 3.33$ ,  $SD=1.00$ ). The lowest rated item was that students are able to represent results from an academic or sports tournament into a spreadsheet to clarify standings and decide the need for playoff. ( $M = 3.11$ ,  $SD = 0.78$ ).

Table 4.15 *Integrating information from varied digital sources Items, Means, and Standard Deviations (Faculty)*

Item	Mean	SD
My students know how to compare advertisements, emails, or websites from competing vendors by summarizing information into a table.	3.33	1.00
My students know how to summarize and synthesize information from a variety of sources according to specific criteria in order to compare information and make a decision.	3.33	1.00
My students are able to re-represent results from an academic or sports tournament into a spreadsheet to clarify standings and decide the need for playoffs.	3.11	0.78

### ***Creating information***

Faculty were asked to report their students' ability to design information using a digital format (see Table 4.16). The ICT skill of creating information focuses on effectively adapting, applying, and creating information in a digital environment. This skill is associated with three items, and they have Likert scales of (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, and (5) Strongly agree. For these items, the mean responses indicated that the faculty considered students proficient. The strongest skill in this area was faculty reporting students being able to create a presentation slide to support a position on a controversial topic ( $M = 3.89$ ,  $SD=0.93$ ). The lowest rated item was students' ability to demonstrate the ability to create a data display

to clarify the relationship between academic and economic variables ( $M = 3.33$ ,  $SD = 1.00$ ).

Table 4.16 *Creating information Items, Means, and Standard Deviations (Faculty)*

Item	Mean	SD
My students are able to edit and format a document according to a set of editorial specifications.	3.33	0.93
My students are able to create a presentation slide to support a position on a controversial topic.	3.89	0.76
My students are able to create a data display to clarify the relationship between academic and economic variables.	3.33	1.00

### *Communicating information through technology*

Faculty were asked to report their students' ability to disseminate information via digital means and tailored for a particular audience (see Table 4.17). These items had Likert scales of (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, and (5) Strongly agree. For these items, the mean responses indicated that the faculty considered their students proficient. The strongest skill in this area was faculty reporting students' ability to advertise to a distinct group of users ( $M = 3.67$ ,  $SD = 0.87$ ). The lowest rated skill based on faculty reporting was students knowing how to select and organize slides for distinct presentations to different audiences ( $M = 3.33$ ,  $SD = 0.71$ ).

Table 4.17 *Communicating information through technology Items, Means, and Standard Deviations (Faculty)*

Item	Mean	SD
My students know how to format a document to make it more useful to a particular group.	3.56	0.82
My students are able to transform an email into a presentation to meet an audience's needs.	3.56	0.88

My students know how to select and organize slides for distinct presentations to different audiences.	3.33	0.71
My students are able to design a flyer to advertise to a distinct group of users.	3.67	0.87

### Comparison of student and faculty responses

Students and faculty rated the abilities of students differently on matching ICT items. The student means were higher than faculty means in all categories. For the standard deviation, the student responses had a lower standard deviation than faculty responses in the following categories: defining a need for information, accessing information via technology, managing digital information, creating information, and communicating information (see Table 4.18).

Table 4.18 *Student and faculty means and standard deviations for responses to ICT Framework areas of measure*

Item	Student Mean	Faculty Mean	Student STD	Faculty STD
Defining a need for information	4.07	3.42	0.33	0.34
Accessing information via technology	4.10	3.30	0.05	0.23
Evaluating online information	3.89	3.07	0.10	0.06
Managing digital information	3.86	3.22	0.04	0.11
Integrating information from varied digital sources	3.79	3.26	0.13	0.13
Creating information	3.93	3.52	0.22	0.32
Communicating information through technology	3.86	3.53	0.10	0.14

## **Qualitative Analysis and Findings**

Qualitative data were collected in the form of six transcribed interviews (three focus group interviews with a total of seven students and three individual interviews with three faculty members) and open-ended survey questions from students and faculty. The interview transcripts were prepared and imported into the latest version of NVivo qualitative software (v2020). The questions were structured in multiple choice and open-ended format. Due to Covid-19, there were fewer student and faculty participants. The unexpected crisis of Covid-19 contributed to the mandatory remote learning environment for students and faculty. The data used to extrapolate themes from the student focus group, faculty interviews, and open-ended survey questions are described later in the chapter.

### **Qualitative Data Analysis**

The qualitative data sources included three student focus group interviews, three faculty interviews, students' open-ended survey responses, and faculty open-ended survey responses. All data was collected during the Spring semester of 2021.

Qualitative data for student focus groups and faculty interviews were collected via recorded sessions on Zoom and included closed captioning. The recordings were saved to my computer as mp4 files. I downloaded the transcripts, reviewed them alongside the audio recordings, and manually edited areas that were not captured accurately in the recording. The open-ended survey responses were maintained in Microsoft Excel. Each column represented an open-ended question and each row represented individual participant responses. There was a total of thirteen open-ended survey questions asked, with eight being asked of faculty and five being asked of students. Next, I used the

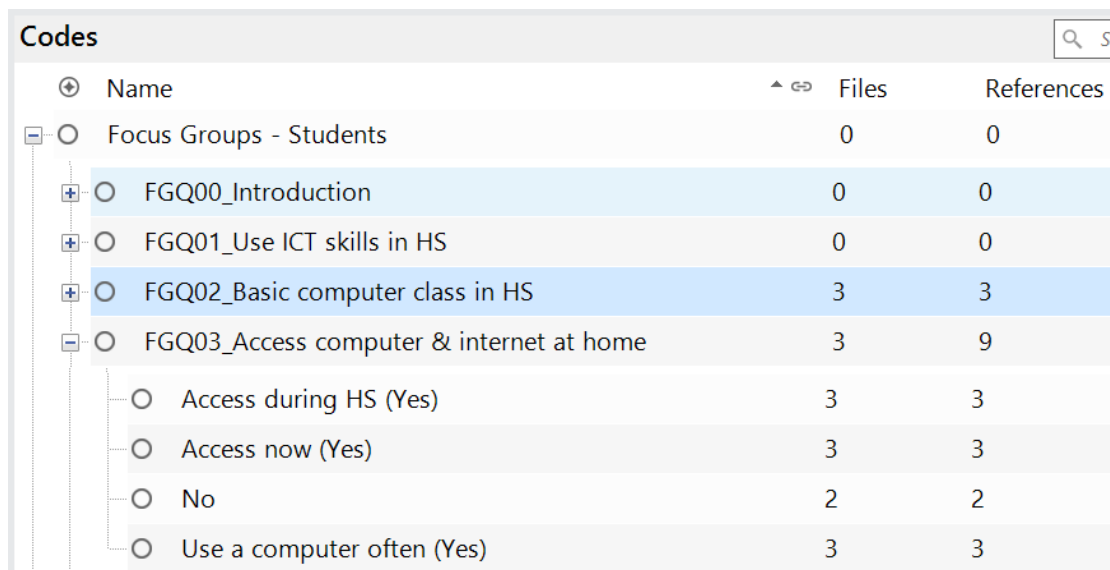
qualitative analysis software, NVivo, to upload my transcripts and open-ended survey data to code my qualitative data.

### **Phase 1-First cycle coding.**

My first cycle of coding consisted of two rounds. These rounds included open coding and in vivo coding. Open coding allowed me to review transcripts and survey questions line-by-line. In vivo coding allowed me to maintain the integrity of the verbiage of my participants (Saldaña, 2016).

#### ***In vivo coding***

According to (Saldaña, 2016), open coding is beneficial for line-by-line analysis of interview data to find relationships between codes. I read each transcript line-by-line and organized participants and data sources. I utilized terms or phrases as my open codes (see Figure 4.1). One of my open codes was “Access computer & internet at home”. In addition, four open codes included: Access during HS (yes), Access now (yes), No, and Use a computer often (yes).



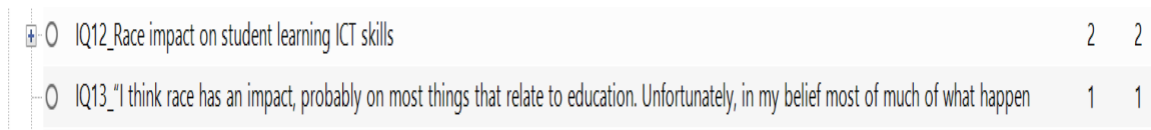
The screenshot shows the 'Codes' list in NVivo. It includes a search bar at the top right. The table below lists the codes, their file counts, and reference counts. The code 'FGQ02\_Basic computer class in HS' is highlighted in blue.

⊕ Name	Files	References
⊖ ○ Focus Groups - Students	0	0
⊕ ○ FGQ00_Introduction	0	0
⊕ ○ FGQ01_Use ICT skills in HS	0	0
⊕ ○ FGQ02_Basic computer class in HS	3	3
⊖ ○ FGQ03_Access computer & internet at home	3	9
○ Access during HS (Yes)	3	3
○ Access now (Yes)	3	3
○ No	2	2
○ Use a computer often (Yes)	3	3

*Figure 4.1* Example of open coding in NVivo

Throughout the research process, it was essential for me to maintain the voice of the participants; therefore, I utilized in vivo coding. In vivo coding is an asset for studies that reflect participants ‘voices (Saldaña, 2016).

I used direct quotes from student focus groups and faculty interviews as my in vivo codes (see Figure 4.2). For example, one of my in vivo codes was, “I think race has an impact, probably on most things that relate to education. Unfortunately, in my belief most of what happens is detrimental.” All in vivo codes were represented in the NVivo software in quotation marks to help differentiate them from my open codes.



IQ12_Race impact on student learning ICT skills	2	2
IQ13_"I think race has an impact, probably on most things that relate to education. Unfortunately, in my belief most of much of what happen	1	1

*Figure 4.2 Example of In Vivo Coding in NVivo*

After my first pass at coding, I met with my advisor for peer debriefing. We discovered that some of the codes were not applicable or reflective of what participants were trying to communicate. Some codes reflected close-ended questions that did not to be coded. For example, the code “Basic computer class in HS” was closed-ended and provided background information that could be included in my description of participants. After conversing with my advisor, I revisited my process and went step-by-step.

I again reviewed data from surveys, interviews, and focus groups. After reviewing, removing, clustering, and merging some of my initial codes, I was able to develop a succinct list of codes. I was intentional about refining the codes by merging similar codes and removing any codes that overlapped. The initial coding process resulted in 103 codes were generated form all transcripts (surveys, interviews and focus groups).



Table 4.19 illustrates an excerpt to show the connection between my codes and direct quotes from my participants. I also included a code description to assist me in synthesizing the quotes. It also helped me to track and remember why I applied certain codes to certain quotes.

Table 4.19 *Example of codes, code meaning, and sample quotes*

<b>Codes</b>	<b>Code Description</b>	<b>Quotes</b>
1. Ability to integrate transitional technology	To learn the ICT skills there must be integration of advance technology	The ability to integrate transitional technology that utilizes data science and artificial intelligence
2. Access during HS (Yes)	During high school the access of technology	Krystin: Okay. Did you have access to a computer and internet at home? MH: Yes.
3. Access now (Yes)	Access of computer and internet after the high school	Krystin: Okay and do you have access to both now? DV: Yes.
4. Address deficiencies due to lack of tech access	For new students' self-esteem issues arises due to unfamiliarity with technology in schools	After their sophomore or junior year, realize that you're deficient those areas, it will cause them to kind of feel a lack of self-esteem
5. Analyze YouTube videos	To learn ICT, YouTube videos are helpful for students	By requiring students to analyze YouTube videos on their smartphones
6. Application of skills	To learn ICT practical knowledge is essential.	Greater practical application of the skills they are already learning in technology classes.
7. Archive assignments and lectures	Teachers save the recorded lectures which aid the students in to catch missing lectures	I was able to upload them on Blackboard. If a kid missed a class either face to face or online, they were able to see my classes.
8. Avoiding scams and viruses	Students must have basic skills how to protect their devices from viruses.	How to avoid scams and viruses that come with some devices.
9. Basic software	Students must have basic	They need to understand the

& platform skills	software knowledge and their practicality	basics of ICT
10. Basics - pros and cons of technology	Etiquettes to use technology is a skill must be in students as fresh year student	I guess you could say the pros and cons of technology to help us understand where this technology came about, and where we can improve in our youth.
11. Basics of technology and remote learning	In the time of Covid students should have good ICT skills for remote learning	ICT skills are generally needed to understand how to access the internet and the ins and out of doing work via technology and on a computer.
12. Being able to use computer programs	For learning purpose core learning application must be in practice	Being able to confidently use core computer programmes to produce common digital information such as Word documents and PowerPoint presentations.
13. Blackboard Collaborate	ICT tool used by the faculty	I use Blackboard Collaborate.
14. Band selection and design precision skills	Faculty design course integrate skills to learn ICT	I arrange band selections and design precision drills for the marching band with specific computer programs
15. Bridging the digital divide through ICT in daily life	To bridge the gap in ICT technologies must be in daily life use to maximize learning	Being able to bridge the digital divide of incorporating ICT into daily life and classroom skill set to maximize the transitional stages of learning in our society.

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**Phase 2 Pattern Coding (Categories).** Next, I transitioned to pattern coding to determine my categories. Pattern coding is a way of grouping summaries into smaller sets or themes and can be used to find patterns or relationships of previously generated codes (Onwuegbuzie, 2016). During the first round of phase 2, pattern coding allowed me to look for categories, which were generated from the relationships discovered between the 103 codes that I developed during Phase 1 (Figure 4.3). I exported the codes to a Google

Spreadsheet. This allowed me to color-code and group similar codes to develop my categories, which were an overview of the main points of my data. Next, I reviewed my color-coded Google spreadsheet, and eliminated any overlap to ensure that my codes aligned with my categories. I also met with my advisor to review my progress and gain insight for improvement.

To detect similarities and relationships for organizational purposes, I revisited my coding within NVivo. I reviewed the transcripts and the codes within each section (Saldaña, 2014). I repeated the process of review for a second round to ensure that I was accurately capturing my data. The use of pattern coding within this round resulted in 16 categories (Table 4.20).

Table 4.20 *Table category, category meaning, and aligned codes*

Categories	Category Meaning	Aligned Codes
Access of computer & internet	High school students access to computer and internet	<ul style="list-style-type: none"> <li>• Access during HS (Yes)</li> <li>• Access now (Yes)</li> <li>• Use a computer often (Yes)</li> </ul>
Basic computer class in HS	Student's background of any computer classes in school	<ul style="list-style-type: none"> <li>• No computer class in HS</li> <li>• Yes, Have basic computer class</li> </ul>
Definition of ICT	Definition of ICT in view of students and faculty members	<ul style="list-style-type: none"> <li>• Basics of technology and remote learning</li> <li>• Being able to use computer programs</li> <li>• Bridging the digital divide through ICT in daily life</li> <li>• Doing research using the internet</li> <li>• Faster way of doing things</li> <li>• System to access and use technology for information</li> <li>• Use of technology to enhance</li> </ul>

		student teaching and learning
Easiest way to learn ICT skills	Methods suggested to learn ICT easily	<ul style="list-style-type: none"> <li>• Coursework – classes</li> <li>• Early childhood education with technology</li> <li>• Faculty training</li> <li>• Games - fun activities</li> <li>• Learning with instructor</li> <li>• Learning with professors</li> <li>• Make it part of every program</li> <li>• Online models</li> <li>• Semester projects</li> <li>• Skills need assessment</li> <li>• Webinars and workshops</li> </ul>
Faculty perception of ICT skills usage within courses	Courses faculty think should be the part of ICT skill learning program	<ul style="list-style-type: none"> <li>• College career</li> <li>• Effective use of ICT</li> <li>• Engages and motivates student interest</li> <li>• Entry into workforce</li> <li>• Expands student tech skills outside social media</li> <li>• More effective teacher with updated tech skills</li> <li>• Provision of computers</li> <li>• Same applies after first year</li> </ul>
ICT professional development program intended for students	Students get benefit from this professional development program in information and communications technology.	<ul style="list-style-type: none"> <li>• Analyze YouTube videos</li> <li>• Application of skills</li> <li>• Avoiding scams and viruses</li> <li>• Brand selection and design precision skills</li> <li>• Communicating via email</li> <li>• Data entry</li> <li>• Defined course</li> <li>• Embedding question bank in the lectures</li> <li>• Hands on workshops</li> <li>• Helpdesk for students</li> <li>• ICT Centre</li> <li>• Interactive and goal-oriented discussions</li> <li>• Internships</li> <li>• Learning tax and insurance</li> </ul>

