

Examining the Effectiveness of Chatbots for Transfer Students in Higher Education

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University of Pittsburgh, 2020

This study examines the effectiveness of implementing a chatbot solution to supplement existing student support or service models on campus, specifically for transfer students. Chatbots, an artificial intelligence solution meant to mimic human conversation and personality, have been viewed as a viable option for supporting transfer students throughout their journey in higher education. With the influx of first-generation students, non-traditional students, and transfer students, institutions want to ensure that they have tailored solutions to meet the needs of all populations. Chatbots may be a potential solution.

This study begins more broadly with contextual evidence that demonstrates that low student satisfaction among other factors can lead to not enrolling in or graduating from a college or university, highlighting more specifically transfer students as a vulnerable population. To address this problem, this study explores the potential of innovative, web-based solutions, such as a chatbot, for assisting institutions in providing timely answers to transfer students navigating the college process. The hypothesis is that the chatbot solution will lead to higher student satisfaction for transfer students.

To determine the merit of this hypothesis, the study evaluates the use of a chatbot on the website of a large, public community college that has a strong focus on transferring students to four-year, bachelor-degree granting institutions. This evaluation uses the college's chatbot preliminary launch utilization data and student survey responses to determine the overall impact

on student satisfaction. Based on the observations and results of this evaluation, this study will conclude with findings and recommendations for future work with chatbots as a tool for transfer student success.

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Preface

This dissertation is dedicated to my amazing daughter, Xaya Prioleau. Because of you, I completed this program to show you that you can do anything you set your mind to. Now you have big shoes to fill and I cannot wait to see what you accomplish. None of this would have been possible without my loving partner, Xin Prioleau, who put Xaya to bed (and made sure she stayed in bed) every night while I researched and typed the night away. You are the real co-recipient of this degree for every page you proofread and every second you heard me talk about my research. I love you and Xaya more than anything in this world.

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1.0 Introduction

In a time of post-high school senior enrollment decline in higher education across the United States, transfer students are now viewed as a mechanism to supplement an institution of higher education's (IHE) revenue by replacing students who may leave after their freshman or sophomore year. Transfer students represent 38% of the total higher education population (National Student Clearinghouse, 2019). In addition to saving enrollment, institutions are aware that this non-traditional population often brings additional diversity in terms of first-generation students, a range of socioeconomic status, and a variety of race and ethnicities. Overall, recruiting and retaining transfer students should be a high priority for institutions seeking to grow enrollment. However, IHEs must be innovative about how to support transfer students and remain agile to the evolving needs that this population brings with it.

One innovation that is increasingly becoming more popular on IHE campuses is a chatbot. A chatbot is a computer program meant to mimic human conversation and personality, which can be used to answer the questions of a human participant (Kane, 2016). Students can use this tool to ask a variety of questions and get immediate answers at any hour of the day. The idea in theory is that a chatbot increases productivity, efficiency, and the potential for the IHE to scale enrollments without adding additional employees for student support. While vendors offer sound demonstrations and prototypes, in actuality only a few studies demonstrate the long-term potential of chatbots for improving student outcomes (Winkler & Söllner, 2018). Making long-term decisions or predictions of success is difficult with limited evidence.

The goal of this study is to provide more evidence on the effectiveness of chatbots in supporting transfer students in higher education through student satisfaction.

This chapter will provide context, a clear statement of the problem of practice, the significance of this study, and the inquiry questions that will guide the examination.

1.1 Background and Context

The first official community college opened in 1901 in Joliet, Illinois, but the work to create a two-year post-secondary curriculum began fifty years prior (Dougherty, 1994). In the 19th century, colleges and universities were very selective and elitist. However, with increasing numbers of students graduating from high school, the people called for greater access to colleges and universities (Handel, 2013). In 1852, Henry Tappan, president of the University of Michigan, offered a plan that would require students to complete specific general education requirements in a separate college before being admitted to the senior institution - modeled similarly after German universities (Handel, 2013). Students who completed this curriculum would then be admitted to the university (Handel, 2013). The first community college movement was built on the premise that students who meet a certain criterion will be able to move to the next level, establishing the first transfer pathway. Decades later, community colleges established articulation agreements with more than one senior institution to guarantee certain courses would transfer. Despite these articulation agreements, the transfer process has not been straightforward for students because of the frequent course catalog changes, evolving general education requirements, and other miscommunications that often require human interaction (Smith, 2017). In order to transfer,

students often require the assistance of an admission representative or advisor. Current estimates indicate that at least fifty to seventy-five percent of community college students indicate transfer as their primary educational goal, but in actuality only 1 in 4 successfully transition (Handel, 2013).

Many decades passed before technological solutions were in place to assist these students outside of direct interactions with a staff member. These technological advancements were not originally designed specifically for higher education or for the student experience, but were tools created from research by computer scientists. The first documented artificial intelligence (AI) tool acting as a chatbot was ELIZA created in 1966 by Joseph Weizenbour. ELIZA focused on pattern matching and user responses to pre-written scripts (Kane, 2016). In present day, chatbots have actual jobs as customer service agents, virtual assistants, and as a searchable database for frequently asked questions (Kane, 2016). When chatbots began filling a professional need that would typically be filled by humans is where the overlap between artificial intelligence and education begins.

1.2 Statement of Problem

Student satisfaction is a key performance indicator for other student success metrics such as retention and graduation. With increasing enrollment and focus on transfer students, the problem is that IHEs are under-resourced and unable to respond to specific transfer-related questions in a timely manner. This can negatively impact a student's overall satisfaction and ultimately their success. Additionally, a combination of declining enrollment and costly technologies with limited efficacy is causing a wave of innovation skepticism in higher education. Faculty and staff want to

know do these investments directly improve student satisfaction, which could lead to other positive outcomes?

The use of technology in higher education can be costly. For example, institutions of higher education in the United States spend \$36 billion dollars on education technology, which is approximately \$256 per student per year (Johnson, 2012). As institutions invest in new initiatives, community stakeholders expect a return on that investment as it relates to enrollment and impact on student success outcomes. While this study identifies the impact on student satisfaction, there are other examples of where technology helps improve other student success and institutional performance metrics. For example, some institutions have implemented communication and artificial intelligence tools that mimic everyday human conversation to solve a very specific challenge known as “summer melt”. Summer melt students are defined as individuals who have paid a deposit to attend one college or university instead matriculate at a different institution, causing a concern for institutions trying to predict their fall enrollment (Castleman & Page, 2013). Institutions are investing in solutions to mitigate this issue as much as possible. Specifically, the cost of a chatbot through AdmitHub implemented at Georgia State University (GSU) ranges between \$7-\$15 per student per year in addition to per student costs associated with staff involvement (Page & Gehlbach, 2017). These costs were less than the prior summer melt interventions involving individual counselor outreach without AI, which ranged from \$100-\$200 per student (Castleman, Page, & Schooley, 2014). Prior to this AI tool, counselors would be responsible for reaching out to each student individually to prevent student melt (Castleman & Page, 2015). Such an effort is costlier and taxing on staff’s time, taking resources away from students with more complicated needs. A cost of \$15 per student served translates into GSU spending approximately \$53,000 on the chatbot technology annually to mitigate summer melt

(Page & Gehlbach, 2017). If strategically invested and implemented, this cost could be easily mitigated by the increase in tuition revenue seen by an increase in transfer students enrolling as a result of success from chatbot support (Page & Gehlbach, 2017). While this study will not specifically look at summer melt, the chatbot outlined in Page and Gehlbach's (2017) work may also have other translatable benefits on different types of students such as transfer students as well as other student success metrics such as overall satisfaction.

Transfer students are particularly vulnerable in post-secondary education settings. Nationwide, approximately only forty-two percent of community college students earned a credential or degree within six years of enrolling into their first course (National Student Clearinghouse, 2017). In Virginia, for example, the Operations and Performance of the Virginia Community College System (VCCS) Report to the Governor and General Assembly of Virginia (2017) highlighted that according to the Joint Legislative Audit and Review Commission's (JLARC) analysis, only thirty-nine percent of community college students earned a community college credential or college bachelor's degree within seven years of their initial enrollment in community college (Joint Legislative Audit and Review Commission JLARC, 2017). Furthermore, just fifteen percent of the overall cohort transferred to a four-year institution and earned a bachelor's degree within seven years (JLARC, 2017). These rates are alarmingly low for students who may be going into debt with little return. Summer melt affects an estimated 10%-20% of college-intending students each year, with higher rates among low-income and first-generation college students (Castleman & Page, 2014). The number of transfer students lost each year is even higher (Cohen & Sanchez, 1997). Chatbots may have transferrable benefits from the first-time, full-time college-intending students to assisting transfer students as well.