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		<ul style="list-style-type: none"> <li>• Navigating and managing tools leaning</li> <li>• News blogs</li> <li>• Online surveys for immediate responses</li> <li>• Pre-semester course</li> <li>• Protocols</li> <li>• Provide teaching and training material</li> <li>• Student engagement - interactive</li> <li>• Through student projects</li> <li>• Use of interactive digital boards</li> <li>• Use of online portals</li> <li>• Using various ICT tools</li> <li>• Video conferencing platforms</li> <li>• Weekly surveys</li> <li>• Writing research papers - plagiarism - citing sources</li> <li>• Ability to integrate transitional technology</li> <li>• Use of ICT is critical in daily life</li> </ul>
ICT understanding of faculty	How faculty perceive the ICT	
Impact of ICT skills on academic success	Having ICT skills or not having it impact the academic success	<ul style="list-style-type: none"> <li>• Updating &amp; expanding tech expectations - 'norm'</li> <li>• Tech deficiencies influence lower self-esteem</li> </ul>
Important tools to integrate ICT	What are the tools needed to integrate the ICT	<ul style="list-style-type: none"> <li>• Archive assignments and lectures</li> <li>• Blackboard - Blackboard Collaborate</li> <li>• Canvas LMS</li> <li>• Develop posters and flyers</li> <li>• Digital presentations</li> <li>• Immediate survey feedback</li> <li>• Microsoft Office Suite</li> <li>• Poster My Wall</li> <li>• PowerPoint</li> <li>• Shared screens</li> <li>• Smartboard</li> <li>• Smartphones</li> <li>• Student-directed learning</li> <li>• Testing software - interactive</li> <li>• Turning Point Software</li> </ul>

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		<ul style="list-style-type: none"> <li>• YouTube videos</li> <li>• Zoom</li> </ul>
Most important ICT skills that students need in college	In college what are the essential ICT skills student need	<ul style="list-style-type: none"> <li>• Address deficiencies due to lack of tech access</li> <li>• Basic software &amp; platform skills</li> <li>• Basics - pros and cons of technology</li> <li>• Create videos &amp; podcasts</li> <li>• Digital textbooks replacing printed</li> <li>• Email handling</li> <li>• Integrating information from varied digital sources</li> <li>• Need updated LMS skills</li> <li>• Screen etiquette - effective communication skills</li> </ul>
Negative Impact of Race	How race has a negative impact on acquainted ICT skills	<ul style="list-style-type: none"> <li>• Detrimental - relevant impact of race</li> <li>• Race cause lack of access</li> <li>• Race has been challenging</li> <li>• Race impact cause chaotic environment</li> </ul>
Positive/Neutral Impact of Race	Positive or neutral effect race has on acquainted ICT skills	<ul style="list-style-type: none"> <li>• Neither helps nor harms</li> <li>• Race has Helpful impact</li> </ul>
Ranking of ICT skills	Ranking of ICT to address the need for improvement	<ul style="list-style-type: none"> <li>• Ranked faculty and student</li> <li>• Strongest ICT skill</li> <li>• Weak ICT skills</li> </ul>
Skills students need to be successful upon graduation	After graduation skills a student require to be successful	<ul style="list-style-type: none"> <li>• Ability to use machinery</li> <li>• Certifications in software and technology</li> <li>• Communicating information</li> <li>• Communication skills</li> <li>• Computer literacy</li> <li>• Critical thinking skills</li> <li>• Documentation apps</li> <li>• Extracting and evaluating information from credible sources</li> <li>• IT savvy - expectations from</li> </ul>

		future employer <ul style="list-style-type: none"> <li>• Managing digital information</li> <li>• Non-ICT (soft skills, patience, time mgmt, writing, APA)</li> <li>• Use of technology</li> </ul>
Student perception of using ICT skills	What is the skills student want to have as an ICT expert	<ul style="list-style-type: none"> <li>• Coding (programming, developer)</li> <li>• Excel - spreadsheets</li> <li>• Improved keyboard skills</li> </ul>
Use of ICT skills in HS	Background of HS student use of ICT	<ul style="list-style-type: none"> <li>• Some - a little bit</li> <li>• Not use ICT in HS</li> </ul>

After reviewing my categories within my Google spreadsheet, I made my category updates within NVivo (Figure 4.3).

<input type="radio"/>	Access of co	0	0
<input type="radio"/>	Basic compu	0	0
<input type="radio"/>	Definition of	1	9
<input type="radio"/>	Easiest way t	1	9
<input type="radio"/>	Faculty perc	1	9
<input type="radio"/>	ICT professi	1	9
<input type="radio"/>	ICT understa	1	9
<input type="radio"/>	Ability t	1	1
<input type="radio"/>	Commu	1	2
<input type="radio"/>	Importa	1	1
<input type="radio"/>	Use of I	1	1
<input type="radio"/>	Impact of IC	0	0
<input type="radio"/>	Important t	0	0
<input type="radio"/>	Most import	1	9
<input type="radio"/>	Basic import	0	0

Figure 4.3 Excerpt of Categories in NVivo

**Phase 3 Thematic coding.** Thematic coding is a form of qualitative analysis which involves recording or identifying passages of text or images that are linked by a common theme or idea allowing researchers to index the text into categories and therefore establish a “framework of thematic ideas about it” (Gibbs, 2007).

This concept allowed me to analyze my codes and categories to arrive at my themes in a systematic way (Creswell, 2014). The purpose of Phase 3 was to develop an understanding of how the categories that I previously developed would lead into the development of themes. I first revisited my codes and categories within NVivo. I reviewed categories to determine which categories had similarities for grouping into themes. I entered all my categories on a Google Sheet and grouped the similar categories within the same columns. I continued this process using clustering and merging to determine how the categories were connected to develop my themes. This resulted in six final themes that I updated within NVivo. Table 4.21 identifies my final themes, the meaning of my themes and the categories that aligns with the themes. I included my theme meanings to provide more clarity for the theme development.

Table 4.21 *Table theme, Theme meaning, and Aligned categories*

Themes	Theme meaning	Aligned categories
Race impacts ICT skill acquisition for students.	It explains how different race of students has impact the ICT acquisition.	<ul style="list-style-type: none"> <li>• Race can be helpful</li> <li>• Race can be harmful</li> </ul>
Students' ICT skills vary.	Every student has a unique set of abilities that is connected to access and experience prior to college.	<ul style="list-style-type: none"> <li>• Lack Access of computer &amp; internet</li> <li>• Lack of Basic computer class in HS</li> <li>• Use of ICT skills in HS</li> </ul>



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		<ul style="list-style-type: none"> <li>• Ranking of ICT skills of students</li> </ul>
Usage of smartphones and smart devices does not equate to ICT proficiency amongst college students.	Students understand and sometimes associate smartphones and smart device usage with ICT proficiency.	<ul style="list-style-type: none"> <li>• Social media usage</li> <li>• Personal use</li> </ul>
ICT learning should be included as part of the first-year college curriculum to ensure student success.	Ways to include information and communications technology (ICT) lessons into the college curriculum that will assist students in achieving success.	<ul style="list-style-type: none"> <li>• Navigate systems in first year</li> <li>• Work in an online environment</li> <li>• Impact of ICT skills on academic success</li> </ul>
ICT skill acquisition is essential for college matriculation, graduation, and to be effective in the job market.	These are the important skills that are needed for college, after graduation, and the job market	<ul style="list-style-type: none"> <li>• Skills students need to be successful in college</li> <li>• Skills students need to be successful upon graduation</li> <li>• Be prepared for the job market</li> </ul>
Students and faculty would like ICT programming/curricula and are willing to be a part of the development process.	Students and faculty detailed how they would like to be involved in the development process and shared their thoughts on programming	<ul style="list-style-type: none"> <li>• Important tools to integrate ICT</li> <li>• Easiest way to learn ICT skills</li> <li>• Most important ICT skills</li> <li>• Student and faculty desires for ICT program</li> </ul>

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### Qualitative Findings

Qualitative findings were obtained from three student focus group

interviews, three faculty interviews, and open-ended survey questions. The focus group interviews were conducted with seven students at Saint Augustine's University. Similarly, the three faculty interviews were also conducted with members of the Saint Augustine's University family. Initials were used to maintain the confidentiality of each participant. Open-ended survey questions included 41 student participants and 9 faculty members from Saint Augustine's University.

Direct quotes were utilized to ensure the integrity of the participants' voices were maintained. Six central themes emerged from the analysis of the data. The themes reflect students' ICT perceived skills, thoughts about programming, and ICT needs. They also reflect faculty members' desire to integrate ICT skills into courses and curricula and for students to successfully matriculate through college.

**Theme: Race impacts ICT skill acquisition for students.**

It has been demonstrated through research that race can impact ICT skills, as Attewell (2001) asserts that poor and minority families are less likely to have access to computers or the internet, thus creating a technology gap. The impact of race was further illustrated through the shared experiences of students and faculty at Saint Augustine's University.

**Race can be helpful or harmful**

Students and faculty both shared their experiences regarding the impact of race in ICT skill development. Both groups agreed that race impact can be helpful or harmful. Some students shared that, while they were enrolled at a predominantly white school, they encountered experiences in which race was harmful to their developing ICT skills. These experiences included incidents of racial bias and being

placed in inferior classes as stated by one student. This was further illustrated with black students providing examples of being placed in gym classes rather than being offered to take technology classes, as their white peers experienced.

Faculty members also agreed that race impact can be helpful or harmful to developing ICT skills. One faculty member spoke about how race can be harmful as he discussed the impact of environment and background. According to this faculty member, black students who come from a certain socioeconomic class level are less likely to have access to technology before entering college. The faculty observed this from students because a significant amount is from low socioeconomic homes. As a result, faculty observed significant technology gaps in first-year students at Saint Augustine University. This faculty member felt strongly that race has a significant effect on the technology gap and ICT skill acquisition for first year minority students. Another faculty member shared a different perspective, in that he felt that the students' perception and attitude toward race is what has an overall impact, including acquiring ICT skills. He supported the idea that some black students define whether it is helpful or harmful based on perception and attitude regarding acquiring ICT skills. But overall students and faculty were able to provide examples of race being helpful as well as harmful.

MH, a student, shared examples of how race can be both helpful and harmful in ICT skill acquisition. She talked about the bias at a predominantly white school. At this school, the student shared that white students were put in the computer classes and the black students were not. However, when she transferred to a predominantly black school, she had better support. The student attributed the difference to the

HBCU experience that the black teachers were afforded. The student shared that lack of computer class access for black students negatively impacted their ability to gain ICT skills.

Several other students echoed the positive experience of having support and being at an HBCU like Saint Augustine's University. Other students supported this idea by stating that being in an environment surrounded by other African Americans was beneficial to their ICT skill acquisition. NS stated, "I feel that being at an HBCU, it's more helpful for African Americans", and fellow interviewees CM and JS agreed with this statement. The consensus from all the student interviews conducted was that race has the potential to put students at a disadvantage but can be helpful when surrounded by others of the same race such as at an HBCU.

Faculty also corroborated student sentiments regarding race and its impact on ICT usage. One faculty member shared, "Because of the demographic of kids that we get at St. Aug, they're not the most technically savvy." This quote explains how race combined with socioeconomic status can have a detrimental effect on youth and exacerbate the differences caused by the technology gap.

It was further echoed by yet another faculty member. It was mentioned that "race plays a very important part" and that it is "very clear that lack of access to technology" impacts ICT skill proficiency. He further surmised, that within certain communities, people do not have access in the way that they should to this type of technology."

**Summary.** Overall, students and faculty both agreed that race does impact ICT skill acquisition. Personal examples and perceptions were shared regarding if race was

harmful or helpful. Both faculty and students weighed in on this topic and had some similar ideas and some different ones. All quotes presented explore the nuances between race and ICT skill acquisition. Anecdotal explanations from the respondents helped to substantiate the claim that race can be both harmful and helpful with regard to obtaining ICT skills.

**Theme: Student ICT skills vary.**

Verhoeven, Dirk Heerwegh, and Kur De Wit (2011) stated that all first-year students present with varying degrees of ICT skills. This statement was further demonstrated in my study as some students possessed more ICT skill experience than others. ICT skill acquisition begins before entering college. Some students had positive experiences and received ICT skills in high schools, while others were not exposed in high school. One of the faculty members explained the correlation between high school ICT experience and how these impact varying levels of first year college students ICT skills. Overall, both students and faculty expressed the impact of high school experience on ICT skill acquisition.

When asked to rate their own ICT skills on a scale of 0 to 10 during focus groups, the student responses varied for students who lacked skills and for those who thought they possessed skills. Three students indicated that they lacked skills and rated themselves five to seven. One student, MH, rated herself a 5, and she thought she lacked skills and could benefit from training. A second student, JM, felt there were a lot of things regarding research and technology that he did not know about, but rated himself a 7. A third student rated themselves as a six or seven although the student indicated they felt good about using technology. However, the other four students who rated themselves as seven or eight thought they had a good understanding of technology. One student rated

themselves as an eight because they felt they were good with technology. Another student would be rated. 7.5 or 8 because of having experience using computers, while a different student expressed they had a lot of training through his jobs while rating themselves as a seven. The fourth student rated himself as a seven although the student thought there were a lot of things he didn't know. Table 4.22 details how students rate themselves and support their ratings.

Table 4.22 *Student responses to ICT skill ratings and support*

Rating	Example Quotes
Eight	Eight. Well, because I'm really good with technology, even though I don't show it all the time. But I'm really good at it, especially when we were reading the different parts. I'm really good at communicating, so I'll give myself an eight.
Seven	A seven. Well one, I'm really not a technology person like, yeah. I'm really not on the technology as much as others and like when I do some research, I figure that I can find information quicker, or legible sites and so.
Six	Um, I would give myself maybe a six or a seven. I think I'm like the offset. I've always used technology, so I feel like I have a good range of how to use it, and how to do things online, so.
Five	I would say I'm a five. I'm not really that trained in it. I feel like I could be a lot better my skill set. Especially in my major, as I continue on into my collegiate career and onward, I know that I'm going to have to communicate with large names, small corporations and large corporations via direct email or even in a setting similar to this, Zoom and Teams. You know, the world starting to become more virtual so I feel like I can be a lot better and hopefully aim for perfect 10.

The varying ICT skills were also illustrated via survey responses. When survey respondents were asked to rate their ICT skills on a scale from 1 (lowest) to 5 (highest), 4.9 percent rated themselves a 1, 7.3 percent rated themselves a 2, 48.8 percent rated

themselves a 3, 36.6 percent rated themselves a 4, and 2.4 percent rated themselves a 5. This means that 61 percent of students rated themselves a 3 or lower on ICT skills. In addition, when asked what they knew about ICT skills, 13 out of 41 (31.7 percent) of student respondents reported that they did not know anything about ICT skills. All the students regardless of ratings provided similar responses regarding the need for additional training.

Faculty members shared similar sentiments. According to faculty member, Dr. S, first-year students have varying ICT skills. Some “come from households that have been immersed in ICT and others have not”. He further stressed the importance of students using the first year to develop ICT skills. Another faculty member discussed how some varying skills were related to socio-economic status and lack of access. He shared that it is essential to get all students on the same level as freshmen versus having students realize later (in their college career) that they are deficient.

**Summary.** Some students understood what ICT was while others did not. Some had been exposed to technology in the home environment and school environment, but there were still some that did not have that same opportunity. All the faculty agree that although the students presented at various levels of ICT skills, it is essential to use ICT within the curriculum to help enhance ICT skills for all the students. It was evident that students' lack of knowledge about ICT played a part in why ICT skills vary for college students at Saint Augustine's University.

**Theme: Usage of smartphones and smart devices does not equate to ICT proficiency amongst college students.**

A 2010 Pew Research Center illustrated that “Latinos and African Americans were more likely to use their cell phones to access the Internet, e-mail, and Facebook

than the white population (2011, p. 6).” Cell phone access works well for social networking and entertainment but not as well for other forms of internet use. Modarres (2011). According to Pew research, smartphones cannot be substituted for providing full digital access. (Modarres, 2011). In the study of minority use of smartphones, participants were comfortable with the use of ICT skills for personal usage, especially social media. The perspective Dr. S shared related to this was that students are very comfortable with using smartphones but need additional ICT and digital skills for college and beyond. This is further supported by his direct quote. Dr. S stated, “Oftentimes I find with the students, they love their smartphones. They have a thousand-dollar phone in their hand, but don’t know how to use it to be successful or gather information. They have to master all the different apps on the phone, instead of just using Instagram, Hulu and Netflix.”

**Students are comfortable using smartphones for personal use such as social media.**

Several students expressed their comfort with smartphones. MH mentioned being able to communicate information via technology due to “having social media platforms”, and JS recalled using a computer and cell phone to manage information”. Dr. S shared that students may have a cell phone, where they can use Tik-Tok all day, but it’s not going to positively impact their ability to gain employment. There is a difference in utilizing ICT skills for your personal usage versus using ICT skills professionally. This was noted by faculty and students in this study.

Students need more ICT skills beyond smartphone usage and social media.

Multiple participants mentioned needing to improve skills for professional usage in school and expanding knowledge of different processes and software. Student, DV, expressed the need for students to become more comfortable with Microsoft Teams and



Zoom for college and beyond and the need to be proficient in using technology to communicate effectively both professionally and personally. One student thought it would be helpful to become more efficient in Microsoft Excel. BD also admitted that the ease at which information is readily available can make it difficult to delineate credible sources and expressed a need for learning “how to find the correct information because not everything online is true”. Overall, the participants understood that although they were comfortable with smart devices, to be fully prepared to be successful in college and life would require expansion of ICT skills.

Faculty agreed that students need to be able to use ICT skills beyond limiting themselves to proficiency using social media platforms. While sharing their perception, one of the faculty respondents shared, "Students have smartphones which are sufficient to expedite quick access to learning, however, computers are needed to maximize the learning curve due to the ability to transition data on the screen." Another faculty member shared, “Often times I fine with the students, they love their smart phones. They have a thousand-dollar phone in their hand, but don’t know how to use it to be successful or gather information.” He also shared that he believes, “That’s good for a social environment, but they have to learn how to master the applications of the management type software on their phones.” Dr. M agreed that social media via smartphones is not reflective of ICT skills. “We have to understand that it's not about Tik Tok. t's not about the social media. It's not about Facebook. It's much more important than that,” she shared.

**Summary.** Students entering Saint Augustine’s University are very comfortable with usage of smart devices for personal usage but lack the skills to utilize professional ICT skills. Some students thought because they are proficient with using smart devices for

social media etc. that this equates to having ICT skills. Therefore, it is critical for faculty to recognize the impact and limitations of smartphones related to personal versus professional usage. This is an important consideration as they integrate ICT skills into the curriculum.

**Theme: ICT learning should be included as part of the first-year college curriculum to ensure student success.**

As previously stated, students enter Saint Augustine's University with varying levels of ICT skills. ICT skills are essential to college success for incoming freshman students, therefore, First-year students who lack or possess limited ICT skills, are less prepared to be successful. (Stone, 2006). These skills are needed for first year success and throughout their college matriculation. A survey questioned the validity of first-year students' perceived technology skills. Madigan (2006) asserts that similarly to math and English, incoming freshman ICT skills should also be assessed to determine the skills students should possess to be prepared for university-level work.

My student survey respondents and focus group participants shared that they believe ICT should be a part of first-year college curriculum. Of the student survey respondents, 17 percent stated that they would need a class and 27 percent stated that a program should include computer skills. Several student respondents also shared that they need an understanding of digital information and digital technology.

**Students need to use ICT tools to navigate internal systems within the first year.**

Dr. M discussed utilizing Canva and Blackboard Collaborate, while stressing the importance of first year students being knowledgeable about how to navigate these systems for communication and information retrieval. This has become critical with working in more online environments due to the pandemic. A faculty member stated

that students need to understand how to open a computer and how to deal with participating in and conducting meetings by sharing, “We need to have you able to use whatever is necessary to make the presentation, whatever is necessary for you to research and gather information.” Virtual presentation skills became increasingly important to faculty and students during the pandemic and the transition to online learning.

**ICT is crucial for students to understand how to navigate within an online environment.**

AD, a faculty member, agreed and stated that communication using technology is essential to student success in an online environment. In addition, he added that the use of smartboards and Blackboard Collaborate is a good way to communicate with students using technology. He also expressed that integrating technology in the classroom serves as a good foundation. Another caveat according to faculty member AD is that ICT integration allows for collaboration and a way for students to be interactive. Dr. M thought ICT integration is important for students establishing a solid foundation for all students.

**ICT skills should be integrated as a part of college curriculum.**

Survey respondents reiterated the importance of the integration of ICT skills into the curriculum. One student, CM, thought ICT skills were important enough that rather than simply adding these skills as part of the curriculum for first year students, college students should be able to major in this field of study. This student shared, “I think in college, if you want to major in ICT or deal with technology, there should be classes for students to be able to learn about it”. It was reported by faculty that ICT was integrated into courses through student projects and the use of interactive digital boards. The faculty

also used online portals and shared that they integrate ICT skills into the courses by using various ICT tools. The faculty conveyed that they were effective in their use of ICT skills within their curriculum. It was also communicated that the ICT skills were introduced in communication courses. This served as a foundation for ICT integration into other curricula. The faculty integrated ICT skills into the courses ICT tools including Canva, Google chrome, GroupMe, Microsoft Office, Microsoft Teams, smartphones, Twitter, video development software, and zoom.

**Summary.** Students and faculty agreed that ICT skills are needed for success. Overall faculty voiced that the most important ICT skills that the students need to be successful in college include Communication skills, Computer applications, Digital literacy, glean information from credible sources, Microsoft office, understanding about LMS, using different apps for learning, and use of online instructional platforms. Student participants shared that the most important ICT skills that they need for college are the ability to use different software, communicating information, computer literacy and navigating the internet. One faculty emphasized the importance of students knowing how to navigate using internal university systems for first-year success. This is vital because critical information provided using the Saint Augustine's University system including emails, university, and faculty updates.

**Theme: ICT skill acquisition is essential for college matriculation, graduation, and to be effective in the job market.**

Research details the importance of ICT skill acquisition for long-term success. Henson (2014) asserts that fewer high school graduates and a limited numbers of skilled employees ay result in labor shortages in technical fields unless more is done to increase the computer efficacy of non-traditional college students. Students' opinions at Saint

Augustine's University align with an understood importance of ICT skill acquisition. They voiced that it is important to have the ability to access online resources and know how to use computer hardware. A student participant shared that in their opinion they would need certification in software and technology after they graduate and the ability to access online resources.

On the faculty side, AD communicated that some of these students are lacking necessary technology skills to be successful in the world. He stressed that ICT skills are vital to be successful in the workplace.

### **ICT skills impact college success.**

Dr. S thinks ICT skills should be integrated early and justified it by stating, "It is good to start at the freshman level rather than have somebody, after their sophomore junior year, realize that you're deficient in ICT skills. According to Dr. S, students who have not mastered the technology or some that don't have the reading skills as others, they start falling behind. When they start falling behind, they don't communicate the need for help".

Dr. S, a faculty member, emphasized the importance of integrating ICT skills. To help some of the students with limited or no ICT skills, Dr. S uses Microsoft Teams and Zoom to enhance instruction. When introducing new technology or processes, he uses screen sharing. This faculty member has found that to be effective because it is visual, allowing students to see all the steps involved. From this faculty member's perspective, it is important to stay abreast of the latest ICT trends to keep up with the pace and that doing so is key to making him more effective in the classroom. Dr. M also agreed that it is important to integrate ICT skills because it introduces students to important and vital tools that are needed for the workforce. Students also indicated that they valued ICT

skills. Many of the participants agreed that the integration of these skills help with things such as “trying to do a research paper”, utilizing online sources to conduct research, and translate to professional skills needed in the workforce.

Students stressed the importance of faculty to be interested in keeping up with technology and work to integrate it into the curriculum. Both stated they would be interested in contributing and participating in a program to better equip students with ICT skills and training.

In this study, students at Saint Augustine’s University agreed that ICT skills are crucial for college success. Student survey respondents shared the ICT skills they believe were needed for college success. They believe that the most important ICT skills that they need for college are the ability to use different software, communication skills, and computer literacy. One respondent shared that internet surfing is the most important ICT skill that they need in college. Some other answers were navigating email, learning how to navigate graphs and timesheets, and managing digital information. Microsoft Office, networking skills, research skills, and the use of digital technology are also said to be the most important ICT skills that students need for college. Meanwhile, three respondents were unable to articulate what skills they felt were most important for college. The expectation is that higher education institutions should address the needs of students with varying levels of technological readiness because a lack of ICT skills has shown to be a hindrance to student success (Muna, Magdi, & Hwei, 2018).

Faculty survey respondents also shared the skills they believe are most needed for college. According to faculty members, some of the most important ICT skills that the students need to be successful in college include communication skills, computer applications, digital literacy, gleaning information from credible sources, Microsoft

Office, understanding about LMS, use of different apps for learning, and use of online instructional platforms.

### **ICT skills impact students in their future careers.**

The students stressed that ICT skills are critical in both college and for future careers. Students and faculty communicated the importance of ongoing learning as it relates to ICT skills. Student survey respondents shared that the ICT skills they think they may need after graduation include the ability to use printers, photocopiers, smartphones, and projectors. They would need the ability to access online resources, the know-how of the basics of ICT hardware. Another respondent shared that in their opinion they would need certification in software and technology once after they graduate. Other respondents mentioned communication and networking skills, computer literacy, confidence, documentation apps, internet browsing, management skills, managing digital information, MS office, research skills, and use of digital technology as some of the ICT skills they would need once after they graduate.

The faculty also shared the following as essential ICT skills for students to be successful after graduation: (1) Communication skills, (2) Computer literacy, (3) Critical thinking skills, (4) Decision-making skills, (5) Extracting and evaluating information from credible sources, and (6) Use of technology. In addition, researchers surmise that proficiency with ICT is a requirement to be successful and acquire profitable careers. (Grant, Malloy, & Murphy, 2009; Levy & Murnane, 2004; Stone & Madigan, 2007).

Summary. Both students and faculty at Saint Augustine reiterated the importance of integration of ICT skills into curriculum for future success. Students all agreed that it was very important to gain understanding and usage of ICT skills to secure jobs. Faculty discussed the importance of their role in using ICT skills and introducing the skills to the

students. ICT skills are required for knowing how to navigate the internal systems and also for collaboration and communication with faculty and students. Faculty use ICT skills to support and assist with learning for the students. Faculty has a major role in contributing to improving ICT skills in order for students to be comfortable in the workplace. Both faculty and students found ICT skills to be valuable tools for contributing to overall academic success and job placement.

**Summary.** Saint Augustine's University students and faculty emphasized the importance of ICT skill acquisition in college and beyond. Students and faculty are aware that ICT skills impact their college success and their future careers. All parties agreed that it was impotent to be introduced to ICT skills in college to ensure a successful. Students specified that to be prepared for the workforce that they would need advanced ICT skills and software training. Faculty shared that they believe students would need advance training as well and that faculty should be willing to stay abreast of latest technology.

**Theme: Students and faculty would like ICT programming/curricula and are willing to be a part of the development process.**

Both students and faculty agreed to participate in developing a new ICT program for first year students at Saint Augustine University. Both shared their ideas and perspectives regarding what should be included and how they would contribute. Students all voiced their opinions and desire to be included in being a part of the process. One student, JS shared that they would like to see active student engagement to enhance the learning experience while using ICT skills. Faculty also agreed that an ICT program is a critical need for first year students attending Saint Augustine University. According to Dr. S., "I think it's getting to a point where you're going to have to have a class, not just basically for ICT, but it could be integrated into the first-year experience that we have at



Saint Augustine's.” This faculty member wants ICT to be a viable part of the first-year experience program at the university. Students and faculty discussed the positive impact this would have on learning opportunities and preparation for the job market.

**Faculty and students value integration of ICT skills.**

Dr. S thinks ICT skills should be integrated early and justified it by stating, “It is good to start at the freshman level rather than have somebody, after their sophomore junior year, realize that you're deficient in ICT skills. According to Dr. S, students who have not mastered the technology or some that don't have the reading skills as others, they start falling behind. When they start falling behind, they don't communicate the need for help”.

Dr. S, a faculty member, emphasized the importance of integrating ICT skills. To help some of the students with limited or no ICT skills, Dr. S uses Microsoft Teams and Zoom to enhance instruction. When introducing new technology or processes, he uses screen sharing. This faculty member has found that to be effective because it is visual, allowing students to see all the steps involved. From this faculty member's perspective, it is important to stay abreast of the latest ICT trends to keep up with the pace and that doing so is key to making him more effective in the classroom. Dr. M also agreed that it is important to integrate ICT skills because it introduces students to important and vital tools that are needed for the workforce. Students also indicated that they valued ICT skills. Many of the participants agreed that the integration of these skills help with things such as “trying to do a research paper”, utilizing online sources to conduct research, and also translate to professional skills needed in the workforce.

Students stressed the importance of faculty to be interested in keeping up with technology and work to integrate it into the curriculum. Both stated they would be

interested in contributing and participating in a program to better equip students with ICT skills and training.

**Certain ICT skills should be included in an ICT program.**

When asked what should be included in an ICT program, faculty and students shared their input. The student survey respondents suggested the ICT program should include avoiding scams and viruses. According to students, there should be classes for beginners, computer literacy for every student, database management, and evaluating online information.

Other student respondents shared that a guideline should be provided to the students for the development of these skills with interactive and goal-oriented discussions. Some of the respondents suggested keyboard classes and instructions on how to navigate real-world scenarios. Learning tax and insurance, use of communication and networking tools, use of digital technology, Microsoft Office skills, and accessibility to teaching and training material are some of the student suggestions for an ICT program. Meanwhile, 8 of the student survey respondents did not share their views on the matter.

Faculty survey respondents also shared what they believe should be included in an ICT program. The faculty members shared that they would like to be included in an ICT program for first year students at Saint Augustine's University. One faculty respondent shared that ICT professional programs should teach extracting information from credible sources using ICT skills. Another suggested hands-on workshops. One faculty respondent shared that there should be a help desk available for the students. The respondents also suggested interactive weekly surveys of skills evaluation for students. Some other suggestions given by the faculty members included online data entry

platforms and online instructional platforms, as well as video conferencing platforms.

There are several methods that make it easier for students to learn ICT skills.

The student survey responses indicated that hands-on learning, interactive communication, online courses and models, PowerPoint, and videos are some of the easiest ways to learn ICT skills. Other student respondents suggested that the easiest way to learn ICT skills is by making them a part of every program and using practical and demonstrations while organizing skills that need assessment. Computer classes and seminars were also suggested by the respondents for easy learning of ICT skills. Meanwhile, 3 of the respondents shared that they do not know any way to learn ICT skills.

The respondents from the faculty surveys indicated that some of the easiest ways to learn ICT skills are faculty training, hands-on practice in labs, and inclusion of ICT skills in courses. Another faculty respondent shared that the easiest way of learning ICT skills is by practicing. Other respondents mentioned utilization of semester projects as well as webinars and workshops.

**Faculty and students would like to be involved in the process.**

According to faculty member AD, it is important to be involved in ICT program development. AD communicated that a refresher course on Microsoft Suite is essential. He also stressed the importance of integrating and utilizing Zoom and Teams. According to AD, this is especially important due to Covid, which created additional online learning requirements for students. Faculty member AD would also like for the first-year students to learn about how to use cloud technology as well as the use of Google Docs for collaboration. He would like to see the ICT program being a semester-long class and shared ideas that he believes should be considered for ICT programming.

Other faculty shared innovative ideas and ways to integrate ICT into programming. They shared that they would like to see the application of the skills included in an ICT program intended for students at Saint Augustine's University. Another faculty participant shared that ICT programs should teach extracting information from credible sources using technology. Faculty participants also suggested interactive weekly surveys for skills evaluation. Some other suggestions given by the faculty members included online data entry platforms and online instructional platforms, as well as video conferencing platforms.

Students willingly shared from their perspective what they believe should be included and their perceptions of the role of the faculty. Faculty discussed their expertise and observations regarding ICT at Saint Augustine's University and what they perceived the students would need to be successful in navigating the internal systems. They had thoughts regarding what ICT skills are needed to be successful in college and how to prepare students for future employment by becoming comfortable with expanding their ICT skills "beyond the basics".

**Summary.** My study respondents indicated that they would like involved in the process of developing ICT programming or curricula at Saint Augustine's University. Both faculty and students also contributed by sharing what they would like to see included in an ICT program. Since they value ICT skill acquisition, they believe that their contributions will be beneficial for the future success of all parties.

### **Chapter Summary**

In summary, this chapter highlighted students' perceived ICT skills, the impact of ICT skills on college success, the impact of race on ICT skill acquisition, the impact of ICT for future employment, and what should be included in an ICT program. Mixed-

methods research was utilized. Results from student and faculty surveys, faculty interviews, and student focus groups provided further insight into ICT skills and what would be needed in an ICT program at Saint Augustine's University. Quantitative data indicated that students and faculty members had varying thoughts regarding students' strengths for ICT skills. Students rated their skills higher than faculty rated students' skills. Collectively, quantitative data from faculty and students indicated that there is a need for stronger skills in all areas of ICT. Qualitative data revealed six themes that highlight how race impacts ICT skill acquisition, what students' current perceived ICT skills are, and how to develop an ICT program at Saint Augustine's University.

## CHAPTER 5

### DISCUSSION

The purpose of this action research was to explore the factors that impact minority college students' information and communication technology (ICT) literacy skills at Saint Augustine's University in order to develop a plan for an ICT program for the first-year minority college students. Quantitative and qualitative data were collected and analyzed to answer three research questions: (1) What are first-year minority students' information and communication technology literacy knowledge and skills at Saint Augustine's University? (2) What do faculty and students think should be included in an information and communication technology literacy program for first-year minority students at Saint Augustine's University? (3) How do faculty integrate information and communication technology literacy skills in their courses for first-year minority students at Saint Augustine's University? This chapter is a culmination of the findings of this study and the literature on ICT programming for minority college students in order to discuss and situate the findings. The (a) discussion, (b) implications, and (c) limitations of this study are discussed below.

#### **Discussion**

This study explored the ICT skills of freshman minority students at Saint Augustine's University, a private HBCU in North Carolina. A similar study conducted at HBCUs indicate that minority college students need to improve specific ICT skills

(Buzzetto-Hollywood, Wang, & Elobeid, 2018). To further explore the topic, it is important to situate the findings of this research within the larger context of research for ICT literacy skills and minority college students. To answer the research questions, a culmination of quantitative and qualitative data was used to inform ICT programming at Saint Augustine's University. The discussion is organized by the three research questions of the study.

**Research Question 1: What are first-year minority students' information and communication technology literacy knowledge and skills at Saint Augustine's University?**

For the purpose of my study, ICT literacy involves the use of digital technology, communications tools, and/or networks for the purpose of defining a need for information, accessing information via technology, evaluating online information, managing digital information, integrating information from varied digital sources, creating information, and communicating information through technology (Katz et al., 2004; Katz, 2007). Buzzetto-Hollywood, Wang, and Elobeid (2018) conducted a study at a HBCU in Maryland in which researchers surmised that a significant population of freshmen may be adept users of social technologies yet lack the foundational digital skills to effectively perform basic academic tasks essential for success in college. Similar findings emerged from my research.