In general, faculty and staff at IHEs are aware that their institutions invest heavily in technological support but they are always aware of the academic and retention issues their students face. It is not clear whether faculty and staff see technological innovation as a solution to supporting students. According to the insights from a survey of college and university Deans designed to capture *The State of Innovation in Higher Education (2017)*, only 67% describe their institutions as fostering academic innovation, 65% believe their campuses will be different in a decade, and less at 56% say the pace of change on their campuses is about right. This same study also highlights 46% of Deans believe higher education is headed in the wrong direction (*The State of Innovation in Higher Education, 2017*). These percentages are unfortunately not very high, showing that a large population of people on campus have doubts about the innovation projects happening at these IHEs. It can be difficult to implement a student-centered solution such as a chatbot in this type of environment, especially with limited efficacy results.

The major problem in this study is that given the complexity of the transfer student experience, it is not uncommon for these students not to transfer to a four-year institution at all. This study will explore if chatbots are a solution to this problem by answering timely questions for students attempting to transfer; however, cost, faculty/staff attitude, and overall impact on student satisfaction and other outcomes are all challenges at play to solving this problem. This study aims to ease some of those concerns by involving faculty and staff in the process and demonstrating positive impact on student satisfaction.

1.3 Purpose and Significance of Study

The purpose of this study is to demonstrate that chatbots can assist with the transfer student satisfaction and other future success outcomes. Approximately, only one out of ten institutions uses a chatbot to assist students (AACRAO, 2018), yet across higher education, emails have less than an 18% open rate and young adults almost never pick up the phone (AdmitHub, 2018). In comparison, text messages have a 98% open rate, and a typical 45% response rate (AdmitHub, 2018). The potential significance is that implementing a chatbot to mimic this texting behavior can have a positive impact on the transfer student's educational experience, satisfaction, and ultimately other success metrics at the institution. Results from a randomized control trial on Georgia State University's chatbot, conducted by researchers at UC Santa Barbara and the University of Pittsburgh, demonstrated a 3.3% increase in enrollment and a 21.4% reduction in summer melt (Page & Gehlbach, 2017). This increase in enrollment could lead to quality career attainment for students and more funding for the institution to reinvest in new initiatives.

Another potential benefit, in addition to saving enrollment and the student experience, is that transfer students are often non-traditional which brings additional diversity in terms of adult learners, first generation, socioeconomic status, and race/ethnicity (Shapiro et al., 2017). Last, the findings of this study will assist with evolving current transfer student practices and encourage institutions to think innovatively in order to promote higher educational attainment for postsecondary students.

1.4 Definitions and Terms

For the purpose of this study, I used the following terms and definitions:

Chatbot - A chatbot is a computer program meant to mimic human conversation and personality, and it can be used to answer the questions of a human participant (Kane, 2016).

Innovation - An invention and implementation of a management practice, process, structure, or technique that is new to the state of the art and is intended to further organizational goals (Birkinshaw, Hamel, & Mol, 2008, p. 825).

Return-on-investment (ROI) - An indication of how much economic benefit is derived from an investment in relation to its costs (Blagg & Blom, 2018). In higher education, this takes the form of improved student success outcomes including higher enrollment and degree completion, satisfaction, grants, diversity, human resources, and more.

Student Support or Service - Refers to frontline facing staff. This study will focus on admissions, financial aid, and advising.

Student Success Outcomes - This term will be used inclusively for all key performance metrics focused on student success such as enrollment, degree completion, persistence, retention, and satisfaction.

Transfer Student - For this study, transfer is defined as a student who transitions from a two-year institution to a four-year institution with or without first receiving an award (either a certificate or associate degree) (Shapiro et al., 2017).

1.5 Inquiry Questions

The following inquiry questions will guide this study to determine if chatbots are a viable solution to support transfer students. The goal of this dissertation is to answer the following questions in order to provide insights and recommendations from this research:

1. How can institutions improve transfer student satisfaction using chatbots?
2. What additional evidence exists within the utilization data to prove the chatbot's effectiveness for community college students interested in transferring to a bachelor degree-seeking institution?

Before addressing these questions, this study will review the relevant literature regarding the history of innovation in higher education, transfer student enrollment challenges, and chatbot applications.

2.0 Literature Review

Recruitment, retention, and graduation are at the center of many conversations in the United States' higher education system. As a result of reviewing these key metrics annually to evaluate institutional and student success, institutions have begun to strategically invest in innovative initiatives that would help to improve student success at every point in their post-secondary journey. Historically, students with questions had to rely on direct interactions with a university staff or faculty member.

2.1 Overview of Enrollment Management

Enrollment management and student success divisions across the country have begun a holistic evaluation and planning process to focus on how to provide quality service from recruitment to graduation. The overall process is known as enrollment management. Bolman and Deal (1991) described enrollment management as a structural framework which can be simultaneously considered as an organizational structure, a set of processes, and policies. Additionally, Bontrager (2008) has defined enrollment management more strategically as a coordinated set of concepts and processes that enables fulfillment of institutional mission and students' educational goals (p. 18). Enrollment management is intended to be a campus and institutional-wide effort that may include (but is not limited to) departmental units such as admissions, financial aid, student affairs, and the registrar office. As institutions attempt to master

the art of enrollment management theory and application, there is a critical, fundamental piece of the puzzle: student-customer service. In connection with enrollment management, Bontrager (2004) was another practitioner to acknowledge the importance of customer service for students. It is advantageous for institutions to focus on providing the highest level of quality service in the shortest period of time (in terms of efficient processes) (Bontrager, 2004, p.13). This adds to the level of importance that should be placed on customer service in enrollment management, but currently very few institutions are incorporating that into their campuses.

Although the concept of enrollment management has been around for a handful of decades, this area has only continued to become of more importance as time progresses. For example, almost one in two students (about fifty-nine percent) who began seeking a bachelor's degree at a four year institution in fall 2007 completed that degree within six years (NCES, 2015). Americans owed nearly \$1.2 trillion in student loan debt as of March 2015, more than three times the amount of debt from just a decade ago (Kelchen, 2015). This trend is most likely due to rising tuition prices with many more students, especially those that drop out or do not earn a degree, are struggling to repay their loans, as evidenced by high rates of default, delinquency and forbearance due to economic hardships (Kelchen, 2015). Because of these outrageous figures, public institutions are increasingly being held more accountable to address low graduation rates by their state legislatures, yet both public and private institutions feel pressure from regional accrediting associations to improve retention (DeAngelo et al., 2011). In an era where institutions are also being held more accountable on the state and federal level, this is causing several of them to reevaluate how they are serving students and implement potential fixes. This has included technology purchases, additional staff, organization restructuring, and more. While money is being invested to improve the overall outcomes for the college and universities, one cannot ignore the

impact on how students are treated in student-facing offices around the campus and the potential areas for opportunity.

2.2 Transfer Student History and Challenges

As mentioned in Chapter I, collecting transfer student data is relatively new and national success rates are even more underwhelming than traditional first-time bachelor degree-seeking students. While transfer students make up thirty-eight percent of all students enrolled in higher education, nationwide approximately forty-two percent of community college students earned a credential or degree within six years (National Student Clearinghouse, 2017). This section will analyze the literature to understand how these challenges exist.

Also captured in Chapter I, it was briefly mentioned that Henry Tappan, president of the University of Michigan, is credited with the first transfer pathway idea by offering a plan that would require students to complete specific general education requirements in a separate college before being admitted to the senior institution. This was never implemented; however, several decades later, the University of Chicago's president, William Rainey Harper, created two divisions at his institution: the junior college and the senior college (Handel, 2013). They were the first to award an associate degree to students who completed their lower division requirements and left the institution (Brint & Karabel, 1989, p. 25). Students who completed the two year program were offered admission to the University of Chicago, and soon expanded to The University of Illinois and Northwestern (Witt et al., 1995, p. 21). Once the program became more popular, separate facilities were built as a result of a bond passage and the first junior college was established

(Handel, 2013). More institutions began to catch on and develop their own junior college models in their respective states.

Following World War II, continued to push junior colleges toward a greater mission (Handel, 2013). In 1948, President Truman convened a committee to review American higher education known as “The Truman Report” and as a result, the commission proposed that the name of these institutions be changed from junior college to “community college” to better represent the expansion of mission and curricula focused on fulfilling local needs and to serve citizens of every age, race, and social class (Witt et al., 1995, p. 131). While community college became more meaningful, students never lost sight of transitioning to a four year institution.