Saint Augustine's University student respondents shared similar feedback. Student survey respondents shared that they know ICT skills as the basics of technology and remote learning. One student shared, "ICT skills are generally needed to understand the basics of technology and remote learning. How to access the internet and the ins and out

of doing work via technology and computer.” Others saw ICT skills as being able to use different computer programs and communication tools and networks. Students also described ICT skills as computer and technology skills, while others knew it as computer literacy. This was supported by a student respondent that shared, “Important ICT skills for college involve literacy, digital technology, and communication. These subjects are necessary to ensure the success of one’s academic school year(s).” Additional student responses described ICT skills as tools that use the internet for technological research, as well as necessary technological skills for navigation of digital computer systems. One student defined ICT skills as being technologically savvy and being familiar with the virtual world and media. Others shared that ICT is a source of understanding online information and the use of technology. Meanwhile, 13 of the survey respondents conveyed that they knew nothing about ICT skills.

In my study two aspects of research question will be further discussed: (1) Students’ perception of their ICT skills and (2) Varying student skill levels and the impact on college success.

### **Students’ Perceptions of ICT skills**

In my study, students surveyed indicated they were able to use keywords to conduct online searches ( $M=4.05$ ;  $SD=0.639$ ) as well as efficiently pursue multiple internet sources to gather pertinent information ( $M=4.15$ ;  $SD=0.622$ ). However, when asked to use technology in more advanced ways, such as evaluating the information found in their internet searches ( $M=3.89$ ;  $SD=0.101$ ) or integrating information from multiple digital sources ( $M=3.79$ ;  $SD=0.128$ ), students did not report being as proficient in these areas. In addition, students’ perceived proficiency was inflated compared to faculty reports of students’ ICT skills. Faculty reported that students’ ability to evaluate



online information ( $M=3.07$ ;  $SD=0.064$ ) and integrate information from varied digital sources ( $M=3.26$ ;  $SD= 0.128$ ) was not as keen as students reported themselves.

A study was conducted on the use of technologies for nontraditional, African American adult students and their perceptions of ICT skills (Kuo, 2018). This study demonstrated that nontraditional minority students utilized basic software tools more and it was inferred that numerous students may lack the knowledge or skills required for utilization of advanced ICT skills. Students at Saint Augustine's University also indicated similar thoughts regarding that they may lack the knowledge and skills required for advanced ICT skills. Saint Augustine University students expressed the need for more advanced training and knowledge of computer software applications and advanced ICT skill training.

Educational Testing Services (ETS), developers of the ICT framework, also conducted a study of college students in which students reported being tech savvy when it comes to entertainment, but still are unable to perform the kinds of information management and research tasks necessary for academic success (Katz, 2007). The study included 6,300 students who participated in the ETS's ICT Literacy Assessment in 2006. Similar to the findings of this study, results from the assessment reflected that college students lack information and communication technology (ICT) literacy skills expected for college level work only earning fifty percent of possible points when assessed (Katz, 2007). Both studies demonstrate that there are deficiencies in college students' ICT skills.

Faculty at Saint Augustine's University also supported this finding. Faculty reiterated that students coming to Saint Augustine's University lack the necessary ICT skills needed to be successful. In one faculty interview, Dr. S specifically stated, "I find with the students, they love their smartphones. They have a thousand-dollar phone in

their hand, but don't know how to use it to be successful or gather information.” This sentiment was corroborated by other faculty and echoed by students who also voiced the need for additional ICT skills.

**Varying levels of ICT skills and impact on college success:**

Institutions of higher education are challenged to meet the needs of students with varying levels of technological readiness with deficiencies in information and digital literacy shown to be a hindrance to student success (Buzzetto-Hollywood, Wang, Elobeid, 2018). This was further collaborated in this study from students and faculty at Saint Augustine's University. Students at Saint Augustine's University were asked to rank their ICT skills on a scale of 1 to 10 and, on average, students rated themselves as a 7.

The students also conveyed that in some cases they lacked access and had not taken computer classes prior to coming to Saint Augustine's University; thus, would require additional assistance with ICT skill acquisition. The following statements provide further support. However, some students did not have the opportunity to take computer classes in high school and had less experience using ICT tools and skills. One student, MH, communicated the following, “I would say I'm a five. I'm not really that trained in [ICT skills]. I feel like I could be a lot better with my skill set.” One faculty member communicated that the varying ICT skills among the students depends on the household and socioeconomic background of students. Through additional research of literature. Researchers have further asserted that socioeconomic status influences students ICT skills (Ferro, Helbig, and Gil-Garcia, 2011; Scheerder, van Deursen, and van Dijk, 2017).

The Saint Augustine. faculty observed a correlation of this finding regarding socioeconomic status and lack of ICT skills among students. Regardless of ICT skills, Dr.

S. stressed the importance of developing all students' ICT skills to ensure not just success in college but also to ensure success in the job market post college matriculation.

**Research Question 2: What do faculty and students think should be included in an information and communication technology literacy program for first-year minority students at Saint Augustine's University?**

ICT and the use of digital literacy skills have evolved and enhanced how our society lives and thinks (Grabe, 2007). Saint Augustine University are tasked to this transformation, leaders of schools and other educational institutions are being challenged with the task of integrating ICT skills in their curriculum (Ghavifekr, Afshari, & Amla Salleh, 2012). Faculty at Saint Augustine's shared several examples of using ICT tools interactively and collaboratively by using tools such as Teams, Zoom, and Google Documents. Students co-signed that it is important to gain skills in areas other than just Microsoft Word for them to be effective as they matriculate through college and beyond. Therefore, teachers are key in equipping and preparing students with the much-needed ICT skills. This is related to their role of providing an effective teaching-learning environment for introducing ICT skills to students (Arnseth & Hatlevik, 2012). Students at Saint Augustine reiterated the importance of the faculty role in preparing students and stated also what they would like to see. This included hands on activities, interactive exercises and courses being offered at different levels.

It has been further illustrated that a lack of basic ICT skills may impede incoming freshmen students' ability to perform at the basic college level (Hoffman & Vance, 2005). Additional studies have also shown that students who do not attain ICT skills in high school enter college behind in comparison to their counterparts. The lack of ICT exposure in high school results in decreased ICT skills for those entering college

(Nataraj, 2014). Thus, deficiency in ICT skills can impact student performance and outcomes (Muna, Magdi, & Hwei, 2018). Therefore, it is essential that institutions of higher learning take a role in bridging the gap to meet the needs for students with varying levels of ICT skills. In this study at Saint Augustine's University, students and faculty agree that an ICT literacy program for first-year students is the best way to tackle the discrepancy between ICT skills amongst college students. Saint Augustine's University faculty agreed on the importance of ICT skills for first year college students. This section will further explore this topic in two parts: (1) Faculty desires for a first-year ICT literacy program and (2) Student desires for a first-year ICT literacy program.

### **Faculty desires for a first-year ICT literacy program**

There has been increased attention surrounding integrating the new ICT tools to curriculum to provide students with the knowledge and skills that they need in the 21st century (Hue and Ab Jalil, 2013). This is becoming viewed as critical for improving quality in teaching and learning. Therefore, integrating ICT into teaching and learning has evolved into a significant issue for many educators (Sahin-Kizil, 2011). In my study, Saint Augustine's University faculty all agreed that an ICT program was very important and should be integrated into the learning environment. Kuth and Vesper (2001) who conducted a study of 125,000 graduates from 205 institutions, determined that students making larger gains in ICT skills during college scored higher on each of 27 academic and social outcome measures when controlling for socioeconomic status. Based on these results, researchers recommended that all entering students become proficient in ICT early in their college careers. Plump et al., (2009) also indicated that the use of ICT for educational purposes can produce positive outcomes for students. These outcomes include increased motivation, active learning, providing efficient resources and better

access to information. These are all important in determining academic and college success. Also, Wang and Woo (2007) cosigned the importance and discussed similar positive impacts on learners including increasing learners' motivation, connecting learners to various information sources, enhancing collaborative learning, and improving teachers' facilitation time. The aforementioned findings were further affirmed by faculty at Saint Augustine's University who all agreed on the importance of ICT skills for first year college students.

To address this concern faculty suggested that there should be some type of skill assessment conducted among first year students. Some suggested even weekly ICT skill assessments. It was thought continuous assessment would serve as an indicator of student progression. Faculty also suggested additional components such as an online instructional platform to ensure that students maintain access and have an internal system for collaborating. According to the faculty, training for Zoom, Teams, Canvas and Blackboard Collaborate, all are key in assisting the students with use of communication and collaboration tools. They further reiterated the importance of including how to utilize and navigate the internal university technology systems. It was also conveyed that some students lacked the skills for using internal systems for simple things like logging into email and checking university wide updates. Faculty provided examples of how lacking ICT skills hindered student performance.

Previously, students were able to participate in face-to-face classes; however, with in person learning not being a viable option due to the Covid-19 pandemic, students who lacked ICT skills were negatively impacted as instruction moved to a digital platform. As weaknesses and areas for improvement with ICT learning were exposed, faculty expressed their awareness of the issue and the need to diligently work to provide

additional assistance and resources to students, especially as some students were completely new to online education. This also resonated with faculty members. The importance of having a program specifically designed to fill in the gaps for the students with limited ICT skills resonated with faculty as they thought it was a great way to enhance ICT acquisition and retention.

According to Ohei (2019); Jimoyiannis et al. (2013); Jaffer, Ng'ambi, and Czerniewicz (2007); and Clarke and Minocha (2009), faculty inclusion of web-based technology and applications in educational environments play a crucial role in ICT acquisition and retention. Incorporating web-based technology and applications within instructional curriculum has a direct impact on students' ICT proficiency and positively impacts success in higher levels of education (Sukanta Sakar, 2012). The aforementioned research corroborates faculty sentiments from findings related to my study, that one of the most effective ways to disseminate ICT curricula is to include technology as part of instruction.

The consensus from Saint Augustine's University faculty regarding desires for a first-year ICT program includes creating a curriculum that will extend students' knowledge of ICT and technology beyond the capabilities of social media. Currently, faculty integrate ICT skills into the curriculum through student projects and the use of interactive digital boards. Thus, they would like for the continued use of projects and digital boards to be an inclusive part of the first-year ICT literacy program.

Faculty members provided additional perspective regarding integrating ICT into the curriculum of first-year students. Faculty member AD specifically mentioned incorporating web-based technologies that students are already familiar with, such as Google Docs, Zoom, and Teams, and diving into the intricacies of appropriate usage of

these software tools in an educational and work setting. Dr. M reiterated this sentiment by expressing the desire for students to “really [know] how a particular program is supposed to be used”. Dr. S was also in accord and stressed the importance of encouraging mastery of management software applications within the ICT literacy program for first-year students.

Overall, Saint Augustine’s University faculty desire an ICT literacy program that will encourage critical thinking to help develop an advanced ICT skill set; emphasize accessing scholarly information, evaluating the information, and subsequently incorporating the information gathered into a structured medium, such as a research paper; as well as promote a deeper understanding of commonly used web-based technologies. Faculty indicated via surveys and interviews that they would like all seven ICT skills to be included in an ICT literacy program (Table 5.1). One faculty member supported explicitly stating that all seven ICT skills should be included.

Table 5.1 *Desired ICT skills from faculty*

<b>ICT Skill</b>	<b>Corresponding Faculty Survey Responses</b>
Defining a need for information	Gleaning important information from credible sources; synthesizing information; using multiple sources to inform their understanding of a topic or concept.
Accessing information via technology	Have the ability to find/access information via technology.
Evaluating online information	Use critical thinking skills to evaluate, synthesize, and communicate findings. Make effective decisions, thereafter.
Managing digital information	The ability to use computer operating systems, to access software programs and manage the basic functions of a computer.

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Integrating information from varied sources	Using multiple sources to inform their understanding of a topic or concept.
Creating information	Using Online Instructional Platforms; Video Conferencing Platforms, Online data entry Platforms.
Communicating information through technology	Using communication and presentation skills.

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Students desires for a first-year ICT literacy program also coincide with ICT program needs. There is a vast need for the development of 21st century information, digital, and visual literacies to ensure that students are equipped with the skills needed to succeed in college and future careers (Educause, n.d.). Digital literacy is considered “an essential requirement for life in a digital age” (Bawden, 2008, p. 30). Often used interchangeably with computer or information and communications technology (ICT) literacy, in a study of third-year college students at two UK universities, discovered that students lacked the ability to comprehend the importance of technology in supporting learning, but instead relied on faculty for ideas on technology-enhanced learning (Margaryan, Littlejohn, and Vojt, 2011). The lack of ICT skills is an issue that impacts higher education. A 2011 study of 3,000 undergraduate students from 1,179 colleges and universities found that many students lacked confidence in their ability to use basic software and resources including spreadsheets e-textbooks, presentation software, course or learning management systems, word processing, utilizing the internal the college/university website (Dahlstrohm, de Boor, Grunwald, & Vockley, 2011. In a study of minority students that attended an HBCU, they perceived that they were computer literate but expressed the need to become more technologically literate, and skilled in computer software applications (Buzzetto-Hollywood & Alade, 2018).



All of the above studies reflect what is needed within an ICT program. This appeared prevalent in my study at Saint Augustine's University as well. Students expressed the need for more advanced training and knowledge of computer software applications. Students at Saint Augustine's University agreed that ICT skills were a much-needed skill. Students all were eager in sharing and voicing what they perceived should be included within an ICT program. Students in my study, expressed the need to include information regarding basics of computer hardware and software usage.

All students conferred that it was important to be computer literate in order to function in college and beyond. Through my findings, students communicated the need for the following to be included within an ICT program at Saint Augustine University, internet surfing, navigating emails, accessing, and managing digital information, Accessing online resources for research, database management and basic usage of hardware in software.

In addition, students thought it would be important to include more in-depth training on Microsoft word and other advanced internal and external software training. Two students indicated that they would like to see coding included. Another student discussed the importance of including how to communicate effectively using technology. In addition, one student stressed how critical it would be to ensure that training on Teams, Zoom, and Google Docs also be included. The students also wanted the program to be interactive and involve continuous learning opportunities of ICT skills for first year students at the University. Students also thought that the faculty should play an important role in the integration of ICT in the learning environment.

Several students admitted that they had very limited experience with ICT. This group felt this would be a hindrance and therefore felt an ICT program for first year

students would enhance their technology skills and improve their overall academic experience. There were others who expressed they gained more experience through high school and other internships, however this group still agreed that it is important to have a program and thought it would be critical to help when seeking employment and within the workforce. Students also thought that the faculty role is critical for integration of ICT in the learning environment to be successful.

Students at Saint Augustine's University described their ideal first-year ICT literacy program as an interactive experience that makes learning fun, allows for hands-on and in-person learning, as well as offers internships that will reinforce ICT skills and promote application in a real-world setting. One student, BD, specifically stated, "I think a way to learn [is to] have hands-on practice", which was echoed by other participants interviewed. Fu (2013) provided additional support stating that hands-on, student-directed education has an impact on ICT learning for first-year students.

Use of computer games in supporting education and the current interest in computer games show a great potential in the use of games in education. (Simkova, 2014) The usage of incorporating games was discussed by a student within my study. Another student, MH, articulated that hands-on learning is not enough to guarantee retention and expressed a desire for "some type of computer program [or] game [that] teaches [students] the information, but makes it fun."

Recently, internships have become the way in which graduates acquire and demonstrate work-readiness to potential employers. (Chillas, Marks, & Galloway, 2015) This was echoed by a student in my study. Student JS also reiterated the importance of internships. JS expressed the desire to incorporate internships as part of the first-year ICT literacy program "because a lot of internships are moving digitally, and a lot of [students]

need their computer skills”. Researchers surmise that proficiency with ICT is a requirement to be successful and acquire profitable careers. (Grant, Malloy, & Murphy, 2009; Levy & Murnane, 2004; Stone & Madigan, 2007). The students at Saint Augustine University also mentioned how this practical use of ICT skills would be essential in the job market and post-graduation.

**Summary.** Both students and faculty at Saint Augustine reiterated the importance of integration of ICT skills into curriculum for future success. Students all agreed that it was very important to gain understanding and usage of ICT skills to secure jobs. Student requests were shared via survey responses and focus group responses. See Table 5.2 which outlines what students would like to see in an ICT program.

Table 5.2 *Student Desires for an ICT Program*

Student Desires for an ICT Program	Corresponding Student Response
Specific skills	<ul style="list-style-type: none"> <li>• Keyboard classes</li> <li>• Computer basics</li> <li>• Hardware and software</li> <li>• Coding</li> <li>• How to avoid scams and viruses that come with some devices.</li> <li>• Things like spreadsheet skills and database management.</li> <li>• PowerPoint and videos</li> </ul>
Interactive/Hands-on	<ul style="list-style-type: none"> <li>• Make it interactive, relatable</li> <li>• Better hands-on work</li> <li>• How to operate digital sites</li> <li>• Being able to play around with it before hand</li> <li>• Games</li> <li>• Fun</li> </ul>
Practical Experience	<ul style="list-style-type: none"> <li>• Jobs</li> <li>• Internships</li> <li>• Courses</li> <li>• Real-life situations</li> </ul>

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Offered course	<ul style="list-style-type: none"> <li>• Taking a computer class while you're in school would be the easiest way to learn ICT skills.</li> <li>• Listening and learning from the professor that teaches it.</li> <li>• Communication between students and professors.</li> <li>• A face-to-face class.</li> <li>• Online models</li> <li>• Labs</li> <li>• Through seminars.</li> <li>• I think the program should be in at least every course class so people can get the gist of how communication technology works and how it's used in daily day life.</li> </ul>
Different levels	<ul style="list-style-type: none"> <li>• Practice what you need to learn, start with basics from the beginning, take heed of the knowledge and get hands-on practice.</li> <li>• I feel the ICT professional development program intended for saint Augustine university should have classes for beginners to people who are more advanced for the program.</li> </ul>

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Modern day society has transitioned toward being more information driven, resulting in an increase in ICT mastery expectations for college graduates (Braun, 2004; Feast, 2003). Faculty in this study expressed this sentiment. One faculty member shared, "A lot of jobs don't do a lot of on-the-job training. They want you to come already prepared and understand the technology and if anything, advanced the technology they're using with your skillset." This has become ingrained within our society requiring that students understand and agree that it is important that they are equipped with efficient ICT skills. Carlson (2005) acknowledged that it is important to have buy-in from students as 21st century college students value independence and autonomous learning. It is critical to be aware of their values when designing an ICT literacy program that will ensure success post college matriculation (Lim, 2007).

ICT skills gained in college have the ability to transform into effective tools for economic growth and sustainability (Davis & Tearle, 1999; Lemke & Coughlin, 1998). While ICT awareness has increased, leaders of colleges and universities are lagging behind with curriculum adoption that will produce technologically and digitally competent graduates (Murray & Perez, 2014). This portion of the research question presented information based on student perspectives of what is needed in a successful ICT literacy program for first-year students at Saint Augustine's University. This also provided further insight into the value of student input for developing a program that students envision will assist them through college matriculation and beyond.

Research Question 3: How do faculty integrate information and communication technology literacy skills in their courses for first-year minority students at Saint Augustine's University?

The integration of ICT skills into teaching and learning environments offers a way for teachers and students to work better in a globalized digital age (Lawrence & Tar, 2018). Morata (2020) asserted that the global problem related to the pandemic Covid-19 resulted in an increase in the area of new technologies). Dr. M shared, "...We haven't finally come through, but with Covid there was so many things that got exposed that we were able to see. And for me, it was total chaos."

There is more activity and engagement within virtual platforms and social networks for the transmission of information. As a result, there is a need for ICT skills to be incorporated in the learning process; however, lack of access is one of the barriers for integrating ICT into the teaching and learning environments. When asked, all three interview respondents shared that lack of access for students when working from home, was a challenge. Katz (2018) further speaks to the dilemma of students having access to

the technology needed to promote ICT skills but not having adequate teaching to foster ICT proficiency.

My study provided faculty perspectives regarding the ways in which ICT skills are incorporated into teaching at Saint Augustine's University. This research question will be addressed in one part: ICT literacy skill integration in first-year courses at Saint Augustine's University.

### **ICT literacy skill integration in first-year courses at Saint Augustine's University**

According to Lawrence and Tar (2018), ICT is becoming more important in both our daily lives and within our educational system. This has caused an increasing demand for educational institutions to utilize ICT skills integration to prepare students for the digital age (Knezek & Christensen, 2016). My findings from my faculty interviews and student focus groups indicated that ICT skill integration will be a necessary part of their lives. Some vital aspects of ICT integration include having the skills to utilize search engines, conducting information search, and the ability to use interactive tools and social networks. Students and faculty at Saint Augustine's University were asked about seven ICT framework areas of measure, all of which faculty agreed are very important to integrate into courses for first year students. During his interview, AD stated, "Reaching out to [students] in a technological way probably makes it better for them to grasp the information" and stated that he specially uses a smartboard as well as Blackboard Collaborate to integrate technology into his courses.

Other faculty members interviewed at Saint Augustine's University utilized similar methods for integrating technology into their lessons. It was also commonly agreed upon that assigning projects that required students to use digital software in a manner different from social media was instrumental in teaching ICT skills to students.

Technological integration into education at Saint Augustine’s University is also occurring by including Canva, Google Chrome, GroupMe, Microsoft Office, Microsoft Teams, smartphones, Twitter, video making, and Zoom into instruction.

When Covid-19 started, students left campus to take virtual courses. This required faculty members to use Zoom and Microsoft Teams for access to lectures and to have synchronous sessions with faculty members. They accessed their courses via computers, but some students relied on smartphones for access to synchronous courses. Faculty member AD stated that he, along with colleagues, relied on Zoom and Microsoft Teams as a result of students leaving campus due to Covid-19. Although there was an emphasis on communicating information through technology based on Covid-19, faculty indicated that they integrate all seven ICT skills of the ICT framework within their curricula (Table 5.3).

Table 5.3 *Direct quotes for ICT skill integration among faculty*

ICT Skill	How faculty integrate the skill
Defining a need for information	Homework in online portals and financial research on the web.
Accessing information via technology	Requiring students to analyze YouTube videos on smartphones, then write reflection papers of their experience. Setting up quick quizzes on google docs to get quick access to answers.
Evaluating online information	I use youtube, twitter, news blogs, and dozens of other websites to show examples to students. I also monitor news media sites to stay up to date on the news happenings around the world. This also helps my students to keep material relevant. I use several questions embedded in my lectures that students have to answer to receive credit.
Managing digital information	ICT has also become integral to the teaching-learning interaction, through such approaches as replacing chalkboards with interactive digital whiteboards, using students' own smartphones or other devices for learning during class time

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Integrating information from varied sources	Using multiple sources to inform their understanding of a topic or concept. I arrange band selections and design precision drills for the marching band with specific computer programs and I use the smart board for presenting PowerPoint slides, YouTube Videos, and other tech presentations in my other classes.
Creating information	I use a wide variety of tools such as MS Office, Google Chrome, MS Teams, Zoom, GroupMe, Blackboard, Canva, and videomaking, to support instruction and to communicate with the students in my classes.
Communicating information through technology	Formerly, we integrated these skills when we had our students work on a group project tied to a global social justice theme. I use Blackboard to administer exams, and I use desktop / video recordings for teaching purposes.

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Aguiar, Velázquez, and Aguiar (2019) further explained aspects of ICT integration focused on competence and motivation. Similarly, Melo (2018) defined the integration of ICT as knowing how to communicate and integrate technological advances and how to get students to acquire new knowledge using ICT within the classroom. Dr. S spoke about the importance of instructors being able to use a plethora of technologies in the classroom as “everybody is going towards using ICT because [for] a lot of artificial intelligence, you have to be able to maneuver around the technologies in the classroom to gather data that make you a more effective teacher”. Teachers must have strong ICT skills to effectively impart ICT knowledge to their students. This involves not only being able to use a multitude of technologies, but also as Melo (2018) alluded to, being able to effectively integrate technology into the classroom and explain the ins and outs of the various systems to students in a way that registers to them and promotes retention. Dr. M stated, “[faculty] use of [technology] helps to further acquaint [students] with the notion of what these tools are and why they are important”. Other faculty members mentioned,



“To be an effective faculty member, you have to stay on top of what's going on with ICT and [technology]”.

The integration of ICT in education plays an important role in facilitating and influencing student learning. Faculty knowledge, training, attitude, and how they view ICT usage can impact the learning and teaching environment. This was further illustrated by Saint Augustine's University faculty through surveys and interviews; the faculty at Saint Augustine's indicated that integration is paramount and essential to the success of first-year students at the university.

### **Recommendations for ICT Programming for students at Saint Augustine's University**

Through this research, study, I have developed recommendations for the need to implement an ICT program for first-year students at Saint Augustine's University. The purpose is to develop a program for professional development and growth for students. It will also encourage faculty involvement to ensure they are equipped as facilitators, thereby ensuring student success. ICT programming is critical to prepare students for college matriculation and for the workforce. Students are increasingly maximizing their higher education experience, and they view digital learning technology and ICT skills as being key to their success. McGraw (2016) conducted a survey of more than 33,00 college students in associates, bachelors, and graduate programs. The result of the survey showed that 84% of students agreed that technology use in college classes improved education while 81% found that it enhanced their academics and increased efficiency.

When asked, students in my study shared that they believed that ICT courses or curricula would help to improve their education. Seventeen percent of student survey respondents specifically requested a class to learn ICT skills. Some used different

terminology such as workshops and seminars to indicate that technology use during their college career would be beneficial. Faculty respondents in my survey and interviews also shared that ICT courses and integration would greatly benefit students.

Students also feel using technology has helped with their career readiness. According to McGraw-Hill's 2016 Workforce Readiness Survey released in June 2016, 84% of college students feel having used technology in classes or to study has helped to make them a better job candidate. Nataraj's (2014) research reaffirms the need regarding the role of higher education institutions to ensure that graduates gain the much-needed ICT skills as they matriculate through colleges and universities. Higher education institutions have a pivotal role in ensuring that graduates demonstrate proficiency in ICT literacy upon graduation (McCausland, Wache & Berk, 1999). ICT skills are needed for students to function after college.

The aforementioned studies solidify the importance of the university's role in developing an effective ICT program for first year students at Saint Augustine's University. This section will further explore (a) recommendations for practice and (b) considerations for working within program development during Covid-19.

### **Recommendations for Practice**

With the transformation of a more global technological society, more is expected from a college graduate as it relates to an information-driven society (Braun, 2004; Feast, 2003). Thus, for several years, leaders of colleges and universities have been evaluating their programs and designing their curricula to meet that expectation (Feast, 2003; Lambrecht, 2000). It has been asserted that ICT skills obtained in college can translate into effective workforce skills for economic growth and sustainability (Davis & Tearle, 1999; Lemke & Coughlin, 1998). Sarkar (2012) called for a renewed focus on ICT skills in

higher education to improve the competency of both faculty and students. According to Venkatesh and Davis (2000), when teachers are presented with a new technology, the following factors determine their use of the new technology: limited accessibility and network connection, schools with limited ICT resources, need for effective training, lack of competency and time. All these factors must be evaluated in order to create an effective program where faculty are comfortable in the use and integration of ICT into classroom curriculum.

Students felt strongly that there was a need to have ICT incorporated into the classroom. The students voiced their opinions regarding what the program should include and expressed that faculty played a critical role in the success of an ICT program. Successful integration of ICT into the classroom environment requires students, faculty, and technology coexisting in the same space to enrich the learning process as a whole (Earle, 2002). Therefore, according to the aforementioned statements, incorporation of ICT into curriculum benefits both faculty and students. The following is a list of recommendations for the professional development program aimed at supporting the ICT skills of first-year students at St. Augustine's University.

**Recommendation #1: Include students and faculty in the program development process.**

It is important that both faculty and students contribute to an effective development of an ICT program at Saint Augustine's University. According to Wang (2012), there were several systemic factors specifically related to minority students, especially African Americans' environment and socioeconomic background. In addition, the culture, and experiences at an HBCU, as well as faculty and students, can also impact what is perceived to be needed in an effective ICT program for first-year minority students.

ICT can be instrumental in enhancing student learning outcomes and effectiveness when utilized properly. When ICT effectively incorporates applicable resources, and supportive processes it can have a positive impact on both teaching and learning (Hue and Ab Jalil, 2013). Actively engaging students early in the program development process will allow greater student buy-in and empowerment toward their own educational pursuit and success.

It was evident in their eagerness to offer suggestions when asked what should be included in an ICT program. Every student and faculty contributed a response regarding what they would like to see included. For example, one student shared that they would like to make sure coding was a part of the process because it would help them. Another student shared that they would like to learn to avoid viruses and scams. Students and faculty were notified that their voluntary involvement with this study was with the purpose of helping to develop an ICT program for students at Saint Augustine's University. All parties acknowledged that they understood and wanted to contribute to the process. One faculty member ended the interview with, "I'm on top of it. It is important to find out where the mile markers are in what we're trying to do." This indicated that the ICT program development is a collective process that he would like to stay engaged in.

Other faculty at Saint Augustine's shared several examples of using ICT tools interactively and collaboratively by using tools such as Teams, Zoom, and Google Documents. Students co-signed that it is important to gain skills in areas other than just Microsoft Word for them to be effective as they matriculate through college and beyond. Input from both faculty and students will play an integral part in making sure that program components will be impactful for student enrichment and growth. It is also crucial that faculty continue to stay abreast of ICT innovations and tools. This may

encompass continuous education for the faculty such as online modules, seminars, and structured training. It is essential that faculty, regardless of ICT skill levels, are equipped to prepare and guide students with the skills needed to function and exceed technological expectations for the 21st century. This will be accomplished through continuous growth and development along with the sharing and enhanced collaboration of both faculty and students.

**Recommendation #2: Develop a skills assessment to measure students' ICT skills before program entry and after completion.**

Many students have been using technology since high school; however, in a study, it was determined that students who do not attain ICT skills in high school enter their first year of college lacking vital ICT skills (Nataraj, 2014). As discussed by Katz (2007), ICT has been addressed as a part of the transition to prepare students in higher education for 21st Century learning. ICT can also be beneficial for the support of student-centered and self-directed learning (Fu, 2013). The acquisition of ICT skills is not merely reliant upon specific program development.

Developing and executing the needs assessment is often the most important and time-consuming step in the process of setting ICT-related goals for a specific educational program (Szuba et al., 2005). Needs assessments are crucial in the development of ICT programming in higher education. They serve as a litmus test of an organization's current environment relative to the preferred environment, with the difference between the two identified as the organization's needs (Szuba et al., 2005). Needs assessments aid colleges and universities in identifying gaps, and provide direction for programs, projects, and activities; allow staff to determine priorities and allocate limited resources to activities that will have the greatest impact; create cohesion through the alignment of goals,

strategies, professional development, and desired outcomes; enable benchmarking and monitoring of implementation and impact; and assist with continuous improvement activities by helping staff identify change, which instructional and other practices are working, and the strategies associated with the greatest success (Southwest Comprehensive Center, 2008, p.7).

My findings indicated the importance of assessments. There was variation in my findings regarding perceived ICT skills. While students and faculty rated students a 3 (out of 5) or higher on all ICT skill items, faculty rated students lower than the students rated themselves. These findings align with research that questions the reliability of self-reported computer literacy skills (Merritt, Smith, Renzo, 2005). The inconsistency of rating skills indicates the need for a more objective assessment. One faculty member stated that an assessment would help to identify “what needs to be learned”.

It is important to determine who is involved in the needs assessment process, what the process will look like, and the desired outcomes. Needs assessments can include data collection from many sources including, existing documentation, such as historical budgets, student achievement, and target population demographics. Interviews, focus groups, and environmental scans that are implemented during a needs assessment can provide additional information on current climate and practice. Surveys, however, remain the most common form of needs assessment, as they are relatively easy to administer and provide data in an accessible format (Southwest Comprehensive Center, 2008). To support this, one faculty member suggested “interactive weekly surveys to determine if students are using ICT”. Another faculty shared, “And then we also have our surveys that they (students) do, Google surveys on their phones. That way, I get a quick and immediate answer.”

All the above-mentioned information along with qualitative and quantitative data collected during my study will be utilized for determining an assessment program for Saint Augustine University. As indicated from data gathered in my study as well as from existing studies, there is a consensus regarding varying levels of ICT skills of first year students. To examine the ICT skills level, a pre and posttest would be used for tailoring the program to meet the needs and evaluating program effectiveness. The pretest and posttest would rely on testing students' ability to (a) Define a need for information, (b) Access information via technology, (c) Evaluate online information, (d) Manage digital information, (e) Integrating information from varied digital sources, (f) Create information, and (g) Communicate information through technology. Unlike the survey in my study, assessments should be based on actual skills versus perceived or self-reported skills. Research further confirms the value of ICT needs assessments for faculty and students in the areas of hardware and software procurement and ongoing professional development (Anaya, 1999; Kocher & Moore 2001; Kanaya et al. 2005).

**Recommendation #3: Require all students to complete the ICT program.**

The majority of first-semester college students have not taken any type of computer course in high school (Reese, 2016). However, first-semester college students self-report high skill sets in spreadsheet, word processing, and presentation applications (DuFrene, Clipson, & Wilson, 2010). Researchers indicate inconsistencies between students' perceptions of computer skills and their actual levels of competence (Kilcoyne, McDonald, Hanson, Champion, Garland, & Maples, 2009). This finding was corroborated by the current study, too. Many students assess their level of technology competence as higher than actual reality (Hanson, Kilcoyne, Perez-Mira, Hanson, & Champion, 2011). As a result, many students do not perceive when they have a

deficiency (Grant, Malloy, & Murphy, 2009). This was supported in my findings when students indicated that they were proficient (3 out of 5) in all areas of ICT, but 13 of 41 survey respondents said they knew nothing about ICT skills. Additionally, when asked, some students named non-ICT skills such as time management and tax preparation as ICT skills. The inaccuracy and inconsistency in the responses support that student perception is not aligned with student skills.

Furthermore, 21st century college students favor a more independent, autonomous learning style and are less likely to self-report when having difficulty with class instruction or educational directives (Carlson, 2005). As a result of data from my study, as well as other studies, there needs to be a requirement for all students to participate in the ICT program. Students and faculty at Saint Augustine's University both strongly voiced the need for an ICT program to be incorporated into the curriculum. This will allow the students to gain valuable skills to be successful in college matriculation, academic success, and workforce preparation.