The earliest transfer evaluation studies that were completed by Dr. Leland Medsker from 1930-1960 indicate that anywhere from 25-35% of community college students successfully transfer to a four-year institution (Beach, 2011; Medsker, 1960). Today, approximately 50-75% of community college entrants indicate transfer as their educational objective (Handel, 2013). The number of community college students who transfer is small compared to the number who indicate a desire to earn a four-year degree (Dowd, Cheslock, & Melguizo, 2008). While transfer rate definitions vary widely, most experts believe about one in four community college students actually transfer (Wassmer, Moore, & Shulock, 2004). One of the major stumbling blocks for transfer students, especially those going from a community college to a four-year institution, is finding out in an understandable and timely manner whether the course they already took will be accepted as credit not only toward graduation but also toward their chosen major (The National Association for College Admission Counseling, 2017). Despite thousands of articulation agreements now in place across the country, on average transfer students lose 37% of their credits meaning it cannot be applied towards earning a bachelor’s degree. Not to mention, many transfer

and community college students do not qualify for the same scholarships that are given to first-time bachelor degree-seeking students.

To address this issue, universities are strengthening articulation agreements and partnerships with community colleges that align credits for a specific academic program or degree. Institutions are also offering time with transfer advisors to ensure a seamless transition, but this can be difficult to scale. Many institutions have invested in software to help students better figure out online how their credits will transfer in order to scale, but also to provide quality, personalized, and timely support.

2.3 Customer Service in Higher Education

In analyzing the term “customer service”, it is hard to ignore that the word “custom” is included. While many industry-based customer service models may not be a good fit for higher education, administrators and staff could look to build a custom customer service model for their students. The theory is that as a result of intentionally integrating a customized student-customer service into institutional enrollment management frameworks, the existing frameworks will be strengthened and institutions will have an opportunity to identify student service areas of improvement. Anantharathan Parasuraman, Valerie Zeithaml, and Leonard Berry (1985) conducted research with focus groups to build their theoretical framework of customer service in corporate environments (not related to education). They found that there were 10 key categories that people internally assess their customer experience to be: Reliability, Responsiveness, Competence, Access, Courtesy, Communication, Credibility, Security, Understanding/Knowing

the Customer, and Tangibles (Parasuraman, Zeithaml, & Berry, 1985, p. 47). Although this study was conducted in 1985, their key findings are extremely relevant to this topic in terms of establishing the historical context around customer service best practices, and finding areas in enrollment management to incorporate and assess these 10 customer service categories. Studying well-known, current, successful models on customer service that integrate these principles will be critical in order to identify more current best practices in comparison to Parasuraman, Zeithaml, & Berry (1985) that can be translated in the higher education space.

This theoretical framework and incorporation of best practice examples from customer service models in the industry will combine lessons from Parasuraman, Zeithaml, and Berry (1985) and a number of other service practitioners mentioned in this paper into customizing a realistic model in higher education. This model will allow exploration into colleges and universities in order to incorporate customer service into enrollment management spaces, as well as how to assess it.

2.3.1 The Adoption of Customer Relationship Management Systems

Prior to customizing a student support and service model for higher education, it is important to understand more context as to how student relationships are currently managed on campus. Institutions across the United States are undergoing fundamental shifts in how they manage and interact with their “customers” or campus constituents: students, alumni, donors, faculty members, and staff members. Kotler and Fox (1995, as cited in Grant & Anderson, 2002) stated that “the best organization in the world will be ineffective if the focus on ‘customers’ is lost” (p. 23). Once higher education was aware that they were not exempt to this, many institutions

began restructuring and reengineering their processes to cut costs and become more efficient while responding to increased competition (Grant & Anderson, 2002). Restructuring certain processes, however, would not be sustainable in the same way if a technology could be implemented with the same purpose. As a result, many institutions turned to implementing Customer Relationship Management (CRM) systems to accomplish several goals such as day-to-day process automation and optimization in finance, development/advancement, student information, enrollment, facility/inventory management, and human resources (Grant & Anderson, 2002). From a customer relationship perspective, CRMs in higher education have specific modules for recruitment, marketing, communication management, service, and support tracking and management (Grant & Anderson, 2002). A CRM in higher education, Grant and Anderson (2002) noted is supposed to take a very student-centric view of the entire student life cycle, which means that an institution at any given point should have an idea of each individual student's unique status involving any interactions with and between the admissions, registration, financial aid, student accounts, and housing offices, for example.

In present day, The American Association of Collegiate Registrars and Admissions Officers (AACRAO) in 2015 found that sixty-four percent of institutions are using CRMs, and forty-two percent of those institutions who do not have a CRM are considering one. A majority of respondents (59%) indicated their perceived level of overall success with their CRM was "Moderately Successful," and 3% reported their use as "Not Successful" (AACRAO, 2015) (see Figure 1).

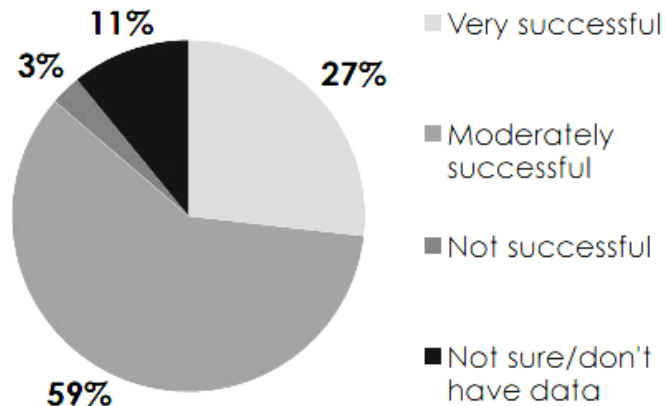


Figure 1 Overall Level of CRM Use Success

This signifies that the majority of CRM users on a college campus were able to transition into a more process-oriented mindset; however, when rating success, student feedback or noted benefits were not included. While CRMs have been implemented successfully across the country, still little focus has been placed on the service component of their customer relationship management. For example, while CRMs come from research on interpersonal relationships, this can become a piece of machinery that staff can hide behind, creating a barrier between the professionals and the student (Boyd, 2012). Though Bejou (2005) suggested adopting customer relationship management (CRM) as a way of establishing and maintaining the relationship between the student and the higher education institution, much more needs to be done to incorporate the service piece for the students. Bejou (2005) believed when CRM is applied to the institution's organizational structure, it could help administrators more effectively allocate funds or resources to enhance the school's recruitment, retention, progression, and enrollment management of students, but this alone will not keep the students satisfied with their campus experience.

2.3.2 Why Customer Service? A Review of Empirical Evidence and Conceptual Models

In addition to the alarming low graduation rates and national student debt statistics, there are other reasons as identified through the literature why institutions should consider implementing the service side of the customer relationship management model. Seeman and O'Hara (2006) considered that all institutions of higher education have a variety of stakeholders, and while each institution must work to satisfy them, the stakeholder with the most influence is the customer – the student. The typical college student makes several trips to campus before classes start. These include one visit prior to college selection, a registration visit and another visit to pay fees and purchase textbooks (Seeman & O'Hara, 2006). While telephone and web-based registration systems have alleviated some problems, students are still faced with numerous administrative tasks to be completed during their college careers (Seeman & O'Hara, 2006). These tasks are not as easy or straightforward as they seem. In many cases, they are complex, require additional research, involve several people, and expect a decision from the student. While CRMs appear to work magic behind the scenes on college campuses, students do not always see the reaped benefits of that implementation. Service is still needed and required in order to assist the students in their next steps.

Furthermore, through observations, higher education institutions appear comfortable considering students as customers through the recruitment process due to today's competitive market, but retention negatively impacted thereafter. Raisman's (2013) research from seven annual studies on institution attrition of 2,400 students showed that almost 50% of students nationwide leave a university due to the perception of the college not caring and/or poor service (p. 7). The four major reasons for departure account for eighty-four percent of the attrition rate:

1. College doesn't care, 2. Poor service and treatment, 3. Not worth it, and 4. Schedule (not being able to find courses that meet their needs) (Raisman, 2013, p. 7). While Raisman (2013) acknowledged that these students might transfer to another school ultimately, they still dropped out of the first school and took their tuition and fees with them for a reason (see Figure 2).