**Recommendation #4: Encourage faculty to integrate ICT skills into curricula.**

ICT can be implemented and can be used in various ways where it helps both teachers and students to learn about their respective subject areas. A technology- based teaching and learning offers various interesting ways which includes educational videos, stimulation, storage of data, the usage of databases, mind-mapping, guided discovery, brainstorming, music, World Wide Web that will make the learning process more fulfilling and meaningful (Finger & Trinidad, 2002).

In addition, students will benefit from ICT integration as they are not restricted to the limited curriculum and resources. Hands-on activities in a technology-based course are designed to help them to stimulate their understanding about the subject. It also helps



teachers to effectively design their lesson plans in a creative way that aids in students' active learning. Previous research proved that use of ICT in teaching will enhance the learning process and maximizes the students' abilities in active learning (Jamieson-Procter et al., 2013).

A technology-based teaching premise offers various options to create a more fulfilling learning process for students (Finger & Trinidad, 2002). Students at Saint Augustine's University expressed the need for integration of ICT to include innovative, creative, and interactive components. Faculty acknowledged that as being essential to peak interest and increase student participation. Also, students will benefit from ICT integration that consists of hands-on activities to further enhance continuous active learning.

Despite progression, there is no consensus regarding understanding students' utilization of ICT (Bennett et al. 2008). There is a body of evidence that indicates that the actual uses of ICT by students are more limited in scope than indicated by students (Selwyn, 2009). Regardless of various arguments, researchers continue to emphasize the importance of educating minority youth as a major concern for education and the importance of technology and ICT (Bennett et al., 2008). The culture and experiences at an HBCU, as well as faculty and students, can also impact what is perceived to be needed in an effective ICT program for first-year minority students. Faculty must consider these factors in considering the importance of integrating ICT skills into the curriculum.

Throughout my study, faculty at Saint Augustine's University shared how they are presently using ICT skills as well as the need for more advanced ICT skills to be utilized and incorporated into a first-year program. Faculty at Saint Augustine's University shared that some ways they are currently integrating ICT skills include MS

Office, Google Chrome, MS Teams, Zoom, GroupMe, Blackboard, Canva, and videomaking software. Students also expressed that they felt the faculty at Saint Augustine's University shared the desire and motivation to integrate ICT skills into the curriculum. They also voiced ICT integration into course work is essential for continued success throughout college, as well as, for success in the job market. As ICT skills have extended outside classroom instruction and manifested in most areas of life outside higher education, it is paramount that faculty prepare students and impart ICT framework to their students as they have become a necessary life skill. Faculty members at Saint Augustine's University shared that they have a role in preparing students for meeting the challenges associated with continuous growth and development related to ICT acquisition for college and beyond. It is important for faculty to understand their role and be comfortable with the technology as they facilitate student learning.

**Recommendation #5: Provide training to assist faculty with implementing ICT skills.**

The use of ICT offers a facilitative teaching-learning culture that is essentially focused on the teachers' task of leading or engaging their students in an active, self-engaged, self-directed, and motivated way of learning (Volman & van Eck 2001; De Corte et al. 2003). Presently, ICT plays an important role in promoting new instructional methods for teaching and learning, such as: self-paced learning (Roberts 2003), network learning (González 2009), and online discussion (González 2010). However, teachers may not possess the ability to effectively integrate technology and ICT skills within their courses.

Saint Augustine's University faculty members had different experiences with ICT. They also had various levels of training prior to and at Saint Augustine's University.

This impacted how use ICT within their courses. Table 5.4 shows the variance in responses regarding training among faculty members.

Table 5.4 *Faculty ICT Training Experience*

<b>Question</b>	<b>Percentage of “yes” responses</b>	<b>Percentage of “no” responses</b>	<b>Percentage of “N/A” responses</b>
Did you receive Information Communication Technology Literacy or Digital Literacy instruction before working at Saint Augustine’s University?	78	11	11
Have you received Information Communication Technology Literacy or Digital Literacy instruction while working at Saint Augustine’s University?	89	11	0
Did you receive Information Communication Technology Literacy or Digital Literacy training before teaching at Saint Augustine’s University?	78	22	0
Have you received Information Communication Technology Literacy or Digital Literacy training while teaching at Saint Augustine’s University?	78	22	0

Although most faculty members reported receiving some type of ICT training, some faculty still reported never receiving training. One faculty member survey

respondent shared, “I use the minimum to be effective,” which indicates that they are potentially introducing students to minimal ICT skills, and that additional training may be beneficial for faculty.

Coaching and situated professional development, particularly for teachers who are not proficient with technology integration, may increase self-efficacy of teachers (Sugar, 2005), which in turn promotes ICT learning among students. In addition, faculty need professional development programs not only in computer skills for administrative tasks but also in developing pedagogical knowledge and skills so that they can incorporate ICT in their teaching-learning tasks (UNESCO 2004; Jones 2004). The changing nature of knowledge, and the changing capabilities of technologies, require faculty in higher education to implement ICT in their teaching and training (Burden, Aubusson, Brindley & Schuck, 2016). With the emergence of ICT integration in colleges and universities, it is essential that faculty have the proper training and knowledge to successfully integrate ICT into instruction as a failure to do so will hinder student’s educational growth, as well as put them at a disadvantage post college matriculation.

Through data from my survey, it was apparent that while some Saint Augustine’s University faculty were comfortable with using ICT within the curriculum, there is a need for additional training to acquire additional advanced ICT skills. All the faculty were thrust into going from teaching students face to face to using online teaching and implementing ICT into the curriculum. As a result of this change to remote learning delivery, it is essential that the faculty receive additional training to keep up with the growing trend of ICT. Providing Saint Augustine University faculty with ongoing ICT training will allow them to adapt to enhance areas of ICT learning and adopt these newly acquired skills into their classrooms. One faculty member respondent stated that this is

new because of Covid and stated the need to continue to grow their skills so that they would be able to provide students with the necessary skills.

A few avenues that may prove fruitful for faculty training at Saint Augustine's University are collaborating with the IT department for internal training, providing access to online materials geared toward ICT education, and creating opportunities for external ICT workshops for all local college and university instructors. As individuals who work in IT interact with ICT on a daily basis and utilize these skills in all aspects of their professional duties, it would be beneficial for the Saint Augustine's IT department to share their wealth of ICT knowledge in the form of internal ICT training for all faculty. In addition to in-person training provided by the IT department, supplemental education materials made available online would also be helpful with ICT faculty training. As these online resources would be accessible anywhere faculty have computer and internet access, this would allow faculty to proactively engage with newly added material on their own time or review information they already know in an effort to help maintain their working knowledge. External workshops for professional development can serve as a vehicle to ensure continuous learning and improvements in the area of ICT integration and allow faculty from different universities to share knowledge with and learn from their peers.

### **Considerations for Working within program development during Covid-19**

With the rapid spread of Covid-19 globally, leaders of colleges and universities were forced to close their doors to on-campus education in favor of remote instruction in an effort to adhere to the social distancing recommendations issued by the Centers for Disease Control (Toquero, 2020). The Covid-19 pandemic facilitated a shift in learning that required both students and faculty to adopt a more technology centric way of

interacting, sharing information, and accessing information (Manco-Chavez , Uribe-Hernandez , Buendia-Aparcana , Vertiz-Osores , Alcoser &, Rengifo-Lozano, 2020).

While this shift to digital learning and remote instruction served to safeguard the well-being of students and faculty, there were inherent challenges associated with making higher education digital. Students who lived in rural or impoverished communities were at a significant disadvantage during Covid-19 as their main pipeline to technology and reliable internet access was in the form of campus provided resources (Adnan & Anwar, 2020). As these students were sent home to continue their collegiate education, they were faced with the possibility of not having access to a computer to complete coursework, not having a reliable internet connection to access courses, and the inability to interact with instructors and other students face to face.

There was a significant impact for students and faculty at Saint Augustine's University due to of Covid-19. This resulted in the need for more remote learning which required more use of ICT skills. .AD, a faculty member stated that because of Covid-19, Saint Augustine's University students were having to use more online courses. This faculty member thought Covid -19 impact is requiring that students become better acquainted with ICT skills which in turn will better prepare them in the future. Dr. M expressed it is imperative that students have basic ICT skills in the first year of college, but for success beyond graduation, students would need to be comfortable using more advanced technology. Another faculty member AD stated, "COVID kind of forced us into this situation a little sooner than we thought, by using Teams or Zoom we're ensuring that our kids will be equipped to navigate these things". Thus, also stressing that additional need for online learning propelled the faculty to use more ICT tools within

their curriculum. The additional use of ICT skills in the online environment serves as a catalyst for students to be better prepared for college and beyond.

When interviewed, Saint Augustine's University's faculty mentioned that students who attend this university tend to come from a lower socioeconomic background and are not the most technologically savvy. These students are also less likely to have access to computers and devices at home needed to perform the rigors of college coursework. These circumstances had to be taken into consideration during Covid-19 as disadvantaged students were required to remain at home and try to navigate the challenges of distance education. Understanding these challenges assists in the process of trying to mitigate the effects Covid-19 has on learning and ICT acquisition.

### **Implications and Future Research**

There are several implications related to my research at Saint Augustine's University. As a minority working in higher education, the implications of access and race are both personal and provide additional opportunities for research regarding ICT acquisition for first year minority students. In this section, I will discuss (a) personal implications and (b) implications for the future research.

#### **Personal Implications**

My experience with this study has helped me in my work in educational technology. It has also allowed me to gain skills and insight regarding the HBCU higher education environment. My research reiterated the importance of: (a) engaging in mixed-methods action research, (b) researching relevant literature, and (c) sharing and communicating findings.

#### **Engaging in mixed-methods action research.**

Mertler (2009) asserts that action research provides practitioners a way to uncover

counterproductive practices in their context. Triangulation is often used to establish rigor and trustworthiness and enhance understanding within a local setting (Creswell, 2014; Leech & Onwuegbuzie, 2007). I utilized mixed-methods action research to develop recommendations for ICT programming for students at Saint Augustine's University. As a higher education professional, my research provided me with a foundation to plan future ICT programming for students. Based on the results of my study, I will also include students and faculty in the planning process. As Mertler (2009) suggests, by triangulating my and quantitative data, I gained a better understanding of the needs and desires of students and faculty for future ICT programming.

### **Researching relevant literature.**

I have always valued technology, worked to enhance my ICT skills, and enjoyed teaching others how to improve their ICT skills. I am impacted by my early access and reliance on technology during my growth and development which afforded me enhanced ICT skills (Bennett, Maton, & Kervin, 2009). In my opinion, current programming does not meet the needs of students at Saint Augustine's University.

Research and exploration of the existing literature concerning ICT skills and minority college students has influenced my opinion regarding ICT programming at Saint Augustine's University. Prior research provided evidence of the disparities among minority students and the need for programming to enhance ICT skills. This study provided me the opportunity to critically analyze my opinions and the opinions of others. The challenges related to ICT skills for students at Saint Augustine's University is not an isolated challenge. Other HBCUs and minority students have faced similar situations. I



am able to utilize prior research to build upon and address the needs of students at Saint Augustine's University.

### **Exploring the impact of race and Critical Race Theory**

Although research can serve different purposes, race tends to be a prominent factor in educational research (Kohli, Pizarro, & Nevárez, 2017). Ortiz and Jani (2010) assert that race is a social construction and permeates all aspects of social life. The definitions of race vary, but many scholars agree that it is a socially constructed category (Omi & Winant, 1994; Haney-López, 2000; Solorzano & Yosso, 2002; Ortiz & Jani 2010). The concept of race is a foundational element of critical race theory.

Regardless of racial designations for research subjects, minority-based research should have five central tenants of a Critical Race Theory (CRT) framework in education, which include: (1) the centrality and intersectionality of race and racism with other forms of subordination, (2) the challenge to dominant ideologies, (3) the commitment to social justice, (4) the importance of experiential knowledge, and (5) the use of interdisciplinary perspectives (Solorzano & Yosso, 2002). However, the need to further develop the use of CRT in the research process is necessary across different fields, including but not limited to education (Perez Huber, 2010). An emphasis needs to be placed on imbedding CRT into all elements of the research process, including the ways researchers formulate research questions, epistemological standpoints, and methodological approaches (Solorzano & Yosso, 2002).

Educational institutions are recognized as a central site of knowledge production, where researchers determine what constitutes valid and legitimate sources of knowledge (Delgado et al., 2002). Although most higher education institutions are founded on Eurocentric values, HBCUs continue to serve as an impetus for the education of Black

students (Gasman, 2007). Research explains the role the academy (colleges and universities) has played in establishing knowledge as a discourse of power, where power to decide what is considered truth or not is tied to the power to legitimate that truth (Córdova, 1998). Thus, numerous scholars of color have expressed the need to deconstruct dominant perspectives rooted in white superiority (Anzaldúa, 1999; Hurtado, 2003; Dillard, 2000; Ladson-Billings, 2003).

Critical race scholarship acknowledges the century-long struggle that scholars of color have endured to understand the experiences of people of color from a Eurocentric perspective. A CRT framework functions to deconstruct the segregation of knowledge that exists within the educational settings through validating and honoring minority experiences and forms of knowledge (Perez Huber, 2010). Minority research should include CRT in the research process. "Race and racism are endemic, permanent, and in the words of Margaret Russell (1992) a central rather than marginal factor in defining and explaining individual experiences, " (as cited in Solorzano & Bernal, 2001, p. 31). CRT is applicable to the issue of ICT literacy, as inequities continue to exist among minority groups in the area of ICT. CRT is an area that would benefit from more exploration regarding the relationship to ICT skill acquisition.

### **Sharing and Communicating Findings**

The findings of this research were shared with stakeholders at Saint Augustine's University and with students who have participated in the study. Student and faculty participants were able to view the results before it was shared publicly. In the interest of reciprocity, students and faculty members were provided with updates throughout the research process. A share-out occurred during the final phase of data collection and after the data analysis process was complete.

The results of this research will also be shared with administration, faculty, and staff of Saint Augustine's University during the Faculty Staff Institute. The Faculty Staff Institute occurs twice a year, and this share-out will involve a presentation with a Q&A session to discuss findings and implications. In addition, all findings were shared with my dissertation committee in the effort to ensure that the study maintains the highest standards of scholarship and quality.

I have also shared my research with peers in my academic program who provided constructive insight and feedback. Throughout the entire research process, I maintained confidentiality by ensuring that participant identity is protected. Thus, data compilation includes the removal of identifiers. Survey, focus group, and interview results from students and faculty will not include specific names of individuals.

In addition, I will share my research with Dr. Irvin Katz and other key ICT researchers. There is a need for additional research regarding ICT and higher education. Dr. Katz would be instrumental in developing an effective program for Saint Augustine's University due to his inception of the ICT framework.

All stakeholders have been receptive to my research and are interested in a second phase. The second phase would include additional research and ultimately developing an ICT program at St. Augustine's University. Faculty and students are interested in continuing the process.

### **Implications for Future Research**

It is essential to provide recommendations for future research (Creswell, 2013). As previously stated, there is a need for more research and literature regarding students' ICT skills and ICT programming at HBCUs. Key researchers have also observed the need for more research in this space (Buzzetto-Hollywood, 2018).

It would be beneficial to engage in similar research post-pandemic and at other institutions. More participants would provide a clearer narrative of students' ICT skills and what should be included in an ICT program. My study could be replicated at other HBCUs or schools with a similar population. Since research is limited in my area, it would be fascinating to discover how this research would be viewed on a larger scale. Additional research in this subject area will ultimately benefit minority college students in the development of ICT skills. More research would also equip faculty with the knowledge to ensure that curricula include an opportunity for students to acquire vital ICT skills.

### **Limitations**

This study utilized the mixed-methods action research model. According to Mertler (2017), action research is used to identify problems in or develop solutions for a specific location to promote positive change. There were several challenges related to this study which resulted in limitations. My limitations included the impact of Covid-19, the death of the university's president, varying ICT skills of first year students, and respondents' size. Covid-19 had a significant impact on my study. According to UNESCO, the educational experiences of nearly 1.4 billion students were interrupted (EDUCASE Review, 2021). The Covid-19 pandemic forced colleges and universities to move their courses online in order to protect millions of students and themselves (EDUCASE Review, 2021).

During the fall of 2020, students at Saint Augustine's University transitioned from a face-to-face model to a completely online model of curriculum delivery. The lack of access to the internet and computers served as a major problem for both students and faculty. The digital divide, which impacts ICT skill acquisition, remains a significant

concern in the United States, with race/ethnicity, income level, and education contributing to inequalities with use of computers and reliable and expedient access to the Internet (Morgan & VanLegen, 2005). According to financial aid statistics, for the academic year 2019-2020, a total of 944 students (97% of undergraduate students) received one or more financial aid including grants, scholarships, and/or student loans (Saint Augustine's University, 2020). Students and faculty had to make the adjustment to a new way of learning. Through surveys and focus groups it was determined that access to technology and internet was an issue. Empirical findings demonstrated that students' use of ICT is driven by several factors, including age, socioeconomic status, living situation, and locality (Valadez & Duran, 2007).