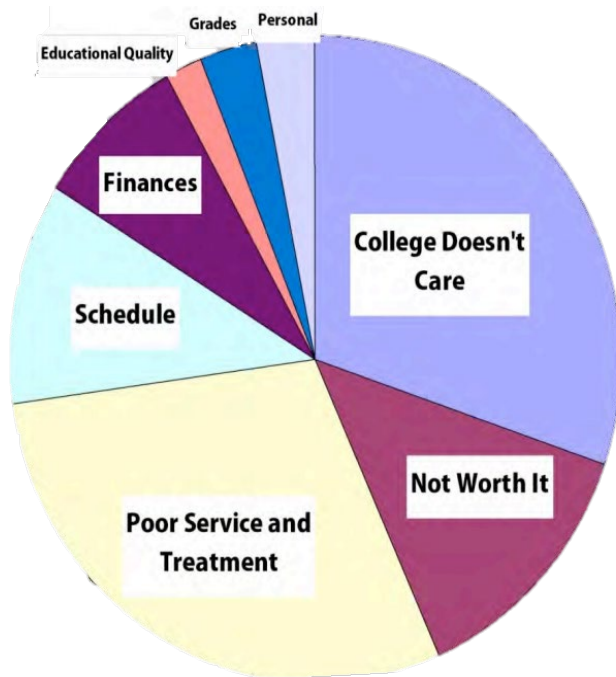


Figure 2 Reasons Why Students Leave Higher Education

These are all issues related to academic customer service that can impact institutions' ability to improve overall retention and increase revenue (Raisman, 2013). Based on Raisman's (2013) research, the participating institutions discovered that "they could improve their retention rates by up to seventy-six percent if they focus more on student needs and concepts of returns on investment. In fact, by addressing these issues successfully they could increase population by as much as eighty-four percent of the total number of drops. So, for instance, a school that is losing \$1 million a year from attrition could recoup up to \$840,000 by attending to the for academic

customer service issues” (p. 8). To answer the question around why customer service, Raisman’s (2013) empirical research shows an apparent need to end the perception that colleges do not care about their students. What better way to do that than through service?

Douglas, McClelland, and Davies (2007) looked at student satisfaction from an inside the classroom perspective in the United Kingdom. Their approach is translatable to outside the classroom in the higher education system in the United States. They surveyed 163 students and found that students faced issues with responsiveness, communication and access (Douglas et al., 2007). These concepts are some of the focus areas found in student support and service that will be expanded upon. They acknowledged that a limitation was that their sample size was smaller than they had hoped, which makes this a starting point (Douglas et al., 2007). Douglas et al. (2007) produced a conceptual model based on their results (see Figure 3).

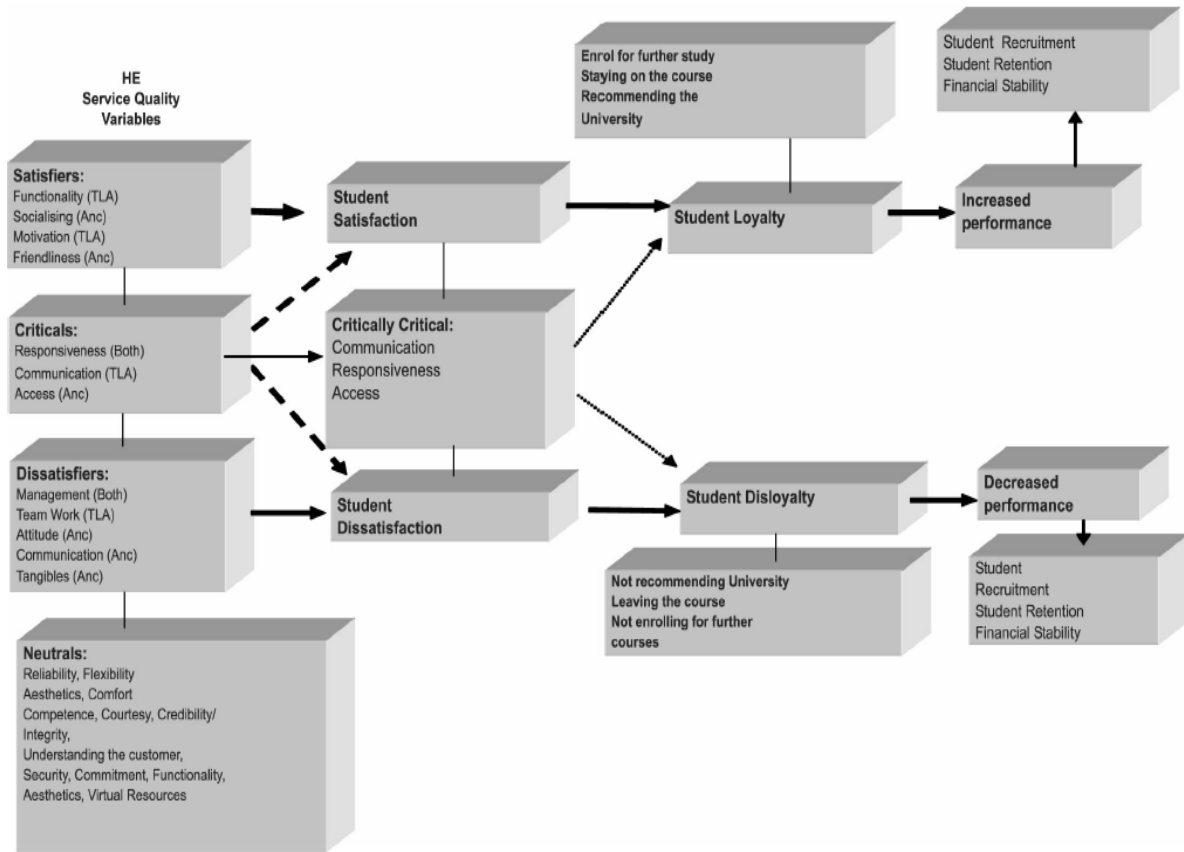


Figure 3 Conceptual Model Of Student Satisfaction with their Higher Education Experience

This conceptual model suggests that when students are satisfied they are more likely to be loyal, which increases performance in student recruitment, retention, and financial stability (Douglas et al., 2007). The opposite is shown for students that are dissatisfied. The performance areas that Douglas et al., (2007) discussed are responsibilities attached to the units mentioned previously. Therefore, the conclusion can be drawn based on Douglas et al.'s (2007) conceptual model that it is the responsibility of those units in charge of recruitment and retention to provide student support and service in order to increase student loyalty to the institution.

The authors noted that several fundamental approaches to service quality and satisfaction measurement in higher education concentrate on teaching quality, however, the student experience involves more than just teaching and learning (Cuthbert, 1996a), and it is rational to include aspects of the service environment to evaluate total student experience (Souter and McNeil, 1996). In 2012, Academic Impressions surveyed professionals from 79 institutions of higher education, asking them to grade their institution's level of customer service and to comment on the challenges faced in improving it (p. 1). 29 of the respondents rated their institution with a "B" letter grade for level of service offered, and 31 would assign a "C" grade (together accounting for three quarters of the total responses). Only 6 would assign an "A" (Academic Impressions, 2012). Among those who assigned a failing grade and those who assigned a C, common complaints were identified: "Too many offices on our campus treat students as an imposition on their work activities. Telephones are unanswered, hours are not conducive to student needs, many staff have the attitude that students should be grateful for anything that they are given" (Academic Impressions, 2012, p. 2).

It continues, "Cranky clerical folks, arrogant faculty, harried receptionists, clueless student workers -- you name it, we've got 'em! it's embarrassing to anyone who cares about the institution and the students" (Academic Impressions, 2012, p. 2).

Lastly, "while some departments excel, others are infused with a 'don't bother me attitude'" (Academic Impressions, 2012, p. 2). Many of the respondents emphasized that front-line staff are focused on completion of tasks rather than achievement of (student-centered) outcomes, and lack the time and the perspective to provide better service to students. When asked to describe how they see exemplary customer service, overwhelmingly, the respondents focused on responsiveness and the need for a "friendly" attitude. In addition to these focus areas, there is a growing awareness

that providing effective service to students has less to do with targeting "customer satisfaction" through an improved demeanor and more to do with eliminating wait times, shortening lines, and ensuring that students receive the help they want and need in removing obstacles to their progress toward a degree, whether they are facing obstacles to registering for classes, receiving their financial aid, or seeking academic support services that will help them succeed in a difficult term (Academic Impressions, 2012, p. 2).

Even with the following literature examples provided above, there is still a lack of empirical literature found on student support and service. Many practitioners have voiced their concerns in the forms of non-empirical literature such as Ewers (2010) and his suggestion that institutions have employees attend customer service training sessions to learn the basics of customer service. Several articles do not go beyond this or deeper than simply having an opinion on the issue because increasing student satisfaction sounds like it is the "right thing to do". At this time, literature has not been found on student satisfaction at a unit (i.e. admissions) level, even though many institutions are assessing this.