Another major issue related to Covid-19 is that the President, Irving McPhail, at Saint Augustine's University became ill with Covid-19 and succumbed to Covid complications in October 2020 (Saint Augustine's University, 2020). This had a significant impact on the overall leadership of the University. The president's wife, Christine Johnson McPhail, was later installed as president in February 2021 (Saint Augustine's University, 2021).

An additional limitation included the respondent size. Because the students and faculty were all working from home, it was difficult to get participation. For the surveys I had a total of 41 students, and 7 students participated in the focus group. For the faculty there were 9 that participated in the surveys, and 3 participated in the interviews. All the above factors were coupled with the varying levels of ICT among the student participants. This increased challenges for faculty to adjust their delivery to meet the needs of all students. On the student side, the students with limited ICT skills experienced

increased academic challenges. Research demonstrates that there is a correlation between ICT skills and academic success (Macharia & Pelser, 2014).

### **Concluding Thoughts**

ICT skills are important for college matriculation and to be successful in the workforce. My study demonstrated that the students at Saint Augustine's University lacked these skills. Institutions of higher education are expected to address the needs of students with varying levels of technological readiness because a lack of ICT skills has shown to be a hindrance to student success (Muna, Magdi, & Hwei, 2018).

Students and faculty at Saint Augustine agreed that ICT skills were lacking, and that additional training is needed. This was further supported by data and responses from students and faculty. Some of this was attributed to access and lack of exposure in high school. Students working remotely from their homes because of Covid-19 presented challenges for both students and faculty. According to Snipes, Ellis, and Thomas (2006), a digital divide exists between people with access to technology and those without it. Computer ownership and Internet usage is lower among Blacks. Roughly 6% of 58 million Americans using the Internet are Black, with less than one third of all Black homes owning personal computers (Ellis, Snipes, Thomas, & 2006).

The ICT experience did impact ICT skills at Saint Augustine University. While some of the students had been exposed to ICT skills in high school, others did not. This resulted in the first-year students having varying levels of ICT skills. It also presented a challenge for both students and faculty. However, the rapid advancement of technology over the last two decades has changed the dynamics of teaching and learning in the 21<sup>st</sup> Century. Educators are now expected to integrate technology in the classroom to meet the needs of today's learners (Henderson & Chapman, 2012) Therefore, it is essential that

HBCUs are steadfast regarding implementing ICT skills into curriculum. ICT skill acquisition is necessary for students to be successful in college, while preparing them to meet the evolving technological needs in the workplace for our emerging global society.

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APPENDIX A  
IRB APPROVAL



OFFICE OF RESEARCH COMPLIANCE

INSTITUTIONAL REVIEW BOARD FOR HUMAN RESEARCH  
APPROVAL LETTER for EXEMPT REVIEW

Krystin McCauley  
12 Saint Andrews Ct.  
Durham, NC 27707

Re: **Pro00106035**

Dear Krystin McCauley:

This is to certify that the research study ***An action research mixed methods study for the development of information and communication technology (ICT) programming at a historically black university*** was reviewed in accordance with 45 CFR 46.104(d)(2) and 45 CFR 46.111(a)(7), the study received an exemption from Human Research Subject Regulations on **11/23/2020**. No further action or Institutional Review Board (IRB) oversight is required, as long as the study remains the same. However, the Principal Investigator must inform the Office of Research Compliance of any changes in procedures involving human subjects. Changes to the current research study could result in a reclassification of the study and further review by the IRB.

Because this study was determined to be exempt from further IRB oversight, consent document(s), if applicable, are not stamped with an expiration date.

All research related records are to be retained for at least three (3) years after termination of the study.

The Office of Research Compliance is an administrative office that supports the University of South Carolina Institutional Review Board (USC IRB). If you have questions, contact Lisa Johnson at [lisaj@mailbox.sc.edu](mailto:lisaj@mailbox.sc.edu) or (803) 777-6670.

Sincerely,

A handwritten signature in blue ink, appearing to read "Lisa M. Johnson".

Lisa M. Johnson  
ORC Assistant Director and IRB Manager

APPENDIX B

INFORMATION AND COMMUNICATION TECHNOLOGY LITERACY STUDENT  
SURVEY EMAIL

All students in the First Year Experience program at Saint Augustine's University are invited to participate in a survey to determine students' information and communication technology literacy skills and to help decide what should be included in an Information and Communication Technology program within the First Year Experience Program. Participants must be 18 or older and enrolled in the First Year Experience program at Saint Augustine's University.

Your participation is strictly voluntary. The survey should take approximately 9 minutes to complete. The survey will ask questions about information and communication technology literacy and programming at Saint Augustine's University.

Your submission of this survey indicates your consent to participate in this study. Your responses will be anonymous. You may terminate your participation at any time during the survey. You can elect at the end of the survey to share your email address to be entered to win a gift card.

If you have questions or concerns about this study, you can contact the researcher directly:

Krystin McCauley

krystinm@email.sc.edu

919-824-8434

APPENDIX C

INFORMATION AND COMMUNICATION TECHNOLOGY LITERACY STUDENT  
SURVEY

## Information Communication Technology Literacy Student Survey

The survey will take approximately 9 minutes to complete.

Definition: Information Communication Technology (ICT) Literacy involves the use of digital technology, communications tools, and/or networks for the purpose of defining a need for information, accessing information via technology, evaluating online information, managing digital information, integrating information from varied digital sources, creating information, and communicating information through technology (Katz et al., 2004; Katz, 2007).

The goal of the survey: To evaluate ICT/digital skills you acquired through previous coursework or library experiences.

Instructions: Please use the above definition when answering the questions below.

\* Required

### Demographic Questions

Please answer the following demographic questions.

1. Gender \*

- ☐ Male
- ☐ Female
- ☐ Non-binary
- ☐ Prefer not to say

☐

Other

10/10/2021

2. Race (Select all that apply) \*

- ☐ African American/Black
- ☐ Caucasian/White
- ☐ Hispanic
- ☐ Latino
- ☐ Native American
- ☐ Asian
- ☐ Other
- ☐ Prefer not to answer

3. Grade classification \*

- ☐ Freshman
- ☐ Sophomore
- ☐ Junior
- ☐ Senior

4. Age \*

5. Major(s) \*

10/10/2021

6. Are you a full-time student at Saint Augustine's University? \*

☐ Yes

☐ No

7. Are you enrolled in the First Year Experience program at Saint Augustine's University? \*

☐ Yes

☐ No

10/10/2021

## Information Communication Technology Instruction and Background

The following questions are regarding ICT student instruction and background.

8. Did you receive Information Communication Technology Literacy or Digital Literacy instruction before attending Saint Augustine's University? \*

☐ Yes

☐ No

9. Have you received Information and Communication Technology Literacy or Digital Literacy instruction while attending Saint Augustine's University? \*

☐ Yes

☐ No

10. Use a rating scale of 1-5 with 1 being the lowest and 5 being the highest in answering this question.

	1	2	3	4	5
How would you rate your Information Communication Technology Literacy skills?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

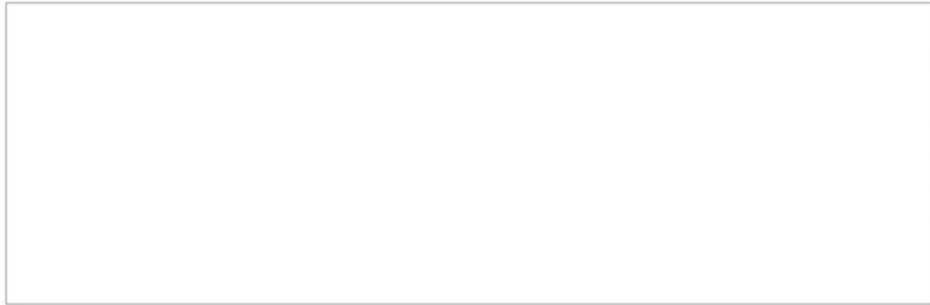
10/10/2021

## ICT in Your Own Words

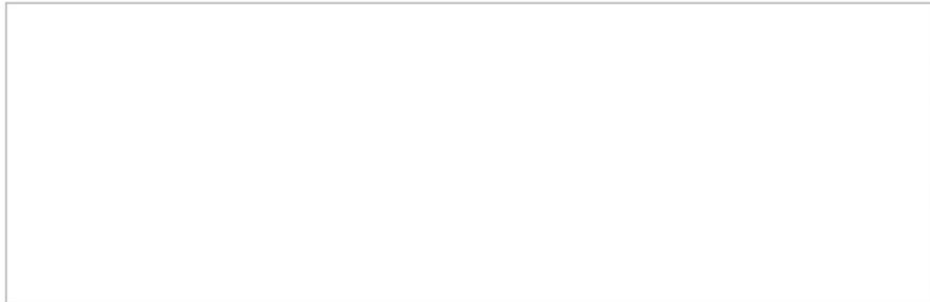
Definition: Information Communication Technology (ICT) Literacy involves the use of digital technology, communications tools, and/or networks for the purpose of defining a need for information, accessing information via technology, evaluating online information, managing digital information, integrating information from varied digital sources, creating information, and communicating information through technology (Katz et al., 2004; Katz, 2007).

Please answer the following list of questions using your own words:

11. What do you know about ICT skills? \*



12. What do you think are the most important ICT skills that you need for college? \*



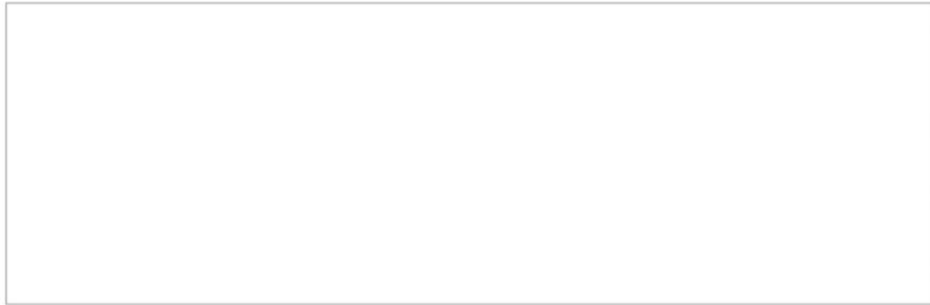
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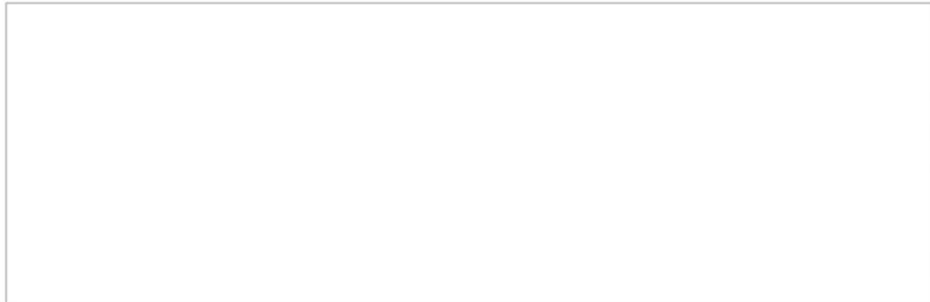
13. What ICT skills do you think you may need after graduation? \*



14. What would you like to see included in an ICT professional development program intended for students at Saint Augustine's University? \*



15. What do you think would be the easiest way to learn ICT skills? \*



10/10/2021

## Your Understanding of ICT

Definition: Information Communication Technology (ICT) Literacy involves the use of digital technology, communications tools, and/or networks for the purpose of defining a need for information, accessing information via technology, evaluating online information, managing digital information, integrating information from varied digital sources, creating information, and communicating information through technology (Katz et al., 2004; Katz, 2007).

Note: All the items are measured on a 5-point Likert scale (1: strongly disagree to 5: strongly agree). Please answer the following questions.

### 16. Answer the following questions regarding your ICT skills.

Define: Using digital tools to identify and represent an information need

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I can develop a research topic to fit a particular information need.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know how to ask questions to clarify the information need.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to ask questions of a "professor" that help clarify a vague research assignment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know how to conduct effective preliminary information searches to help frame a research statement.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10/10/2021

## Access

### 17. Access: Collecting and/or retrieving information in digital environments

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am able to generate and combine search terms (keywords) to satisfy the requirements of a particular research task.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to efficiently browse one or more resources to locate pertinent information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to decide what types of resources might yield the most useful information for a particular need.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10/10/2021

## Evaluate

18. Evaluate: Judging the degree to which digital information satisfies the needs of an information problem, including determining authority, bias, and timeliness of materials

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am able to judge the relative usefulness of provided Web pages and online journal articles.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to evaluate whether a database contains appropriately current and pertinent information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to decide the extent to which a collection of resources sufficiently covers a research area.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10/10/2021

## Manage

### 19. Manage: Using digital tools to apply an existing organizational or classification scheme for information

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am able to categorize emails into appropriate folders based on a critical view of the emails' contents.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to arrange personnel information into an organizational chart.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to sort files, emails, or data to clarify clusters of related information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10/10/2021

## Integrate

20. Integrate: Interpreting and representing information, such as by using digital tools to synthesize, summarize, compare, and contrast information from multiple sources

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I know how to compare advertisements, emails, or websites from competing vendors by summarizing information into a table.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know how to summarize and synthesize information from a variety of sources according to specific criteria in order to compare information and make a decision.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be able to re-represent results from an academic or sports tournament into a spreadsheet to clarify standings and decide the need for playoffs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10/10/2021

## Create

### 21. Create: Adapting, applying, designing, or constructing information in digital environments

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I am able to edit and format a document according to a set of editorial specifications.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to create a presentation slide to support a position on a controversial topic.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to create a data display to clarify the relationship between academic and economic variables.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10/10/2021

## Communicate

### 22. Communicate: Disseminating information relevant to a particular audience in an effective digital format

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I know how to format a document to make it more useful to a particular group.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to transform an email into a presentation to meet an audience's needs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know how to select and organize slides for distinct presentations to different audiences.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to design a flyer to advertise to a distinct group of users.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10/10/2021



## Interview Participation

Would you be interested in participating in a focus group for the purpose of learning more about students' ICT skills and determining what students think should be included in an ICT program for first-year students? If you participate in the focus group, you can choose to be entered in a drawing for a gift card. If you are interested in participating, please provide your email address below.

23. Email address

---

This content is neither created nor endorsed by Microsoft. The data you submit will be sent to the form owner.

 Microsoft Forms

10/10/2021

APPENDIX D

INFORMATION AND COMMUNICATION TECHNOLOGY FACULTY SURVEY

EMAIL

All faculty at Saint Augustine's University are invited to participate in a survey to determine how faculty integrate information and communication technology literacy into their curriculum and to help decide what should be included in an Information and Communication Technology program within the First Year Experience Program. Participants must be 18 or older and enrolled in the First Year Experience program at Saint Augustine's University.

Your participation is strictly voluntary. The survey should take approximately 11 minutes to complete. The survey will ask questions about information and communication technology literacy skills integration and programming at Saint Augustine's University.

Your submission of this survey indicates your consent to participate in this study. Your responses will be anonymous. You may terminate your participation at any time during the survey. You can elect at the end of the survey to share your email address to be entered to win a gift card.

If you have questions or concerns about this study, you can contact the researcher directly:

Krystin McCauley

krystinm@email.sc.edu

919-824-8434

APPENDIX E

INFORMATION COMMUNICATION TECHNOLOGY LITERACY FACULTY

SURVEY

## Information Communication Technology Literacy Faculty Survey

This survey should take approximately 11 minutes to complete.

Definition: Information Communication Technology (ICT) Literacy involves the use of digital technology, communications tools, and/or networks for the purpose of defining a need for information, accessing information via technology, evaluating online information, managing digital information, integrating information from varied digital sources, creating information, and communicating information through technology (Katz et al., 2004; Katz, 2007).

The goal of the survey: To evaluate how ICT/digital skills are being utilized and integrated into the classrooms at Saint Augustine's University (SAU).

Instructions: Please use the above definition when answering the questions below.

\* Required

### Demographic Questions

Please answer the following demographic questions.

#### 1. Gender \*

☐ Male

☐ Female

☐ Non-binary

☐ Prefer not to say

☐

Other

10/9/2021

2. Race (Select all that apply) \*

- ☐ African American/Black
- ☐ Caucasian/White
- ☐ Hispanic
- ☐ Latino
- ☐ Native American
- ☐ Asian
- ☐ Other
- ☐ Prefer not to answer

3. What academic department(s) do you work in? \*

4. Are you a full-time faculty member? \*

- ☐ Yes
- ☐ No

5. Are you a part-time faculty member? \*

- ☐ Yes
- ☐ No

10/9/2021

6. Do you teach first-year students? \*

☐ Yes

☐ No

10/9/2021

## Information Communication Technology Training and Background

The following questions are regarding ICT faculty training and background.

7. Did you receive Information Communication Technology Literacy or Digital Literacy instruction before working at Saint Augustine's University?

- ☐ Yes
- ☐ No
- ☐ N/A

8. Have you received Information Communication Technology Literacy or Digital Literacy instruction while working at Saint Augustine's University?

- ☐ Yes
- ☐ No
- ☐ N/A

9. Did you receive Information Communication Technology Literacy or Digital Literacy training before teaching at Saint Augustine's University?

- ☐ Yes
- ☐ No
- ☐ N/A

10. Have you received Information Communication Technology Literacy or Digital Literacy training while teaching at Saint Augustine's University?