2.3.3 Applicable Customer Service Best Practices for Student Support and Service Models

Emery, Kramer and Tian (2001) see service defined potentially from two viewpoints: customer-oriented and product-oriented. These authors found that those institutions that have adopted a customer-oriented approach, insist that everyone from professors to staff treat the students as their customers (Emery, Kramer & Tian, 2001). This approach subscribes to the old phrase "the customer is always right," which on the surface has great appeal. Professors and staff are asked to be more accessible to students; to develop meaningful relationships with students; to

provide quicker feedback to students; and to develop and deliver curriculum that best meet students' needs (Emery, Kramer & Tian, 2001). Emery, Kramer and Tian (2001) found that the greatest risk of a customer-oriented approach and the "customer is always right" mindset is that this may potentially lead faculty to acquiesce to all students' desires, to the disappearance of rigorous and challenging instruction; to confusion and conflict regarding students' needs; and potentially to the decline of areas of scholarship that have little value in the minds of the student (p. 1). Higher education would be diluted down to nothing short of what we currently view as diploma mills.

The second approach is product-oriented, which requires that schools mold students into qualified employees through serious education programs that take the society's needs into consideration (Emery, Kramer & Tian, 2001). To meet these criteria, schools must take an approach that differs from being focused on only the customer's needs to designing more rigorous programs of quality. Bailey and Dangerfield (2000) would agree with Emery, Kramer and Tian (2001) that rigorous course work is good for the long-term perspective, but not good for the short-term from the student's perspective, because it may mean more work, lower grades, and lower grade point averages. Rigorous programs, however, will help schools create positive brand images with a strong reputation for their caliber of students graduating who will ultimately become products of the institutions post-graduation (Emery, Kramer & Tian, 2001). In terms of customizing a customer service model that would best fit higher education, a combination and balance of both customer and product focuses must be evident to provide a quality experience for the student.

In combining these two approaches with general customer service best practices, it is important to consider the many definitions of product. Products can be the customers themselves

or the education they are receiving. Both of these definitions are critical to the ultimate balance that can be concluded from Emery, Kramer and Tian's (2001) research. Customer service consultant and author Micah Solomon (2013) said there were four main elements to focus on when trying to satisfy a customer:

- The perfect product (as defined by the student and the institution);
- Caring delivery of that product (as defined by the student and the institution);
- Timeliness; and
- An effective problem resolution process (Kelso, 2013)

At first glance, some of those elements have direct connections to higher education. While their reference of product is often seen as a tangible, hold-in-your-hands item, the product translation in higher education would be the education delivered or the students themselves. In higher education and in other industries around the globe, we know that the products are rarely delivered perfectly; however, it is the appearance of perfection that appeals to customers. Think about how some students answer a question similar to "How was your time at University X?" In some cases, those students could respond with "it was perfect" or "not so perfect". Additionally, students and customers have in common that in many situations they are looking for that product to do something for their lives, whether it be for professional or personal endeavors. For example, when a customer purchases a smartphone, it is likely that the customer was hoping that the smartphone would improve their life through portability, efficiency, entertainment, and more through a hand-held mobile device. This is no different than what students are looking for in terms of improving their life: a degree, quality-employment, return on tuition money spent, social status, and more. Pursuing a two or four-year degree or purchasing a smartphone, regardless of how it was paid for, can be seen as an investment, one that often comes proportionately with high

expectations for a significant return, monetary or non-monetary. This expectation can have a direct impact on how students perceive the product that they are receiving.

The next best practice identified was the caring delivery of that product (Kelso, 2013). That same smartphone should not be delivered to the customer with a cracked screen or subpar performance. Quality and care must be evident throughout the customers' experience in order to retain them. Are intuitions meeting their student customers' needs when it comes to education delivery whether it be online, in reasonably sized classrooms, or advising for academic or career ambitions? Metaphorically, students may be feeling like their education experience has a "crack in the screen" and are looking for ways to repair it with a potential lack of resources or timely, proactive interventions. This is another area that can be applied in higher education.

Timeliness is another area of opportunity for higher education. Using a different product as an example, a restaurant that highlights their burgers must deliver that item to their customers within a reasonable period of time. If a customer had to wait two hours for their burger, and still managed to wait without leaving, that burger may not be valued, appreciated, or enjoyed as much due to what may be seen as an unnecessary wait. In the context of higher education, how quickly are students notified of a financial hold or how quickly are institutions able to deliver resources to students who may be at risk of leaving the institutions? In some cases, students complain about a lack of timely response or fix in their situation, which also goes hand-in-hand with effective problem resolution. Are students referred to a library of pamphlets and forms, or are their customized problem-fixes put in place for each student? In certain industries where customers experience issues with a product or service such as cable, the expectation is that whoever is on the other end of the line will listen to the customer, identify their specific issue, and work to resolve it in the moment as much as possible.

Imagine a world where the cable company points their customers to a website or to physically come into an office to resolve all the customers' needs without more human interactions that could customize a more specific resolution for that customer. While many issues can be solved on the general level, institutions of higher education may be losing students due to a disconnect between the institution's "fix" and what would actually assist the student in continuing their postsecondary journey. Problem resolution practices in each unit around campus could certainly be revisited. Before customizing a student support and service model, it would be helpful to also review life examples of where these practices have been put in place and how successful they have been. Revisiting these ideas and contrasts of customer service models in current industries could be step one of customizing a student support and service model for higher education.

2.3.4 A Review of Corporate and Health Care Service Models Based on the Literature

Some consider comparing industry customer service models to how higher education treats its students is like comparing apples and oranges. While there are obvious differences and challenges higher education faces, similar to the practices listed in the previous section, there are translatable and customizable practices that higher education could implement. This section will review examples of customer service models from Starbucks and Sony to provide different examples.

Starbucks firmly believes on focusing on the customer experience and paying attention to their "brand consciousness" (Hanft, 2005). Hanft (2005) referenced F. Scott Fitzgerald's work on *The Great Gatsby* where he defined personality as an "unbroken string of successful gestures" such as writing customer names on cups, creating a home away from home space, customizing drinks

to customers' satisfaction, and policies around refunds and remaking drinks (Hanft, 2005). Starbucks has a smart understanding of its customers, their values, their lifestyles, and their needs then responds accordingly (Hanft, 2005). In higher education, these practices would clearly not work. Imagine a world where students after they graduate and are unable to find meaningful employment request a refund or a "remake" of their experience and investment. It does not quite work like that, though some might indulge in an opportunity like that. In reality, once graduated, students must make the most of the value of their degree and embark on the opportunities that are best for them. While institutions cannot refund or "remake", their implementation of an "unbroken string of successful gestures" is certainly something they can strive towards in a more customized for higher education way. When focusing on the customer or students' experience, brand recognition follows closely behind. Emery, Kramer and Tian (2001) indirectly agreed by saying "Student-customer satisfaction directly correlates to larger enrollments. Happy students stay in school, so retention rates remain high; happy students tell their high-school friends, so recruitment numbers are higher" (p. 2). If every time a student interacts with a particular office they have a positive experience or had an issue resolved, then these are the same students that are more likely to tell their friends (increase in recruitment), retain at the institution (increased retention rates), graduate from the institution (increased graduation rates), and more likely to donate back to the institution during their alumni status (increased endowments, scholarships, and overall advancement funds).

In review of Sony's customer service model several similarities with Starbucks' model were evident. Similar to Starbucks, the executives in this company have aggressive expectations for high quality service. In order to implement this, they focused more on training and the repetition of best practices (Kelso, 2013). Kelso (2013) quoted Megan Ragsdale, director of Customer

Experience at Sony, and her testimony that once her company amplified its focus on customer service, and trained its employees accordingly, there were immediate, successful results. In addition, she noted "We were being too technical and not personal enough. So we changed our vernacular — from customer to guest — and we created guest experience training from scratch" (Kelso, 2013). In many ways, higher education focuses on the technical processes, especially in the wave of CRM implementations and development, and less on the students' actual experience. The issue with Ragsdale's testimony alongside of Starbucks' critique of refunding/remaking to fix an experience is that for higher education professionals these changes are easier said than done, especially in a non-profit, shared governance space with limited resources. For-profit companies have the luxury of a top-down power dynamic and investing money in these spaces without there potentially being negative consequences to other areas around the firm. In higher education, an implementation like this would likely cause for a greater disruption and consideration from multiple stakeholders.

Lastly, in the healthcare space, each year more than 65 million people in the United States (29% to 39% of the population) provide care for a chronically ill patient. In this space, customer (or patient, in this case) satisfaction is of utmost importance for quality of life (Sarkar, et. al, 2011). To keep up with the demand for health care, the United States is rapidly adopting Electronic Health Records (EHRs). According to one recent estimate, 72% of office-based physicians now use EHRs, up from 48% in 2009 (Sarkar, et. al, 2011). These EHRs are typically linked to personal health records (often called patient portals), which can help patients manage their care online via e-mail messaging with clinicians, access to laboratory test results and medical histories, and online appointment and prescription refill functions (Sarkar, et. al, 2011). This provides an opportunity for patients to collect information, find answers to their common questions, and identify next steps

for any in-person interaction. While challenges still exist, the health care space has begun to develop the necessary groundwork to enable care partners—not just health care proxies—to access personal health records. This represents a key catalyst in enabling care coordination and delivering on the potential of technology to enhance health care and, ultimately, improve health (Sarkar, et al, 2011). These practices from the corporate and health care spaces can be used in developing a student support and service model for higher education.

2.4 Customizing a Customer Service Model for Higher Education

This paper is not suggesting that higher education institutions develop a Starbucks, Sony, or health care type of customer service model because Vaill (2008) argued that, “Education is clearly a service... in higher education; [but institutions still] have to be mindful of, responsive to the characteristics, needs, and expectations of the student” (p. 1). What is being suggested is that there are translatable benefits from their model that can be used to customize a specific model for higher education. This would be a unique type or service model customized for higher education and based on the quantitative and qualitative feedback they receive. Additionally, Wallace (2010) compiled “15 Principles for Complete Customer Service,” which allows higher education the opportunity to select principles and customize them based on their student feedback and CRM plan. Here are the higher-education specific versions of the most relevant seven of Wallace’s (2010, p. 7) fifteen principles for thinking about incorporating student support and service across campus (Boyd, 2012):

1. The success of the institution is dependent upon providing high-quality service to students. Students affect the bottom line.
2. Employees need to be reminded that every single one of them, regardless of their level of interaction with students, is in the business of serving students. Everything is woven together in the institution, and students deserve to receive assistance to meet their legitimate needs.
3. When it comes to experiencing service satisfaction, perception is reality in the minds of every student. It is important to understand the student in order to deliver service in a manner that is perceived to be satisfying to the student.
4. Each student is unique, thus it is important to understand the unique qualities of each student in order to provide service that meets their individual needs.
5. Employees should follow a variation of the Golden Rule by treating students the way that they would want their son or daughter to be treated.
6. It is hard to recover from a mistake, so when it comes to service to students every effort should be made to do it right the first time.
7. There is a need to solicit feedback from students at all times and then listen, especially when it hurts. How else can a high level of service be measured? (Boyd, 2012)

While these principles are helpful, implementing them, as already stated, is easier said than done and there are many challenges to ensuring that the majority of students are satisfied with their overall experience. The hope is that the research and findings from this paper will inform institutions on how to incorporate or maintain a level of customer (student) service and support through technology, but also how to evaluate it on an ongoing basis.

2.5 History of Chatbots

Many people are familiar with Alexa on Amazon and Siri on Apple devices. These are voice-operated bots that originated from a much simpler invention. As mentioned in the introduction, the first chatbot named ELIZA was created in 1966 by Joseph Weizenbour (Kane, 2016). This initial version focused on pattern matching and user responses to pre-written scripts, which has now evolved into chatbots serving in customer service functions as virtual assistants and troubleshooters (Kane, 2016). Chatbots are able to deliver these types of services because they are programmed to mimic human conversation and personality, so it appears as though users are having a simple conversation with or asking simple questions to another human participant (Kane, 2016). Kane (2016) adds:

There are two main types of chatbots: A “web-based” application which runs on a remote server and is accessed through a web page from multiple computers or a “stand-alone” application which runs on a single computer (Kane, 2016). Web-based chatbots have advantages over stand-alone applications: web-based chatbots allow more control over bot behavior and personality, they can be accessed from multiple computers, and most can be hosted for free, though premium options are available. While standalone chatbots are easy to install and to use, you usually do not own the chatbots. This limits the amount of configuration that can be done to personalize the chatbots (Kane, 2016, p. 2).

The first chatbots entered higher education through Library Services in the 1990s. Library websites have overwhelming amounts of resources and it is only advantageous to the institution if students can easily access them. Additionally, Christensen (2007) captures that chatbot conversation could also appeal to students who suffer from library anxiety or lack of library

knowledge because of the anonymity chatbots provide. This is the perfect resource for someone who may be afraid of being judged for asking a “dumb” question, which we know there is no such thing. This helps students feel more comfortable; however, Nardi & O’Day (1996) states that it is also important to remember that librarians can do things that chatbots cannot do, such as speak, read, understand content, make connections, and access non-electronic materials. Chatbots should, therefore, not replace traditional reference and instruction services but can be used to enhance or fill gaps in traditional services (Kane, 2016).

Fast-forwarding to 2017, the University of West Florida (UWF) became the first school in the state of Florida to use “Argie”, an artificial intelligence powered chatbot from AdmitHub that works with transfer students to make the transition from other universities to UWF smooth and straightforward with two-way text communication (AdmitHub, 2019). This tool was implemented to effectively attract and enroll students by opening up a channel of communication that Generation Z students prefer (AdmitHub, 2019). The results at UWF are impressive. In addition to transfer students enrolling at UWF earlier than in previous years, the undergraduate admissions office noted a 3.5% increase in completed applications from transfer students (AdmitHub, 2019). This shows preliminary evidence that this can work for other institutions as well.

2.6 Implications Identified by the Literature

The broader environmental impact and implications of a lack of customer service on any campus are negative, but it is becoming much more of an issue on a national level. As previously stated, about fifty-nine percent of students who began seeking a bachelor's degree at a 4-year

institution in fall 2007 in the United States completed that degree within six years (NCES, 2015). That is almost 1 in 2 students that will go on and graduate with a bachelor's degree. Additionally, there is a \$1 trillion dollar debt in the United States, many of the students who contribute to the deficit were unable to graduate in order to see a return in their investment (NCES, 2015). These outcomes are worse for transfer students. In the broader environment based on this problem of practice, there are opportunities to invest and practices to improve retention and graduation rates on campus. The good news is that there is also opportunity to see a return on those investments. In 2011, Noel Levitz provided an ROI retention example, by investing \$10,000, an expectation to retain at least 10 additional first-term students from the next incoming cohort at an average net tuition per term of \$2,500/student, the short-term ROI (after two terms) would be one hundred and fifty percent. This gain would be a win for the students and a win for the university.

Expanding on what was introduced in the first section, there are translatable benefits to providing the principles of customer service within innovation to ensure students are being attracted to and retained at institutions. Not implementing best practices could result in negative implications. Both the institution and students can be affected by the lack of customer service their units are providing with or without technology. For example, for those that have a negative experience in admissions, they may decide to attend another competing institution which could affect their overall yield and enrollment.

The second impact focused on financial aid in a broader context is that the student may feel that the information is too complex to understand or receive the wrong information which could lead to not feeling like they can afford tuition, taking out too many loans, or not attending college at all. This can affect institutions in the short term by its revenue stream or long term if students

are unable to donate to the institution when they reach alumni status because they are still paying off their student loans.

The third is more focused throughout the student's experience on campus. Students who may be overwhelmed by information or do not understand it could be late in submitting items on time for very important milestones such as registering for classes or preparing for graduation.

Overall, the recruitment, retention, and development aspects and potential benefits are the reasons why student support and service should be focused on. More specifically, best practice principles of customer service will contribute to a student having a positive experience on campus. "Happy students stay in school, so retention rates remain high; happy students tell their high-school friends, so recruitment numbers are higher" (Emery, Kramer & Tian, 2001, p.2). More students mean more tuition revenue. The absence of student support and service could negatively affect institutions in enrolling and retaining students, especially for those at tuition-dependent institutions or those affected by performance funding while public, research institutions are not immune. From a long-term perspective, this can also impact advancement and development. Bejou (2005) acknowledged that given that students pay for their education, "If the quality of the initial encounter is good, and the ongoing relationship is strong, satisfaction and loyalty remain high" (p. 46), which could lead to donations long term.

2.7 Summary

This chapter provided additional context around the history of enrollment management, transfer challenges, customer service, and artificial intelligence tools known as chatbots. This

literature review provided insight into how institutions currently leverage technology to improve the student experience. In summary, an opportunity to leverage personalized, innovative technology tools to communicate with students exists with chatbots. The evidence shown in libraries across the country. Additionally, at The University of West Florida (UWF), the evidence demonstrates the possibility that community colleges can also benefit while still maintaining a high level of personalization and customer service. This literature and the cases described in this section support institutions of higher education in understanding if chatbots will work on their campus and how to evaluate their effectiveness.

3.0 Methodology

3.1 Introduction

The purpose of this section is to outline the methodology behind investigating the effectiveness of chatbots on webpages, as a means to scale and enhance student support for prospective and current students. An evaluation of one chatbot on a large community college's website provided evidence for institutions to think strategically about how they are serving transfer students and scaling resources through their web space. This study evaluated the chatbot's utilization data and survey responses to determine preliminary effectiveness for transfer students. The Q&A inventory contained content from enrollment management, financial aid, and advising units. The utilization data showed frequency of use, time of use, and most common questions answered. The survey data helped determine the tool's effect on student satisfaction.