- ☐ Yes
- ☐ No
- ☐ N/A

10/9/2021

11. Use a rating scale of 1-5 with 1 being the lowest and 5 being the highest in answering this question.

	1	2	3	4	5
How would you rate your Information Communication Technology Literacy skills?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

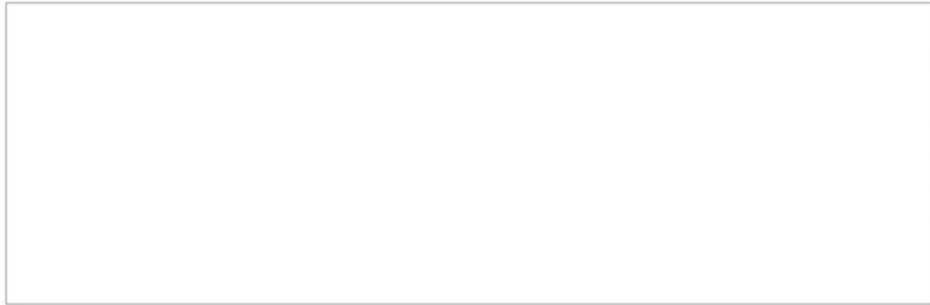
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## ICT Self-analysis

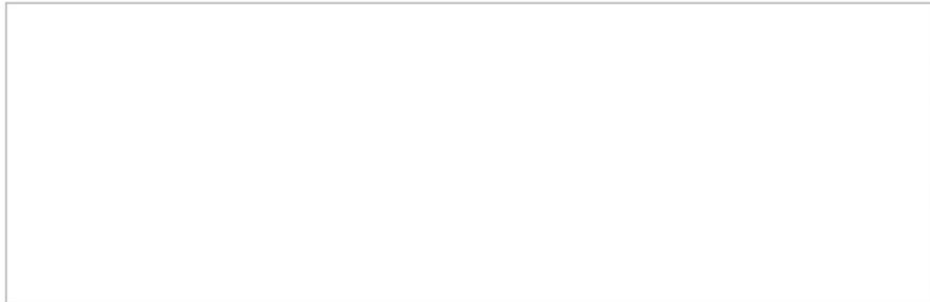
Definition: Information Communication Technology (ICT) Literacy involves the use of digital technology, communications tools, and/or networks for the purpose of defining a need for information, accessing information via technology, evaluating online information, managing digital information, integrating information from varied digital sources, creating information, and communicating information through technology (Katz et al., 2004; Katz, 2007).

Please answer the following list of questions using your own words:

12. How do you define Information Communication Technology? \*



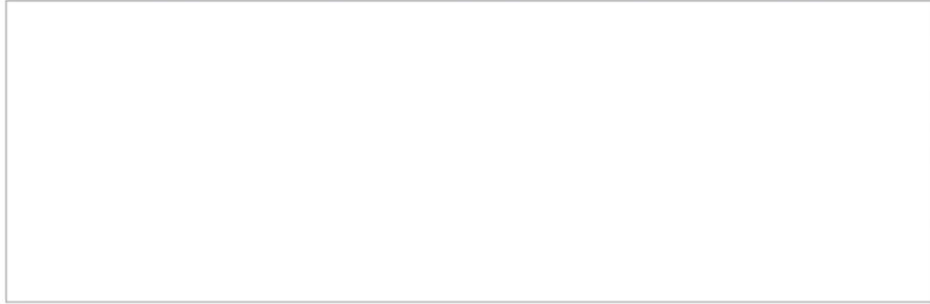
13. What is your understanding of ICT? \*



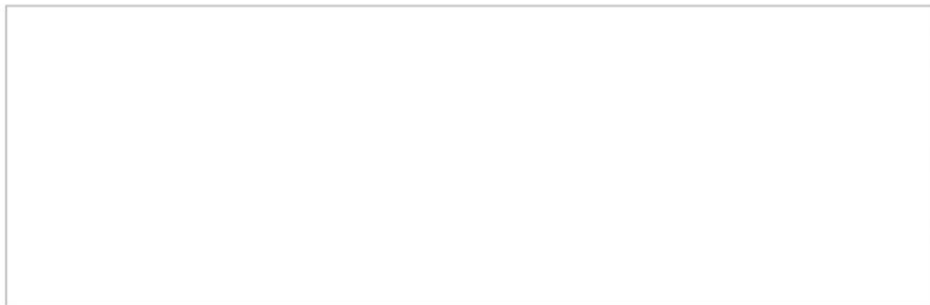
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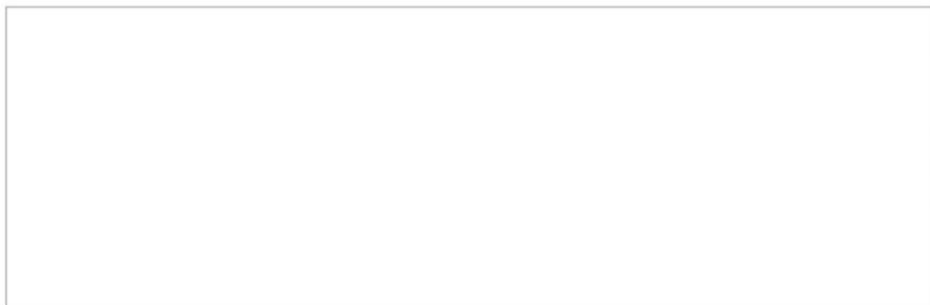
14. What is your perception of ICT skills usage within your courses? \*

A large, empty rectangular box with a thin black border, intended for the respondent to provide their perception of ICT skills usage within their courses.

15. How do you integrate ICT skills in your courses? \*

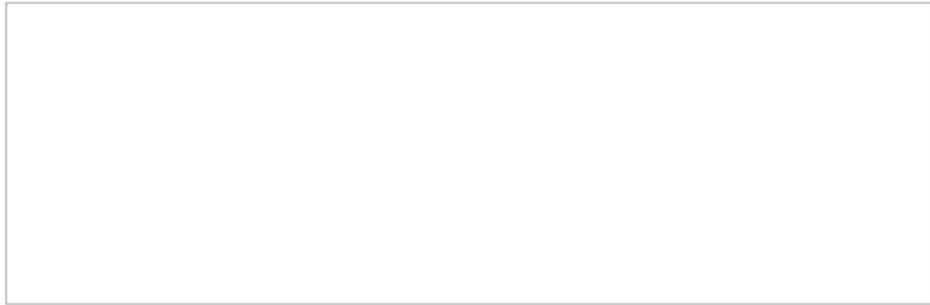
A large, empty rectangular box with a thin black border, intended for the respondent to describe how they integrate ICT skills in their courses.

16. What do you think would be the easiest way to learn ICT skills? \*

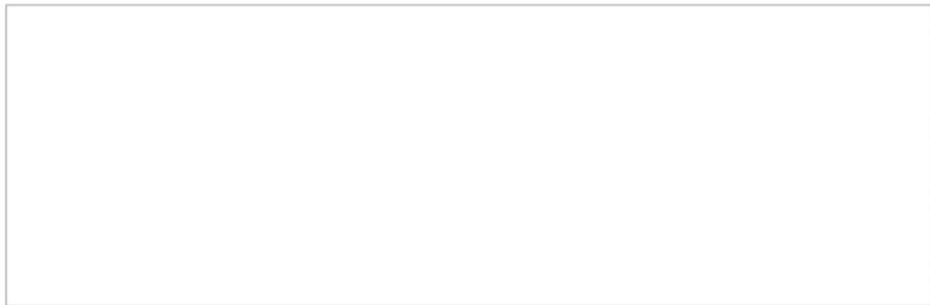
A large, empty rectangular box with a thin black border, intended for the respondent to suggest the easiest way to learn ICT skills.

10/9/2021

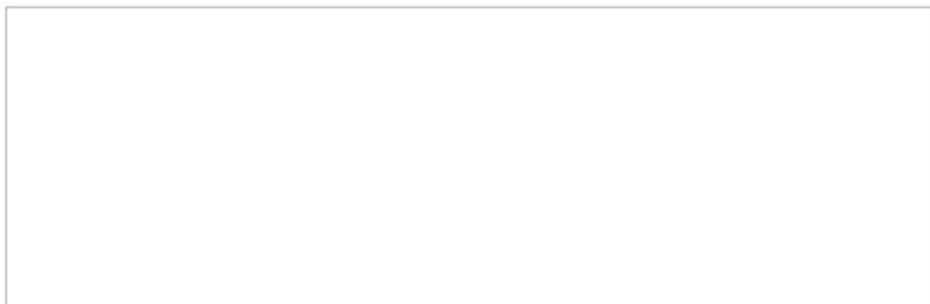
17. What are the most important ICT skills that students need to be successful in college?  
\*

A large, empty rectangular box with a thin black border, intended for the respondent to write their answer to question 17.

18. What ICT skills do you think students need to be successful upon graduation? \*

A large, empty rectangular box with a thin black border, intended for the respondent to write their answer to question 18.

19. What would you like to see included in an ICT professional development program intended for students at Saint Augustine's University? \*

A large, empty rectangular box with a thin black border, intended for the respondent to write their answer to question 19.

10/9/2021

## ICT in the Classroom

Definition: Information Communication Technology (ICT) Literacy involves the use of digital technology, communications tools, and/or networks for the purpose of defining a need for information, accessing information via technology, evaluating online information, managing digital information, integrating information from varied digital sources, creating information, and communicating information through technology (Katz et al., 2004; Katz, 2007).

Note: All the items are measured on a 5-point Likert scale (1: strongly disagree to 5: strongly agree). Please answer the following questions.

20. Answer the following questions regarding what occurs in your class.

Define: Using digital tools to identify and represent an information need

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
My students can develop a research topic to fit a particular information need.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students know how to ask questions to clarify the information need.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students are able to ask questions of a "professor" that help clarify a vague research assignment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students know how to conduct effective preliminary information searches to help frame a research statement.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10/9/2021

## Access

### 21. Access: Collecting and/or retrieving information in digital environments

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
My students are able to generate and combine search terms (keywords) to satisfy the requirements of a particular research task.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students are able to efficiently browse one or more resources to locate pertinent information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students are able to decide what types of resources might yield the most useful information for a particular need.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10/9/2021

## Evaluate

22. Evaluate: Judging the degree to which digital information satisfies the needs of an information problem, including determining authority, bias, and timeliness of materials

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
My students are able to judge the relative usefulness of provided Web pages and online journal articles.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students are able to evaluate whether a database contains appropriately current and pertinent information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students are able to decide the extent to which a collection of resources sufficiently covers a research area.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10/9/2021

## Manage

### 23. Manage: Using digital tools to apply an existing organizational or classification scheme for information

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
My students are able to categorize emails into appropriate folders based on a critical view of the emails' contents.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students are able to arrange personnel information into an organizational chart.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students are able to sort files, emails, or data to clarify clusters of related information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10/9/2021

## Integrate

24. Integrate: Interpreting and representing information, such as by using digital tools to synthesize, summarize, compare, and contrast information from multiple sources

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
My students know how to compare advertisements, emails, or websites from competing vendors by summarizing information into a table.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students know how to summarize and synthesize information from a variety of sources according to specific criteria in order to compare information and make a decision.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students are able to re-represent results from an academic or sports tournament into a spreadsheet to clarify standings and decide the need for playoffs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10/9/2021

## Create

### 25. Create: Adapting, applying, designing, or constructing information in digital environments

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
My students are able to edit and format a document according to a set of editorial specifications.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students are able to create a presentation slide to support a position on a controversial topic.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students are able to create a data display to clarify the relationship between academic and economic variables.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10/9/2021



## Communicate

### 26. Communicate: Disseminating information relevant to a particular audience in an effective digital format

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
My students know how to format a document to make it more useful to a particular group.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students are able to transform an email into a presentation to meet an audience's needs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students know how to select and organize slides for distinct presentations to different audiences.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My students are able to design a flyer to advertise to a distinct group of users.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10/9/2021

## Interview Participation

Would you be interested in participating in an interview for the purpose of learning more about faculty members' ICT skills integration and determining what faculty members think should be included in an ICT program for first-year students? If you participate in the focus group, you can choose to be entered in a drawing for a gift card. If you are interested in participating, please provide your information below.

27. First Name

28. Last Name

29. Email address

30. Phone number

31. Preferred method of contact for scheduling

- ☐ Phone call
- ☐ Email
- ☐ Text message

10/9/2021

APPENDIX F

INFORMATION COMMUNICATION TECHNOLOGY LITERACY STUDENT  
FOCUS GROUP PROTOCOL

Opening

Researcher: Hello and thank you for attending today's focus group. You all are here to talk about information and communication technology literacy skills. Today's group consists of X students. To begin, thank you for your consent. You shared that you are willing to participate in the study and that you acknowledge you can leave at any time. For today's participation, you will receive an Amazon gift card. Please note that this session will be recorded, but no identifying information will be revealed in the study. If you have any questions at any time, please do not hesitate to ask.

This is a safe space where all thoughts and opinions are valued. Please be respectful of your fellow participants.

Interviewee Background Questions

To warm-up, let's go around the room and share the following: your major, year, and where you're from.

Thank you for sharing.

I'll remind you of the definition of ICT literacy.

ICT Literacy: ICT literacy involves the use of digital technology, communications tools, and/or networks for the purpose of defining a need for information, accessing

information via technology, evaluating online information, managing digital information, integrating information from varied digital sources, creating information, and communicating information through technology

### Questions

Let's go ahead and begin with the questions. Let's first talk about high school.

1. Did you use ICT skills in high school?
2. Did you take a basic computer class in high school?
3. Did you have access to a computer and internet at home?
  - a. Do you have access to both now?
  - b. Do you use a computer often?

How has your race impacted your ability to gain ICT skills? Has your race been helpful or harmful?

Okay, let's talk more about ICT.

1. Rank in order, with 1 being your strongest, your ICT literacy skills.
2. Defining a need for information
3. Accessing information via technology
4. Evaluating online information
5. Managing digital information
6. Integrating information from varied digital sources
7. Creating information
8. Communicating information through technology
9. Share the order from strongest to least.

4. Why do you think \_\_\_\_\_ is your strongest and \_\_\_\_\_ is your least?
5. What is your understanding of ICT?
6. Do you know how to research a topic?
7. How would you rate your ICT skills on a scale from 1-10 with 10 being the strongest?
  - a. Why did you rate yourself in that way?
  - b. Are you satisfied with your skills and self-reported rating? Why or why not?
8. What is one thing that you wish you knew how to do using ICT skills?

We're trying to develop an ICT program to improve student ICT skills.

We'd really like your input for this.
9. What are the most important ICT skills that you need for college?
10. What ICT skills do you think that you may need after graduation?
11. What would you like to see included in an ICT program?
12. What do you think would be the easiest way to learn ICT skills?

### Closing

That is all of the questions that I have prepared for you all today. Is there anything else that you all would like to share?

Thank you for your time today. I really appreciate it.

APPENDIX G

INFORMATION COMMUNICATION TECHNOLOGY LITERACY FACULTY

INTERVIEW PROTOCOL

Opening

Researcher: Hello and thank you for attending today's interview. You all are here to talk about information and communication technology literacy skills. Thank you for your consent to participate. For today's participation, you will receive an Amazon gift card. Please note that this session will be recorded, but no identifying information will be revealed in the study. If you have any questions at any time, please do not hesitate to ask. This is a safe space where all thoughts and opinions are valued.

Interviewee Background Questions

To warm-up, please share the following: department and number of years working in higher education.

Thank you for sharing.

Question

Let's go ahead and begin with the questions. Let's first talk about ICT literacy skill integration.

1. As a faculty member, do you think it is important to integrate technology into your courses for first-year students?
2. How do you integrate ICT skills in your courses for first-year students?

3. Do you think it is important for faculty to use ICT tools with first-year students?
  - a. Please explain why or why not.
  - b. Does the same apply after the first year?
4. What tools do you use to integrate ICT skills into the classroom?

Okay, let's talk more about ICT.

You were provided this definition of ICT literacy: ICT Literacy: ICT literacy involves the use of digital technology, communications tools, and/or networks for the purpose of defining a need for information, accessing information via technology, evaluating online information, managing digital information, integrating information from varied digital sources, creating information, and communicating information through technology (Katz et al., 2004; Katz, 2007). Rank in order, with 1 being most important, the ICT literacy skills needed for students.

Defining a need for information

Accessing information via technology

Evaluating online information

Managing digital information

Integrating information from varied digital sources

Creating information

Communicating information through technology

3. Share the order from most important to least important.
4. Why do you think \_\_\_\_\_ is the most important and \_\_\_\_\_ is the least?

We're trying to develop an ICT program to improve student ICT skills. We'd really like your input for this.

1. Do you think it is important for first-year students to possess ICT skills?
2. Do you think lack of ICT skills for first-year students will impact academic success?
3. What ICT skills do you think first-year students need to be successful in school?
4. What ICT skills do you think first-year students need to be successful upon graduation?
5. What do you think should be included in a ICT program for first-year students?
6. What do you think would be the best way for students to learn the ICT skills?
7. Now, I'll ask about race. How does race impact students' ability to learn ICT skills? Does it help or harm?

### Closing

That is all of the questions that I have prepared for you all today. Is there anything else that you all would like to share?

Thank you for your time today. I really appreciate it.