3.2 Inquiry Questions

The following questions guided this study to determine if chatbots are a viable solution to support transfer students, and if/why community colleges are investing in these tools. The goal of this dissertation was to answer the following questions in order to provide insights and recommendations from this research:

1. How can institutions improve transfer student satisfaction using chatbots?

2. What additional evidence exists within the utilization data to prove the chatbot's effectiveness for community college students interested in transferring to a bachelor degree-seeking institution?

3.3 Description of Involved Stakeholders

This study focused on the student as the most relevant stakeholder; however, they are not the only relevant stakeholder. To achieve a list of comprehensive questions that can be fed into the chatbot, student-facing units across campus and individual departments play a role. The Directors, Deans, and frontline staff from all of these units are also considered direct stakeholders in implementing any changes as a result of this study. There are several units involved depending on the specific campus: Admissions and Recruitment, Advising, Financial Aid, Student Services and/or Affairs, and Records and Registration (The Registrar's Office).

The Office of Admissions manages the recruitment and application processes for all student applicants. Student Services and/or Affairs works with students participating in orientation, residence halls, co-curricular activities, and dining services. This area can also have a focus on diversity and non-academic advising to ensure a smooth transition to higher education and support towards graduation. The Office of Financial Aid manages the financial and federal aid students receive as well as the billing process for tuition. Records and Registration oversee the matriculation and graduation processes for all new and continuing students. Academic Advising serves to provide students with the necessary tools and information that allows them to make the appropriate program and course choices, facilitating academic success and a timely graduation from the

university (Virginia Commonwealth University Division of Enrollment Management, 2014). For the scope of this research, the Q&A inventory from admissions, financial aid, and the advising were chosen to be evaluated.

3.4 Institution Sample and Profile

For this study, the community college chosen to participate was anonymized for the confidentiality. This community college is a large public institution in Virginia founded in the mid-20th century. The institution has six, suburban campus sites where students can enroll and register for classes. In total, the institution offers more than 160 associate degree and certificate programs to more than 75,000 students (over 30,000 full-time) from 150 countries, 80% of which indicate that they want to transfer to a bachelor degree granting institution. In actuality, only 6.5% of students actually transfer to a local bachelor degree-granting institution each year. The community college's tuition and fees are \$5,565 per year for in-state students, and \$11,618 for out-of-state students. This college's 6-year graduation rate is 29%. First year retention rate is 65%, compared to the national average of 39% and 49% respectively (National Student Clearinghouse, 2019). Throughout this study, this institution will only be referred to as "the college" and its artificial intelligence tool will only be referenced as "the chatbot".

3.5 Methodological Framework

The Evaluation Rubric used in this study was modified from best website quality assessment research and practices described in this section. In 2011, University of Washington (UW) measured the effectiveness of their TRIO (federal outreach and student services programs designed to identify and provide services for students from disadvantaged backgrounds) program website, which was designed to identify and provide services for individuals from disadvantaged backgrounds. The variables UW used for evaluation were used in order to acknowledge that judging the quality of a website can be very subjective (University of Washington TRIO Program, 2011). The World Wide Web Consortium (2011) referenced from the University of Washington TRIO's program (2011) was focused on content and impact to the user. They stated that the quality of a website must be judged within the context of its purpose; however, only a few standard practices that all websites should follow exist based on the recommendations from the World Wide Web Consortium (2011). This organization created website guidelines that promote access, responsible use, and user friendliness based on the five areas listed in Table 1 below (World Wide Web Consortium, 2011).

Table 1 Best Practices for Website Evaluation

Website Evaluation Criteria	Description
1. ACCESSIBILITY	For a website to be highly accessible, the page must be easily discoverable, load quickly, and consider levels of educational and cultural backgrounds.
2. DESIGN	The design of a website is a very important element to consider when judging overall quality. Good websites have a design that is visually appealing, readable, easy to navigate, and reinforces the purpose of the site while giving it a unified look and feel.

3. CONTENT	Content must maintain a level of comprehensiveness to provide users with information while also providing accuracy, authority (source of truth), objectivity, transparent currency, and coverage.
4. TECHNOLOGICAL ASPECTS AND INTERACTIVITY	The site should use new technologies and the multimedia nature of the web to allow user interactivity and make the experience different from reading a book, listening to the radio or watching a TV show.
5. CREATIVENESS/ORIGINALITY	Creative and original websites can be more fun to use because of their novelty and ingenuity. A good website is distinguishable from other websites, and should give you something that you can't find elsewhere. It should be distinct and memorable and give a good over-all impression.

This framework was chosen from the TRIO program because of its focus on websites improving student success outcomes. Currently, no specific tools or rubrics exist to evaluate chatbots in higher education. Therefore, this study tailored the above areas to evaluate the chatbot user experience of students and their satisfaction. Similar categories for this chatbot were created to evaluate the overall impact on transfer student satisfaction at the college. This customized version can be found in Table 2 shown below and connects to the instrument section.

Table 2 Student Support and Service Website Evaluation Rubric

Chatbot Criteria	Statement for Survey	Quality Score (1-5)
Access <i>Ease of discovery from university's main page or Google</i>	This tool is easy to find on my college's website.	
Helpfulness <i>Accuracy and comprehensiveness of information</i>	The answers to my questions were accurate and helpful.	
Time	I received answers to my questions quickly.	

<i>Level of effort and time required to retrieve information</i>		
Design <i>Built for efficiency and scale</i>	After using the chatbot to answer a simple question, I did not need to contact a staff member to answer that same question	
Overall Quality of Resolution <i>Average score across all variables</i>	I would use this tool again.	

3.6 Research Design and Methods

To address both inquiry questions, this study analyzed two parts of the chatbots operations: the front-end (user experience survey) and back-end (summarized interaction/utilization data). General transfer student satisfaction survey results and anonymized quotes were shared as a complement to the two main parts of this research analysis.

3.6.1 Front-end (User Experience) Analysis

At the end of 6 months of the chatbot being live on the website, a survey was sent to students. The front-end analysis reviewed the responses of students who have used the tool and determine their satisfaction based on their experience. The hypothesis for the front-end analysis is that the overall student satisfaction scores should be high based on this chatbot tool.

3.6.2 Back-end (Interaction/Utilization) Analysis

Most likely, many more students interacted with the chatbot than complete the study's survey. To create more context around the front-end user experience analysis, back-end data was pulled to show the total number of chatbot interactions as well as every individual interaction with the chatbot to determine overall effectiveness. This back-end analysis showed:

1. Total student interactions
2. Most commonly asked and answered questions
3. Time of day questions are asked

The hypothesis for the back-end analysis is that hundreds of students will interact with the tool at all hours of the day, proving it can assist universities with scaling student services without adding additional staff members or extending hours.

3.7 Instrument

This study transferred the previously summarized best practices from the World Wide Web Consortium (2011) used by the UW TRIO program to assess the effectiveness of the chatbot implementation and question inventory, which included content from admissions, financial aid, and advising units. The survey initiated to students included five questions focused on the chatbot experience based on the methodological framework shared in the previous section.

1. This tool is easy to find on my college's website.
2. I received answers to my questions quickly.

3. The answers to my questions were accurate and helpful.
4. After using the chatbot to answer a simple question, I did not need to contact a staff member to answer that same question
5. I would use this tool again.

A Likert scale was used to assess a scale of opinions (from poor to excellent) and describe the various areas of chatbot evaluation. The Likert scale applied to the five variables listed in Table 3 allowed for measures to quantitatively evaluate for central tendency, strengths, and areas of improvement.

Table 3 Likert Scale Used for Web-Based Student Support and Service Models

1	2	3	4	5
Poor	Fair	Good	Very Good	Excellent
Absent Impact on Student	Very Little Impact on Student	Decent Impact, Meets Basic Student Needs	Comprehensive Impact on Student, Exceeds Expectations	High Impact on Student, Could Serve as a Best Practice Example

This survey also contained multiple choice to understand how the students learned about the chatbot at the college and open-ended questions to provide more context to their responses (Appendix C).

3.8 Data Collection and Analysis

The survey responses based on the front-end user experience were collected in Qualtrics and the back-end analysis utilization data was collected automatically through Blackboard Student Services, producing an excel spreadsheet of interactions. Additionally, these data were coupled

with a high-level (not specific to the chatbot) transfer student satisfaction survey sent out through Qualtrics to address the second inquiry question: What additional evidence exists within the utilization data to prove the chatbot's effectiveness for community college students interested in transferring to a bachelor degree-seeking institution?

The survey and utilization results were analyzed by sharing the averages of each question and overall for students. To address the front-end analysis hypothesis that the overall student satisfaction should be higher as a result of using the chatbot, the total number of responses was also analyzed for the average, outliers, and standard deviation.

Aggregated data was used to address the back-end analysis hypothesis that hundreds of students interact with the tool at all hours of the day. To determine the effectiveness of the chatbot in assisting universities with scaling student services without adding additional staff members or extending hours, data from total student interactions, most commonly asked and answered questions, and time of day questions was shared as summative information.

To determine how institutions can use insights to improve chatbots using student feedback and utilization data, a general student satisfaction survey was also analyzed for summative data including the average responses. This survey will point to what communication or engagement gaps transfer students may experience that can be filled by this new tool. Lastly, quotes from the survey will be shared to highlight more qualitative feedback based on the transfer student experience.

3.9 Participant Selection

Individuals were eligible to participate in this study if they were at least eighteen years old and a current student enrolled at the college that indicated they are interested in transferring to a bachelor degree-granting institution. Participation is voluntary, and respondents were allowed to withdraw from the survey at any time and for any reason. There is no cost or risk associated with participation.

Students were invited to participate through an introductory email and a series of two reminders across a two-week period. Those that participated received an automated thank you email. Participants were welcome to ask questions at any time, but were not expected to engage outside of the survey.

3.10 Ethical Statement

The following ethical statement will be sent to students participating in the survey:

“Any potential loss of confidentiality will be minimized by maintaining electronic records that are de-identified with no personally identifiable information. In other words, the researcher(s) will maintain any results by assigning a participant code that will be connected to demographic information only with no real name, email, or real student ID. The de-identified data could be used for future research without additional consent from participants. All research files will be securely stored and password protected such that only members of the research team will have access. While it is understood that no

computer transmission can be perfectly secure, reasonable efforts will be made to protect the confidentiality of your transmission. If we write a report or article about this research project, your identity will be protected to the maximum extent possible.”

4.0 Findings

This chapter applied the data collected in this study to answer the inquiry questions listed in chapter one:

1. How can institutions improve transfer student satisfaction using chatbots?
2. What additional evidence exists within the utilization data to prove the chatbot's effectiveness for community college students interested in transferring to a bachelor degree-seeking institution?

The purpose of this study was to determine the overall impact of chatbots on transfer student satisfaction. The findings are presented in two different sections. The first section presents the data analysis on the back-end utilization data. The second section presents the data analysis on the front-end student survey responses focused on the chatbot experience. Prior to exploring the findings of this study, I present the characteristics of the students who responded to the survey and discuss the impact these characteristics may have on the results.

4.1 Participant Demographic Characteristics

The survey was sent to any student identifying as a transfer student at the college which represented all ages, races, genders, socioeconomic levels, credits attained, and progress-to-degree. The survey was sent virtually to 1,110 current transfer students through Qualtrics. A total of 166 students responded to the survey for a total response rate of 15%. While the response rate

was relatively low, the diversity of the participants was incredibly rich and similar to the entire transfer student body at this college. By mapping the student ID with the information in the college’s student information system, 64% of respondents identify as traditionally unrepresented by race or ethnicity, 50% are first generation, and 54% are low-income (as defined by Pell-eligibility). Students credit accumulation ranged from 0 credits to 82 credits, and 62% were first-time in college and 48% were continuing associate degree-seeking students. Additional demographic information from the survey is listed in Table 4.

Table 4 Demographics of Student Respondents for Chatbot Experience Survey

		Survey (N=166)		Transfer Students (N=1,110)	
		#	%	#	%
Race/Ethnicity	White	40	24.1	279	25.1
	Black	14	8.4	148	13.3
	Hispanic	49	29.5	315	28.4
	Asian	32	19.3	195	17.6
	American Indian/Alaska Native	0	0.0	3	0.2
	Native Hawaiian/Pacific Islander	0	0.0	0	0.0
	Two or more races	13	7.8	51	4.6
	Not Reported/Other	18	10.8	119	10.7
Sex	Male	52	31.3	461	41.5
	Female	103	62.1	576	51.9
	Not Reported	11	6.6	73	6.6
Age	Average Age	21.7 years		21.7 years	
	24 years or less	135	81.3	915	82.4
	25 years or more	31	16.7	195	17.6
Veteran Status	Veteran/Active Duty/Reserve	10	6.0	50	4.5
	Dependent/Spouse	4	2.4	30	2.7
	Not Veteran/Not Reported	152	91.6	1030	92.8

Marital Status	Single	117	70.5	NA
	In a Relationship	24	14.5	
	Married	16	9.6	
	Divorced	2	1.2	
	Not Reported	7	4.2	
Location	On-Campus	1	0.6	NA
	Off-Campus (Within 5 miles)	36	21.7	
	Off-Campus (Greater than 5 miles)	122	73.5	
	Not Reported	7	4.2	
First Generation Status ¹	First-Generation	84	50.6	NA
	Continuing Generation	75	45.1	
	Not Reported	7	4.2	
How many hours per week do you work for pay on-campus?	I do not work on campus.	147	88.6	NA
	1-15	7	4.2	
	16-25	4	2.4	
	Not Reported	8	4.8	
How many hours per week do you work for pay off-campus?	I do not work off-campus.	44	26.5	NA

Unlike the survey data, the back-end utilization data only captures chatbot interactions, not specific student or demographic information. While the student survey shows that overall the chatbot users were diverse, capturing this information within the chatbot utilization data was not possible unless the students volunteered that demographic information on the survey. The chatbot utilization data does contain IP address information and time accessed to determine frequency and when the tool is used.

¹ First-Generation Student is defined as a student whose parents have not completed an Associate's degree or higher.

4.2 Data Cleaning and Validation

More than 166 students interacted with the front-end experience survey. Originally, 188 students responded to the survey; however, 22 responses were incomplete and left blank. As a result, these 22 responses were deleted from the sample. After the unfinished responses were deleted, a total of 166 responses remained for a 15% response rate. Limited data cleaning was applied to the back-end utilization data. Some students may access the chatbot using different devices, but this study did not have transparency into different IP addresses owned by one student. For this study, each IP address will be treated as one student accessing the chatbot. The only cleaning that was completed on this utilization data set was to convert the time of access to Eastern Standard Time (EST) which was originally displayed as Greenwich Mean Time (GMT) when the data was pulled.

4.3 Back-end Analysis: Utilization Data

The total number of chatbot interactions during the six-month evaluation period (January 10-June 10) was 336 and the number of sessions totaled to 101. Sessions (see Table 5) are defined as the number of times students use, disconnect, and then come back to the chatbot. Interactions (see Table 6) are defined as the number of questions students are asking the chatbot continuously in a given session. Students can access the chatbot multiple times at different periods during this six-month window (sessions) and ask multiple questions (interactions), but the number of unique students using the chatbot (based on IP address) totaled to 93.

Table 5 Number of Sessions by Student Count (n=101)

Number of Sessions	Number of Students
≥5 times	1
2-5 times	3
1 time	97

Table 6 Number of Interactions per Chatbot Sessions by Student Count (n=101)

Number of Interactions per Session	Number of Students
≥10 times	4
5-9 times	19
2-4 times	64
1 time	14

The average number of sessions that a student had with the chatbot was only one, but in each session the average number of times a student interacted with the chatbot was 3.3 times. This demonstrates the number of questions the students were asking the chatbot at that point in time.

The chatbot was accessed at all hours of the day. The average time that the chatbot was accessed was at 11:30am. Assuming many offices are open and advisors are available to meet consistently between 9:00am-5:00pm, the data showed that 20 students (20%) accessed the chatbot before 9am and 12 students (12%) accessed the chatbot after 5pm. This means that 32% of students using the chatbot were able to be served outside of business hours. The majority of students (68%) did access the chatbot during business hours.

4.4 Front-end Analysis: Student Survey Results

A total of 166 responses out of 1,110 student responses (15% response rate) were analyzed to determine student satisfaction. This first section of the survey included five Likert scale questions. The first statement about the chatbot, “this tool is easy to find on my college’s website”, showed a total of 89% of students agree or strongly agree with 11% disagreeing. The second statement, “I received answers to my questions quickly”, showed more than three quarters (76%) of students agree or strongly agree with 6% neither agreeing/disagreeing and 18% disagreeing. The third statement, “the answers to my questions were accurate and helpful”, showed a total of 83% of students agree or strongly agree with 6% neither agreeing/disagreeing and 7% disagreeing. This statement had an additional 4% of students strongly disagree. The fourth statement, “after using the chatbot to answer a simple question I did not need to contact a staff member to answer that same question”, showed a total of 74% of students agree or strongly agree with 6% neither agreeing/disagreeing and 12% disagreeing. This statement had an additional 8% of students strongly disagree. The last statement, “I would use this tool again”, the majority at 94% of students agree or strongly agree with 4% neither agreeing/disagreeing and 2% disagreeing (see Table 7). Based on the minority of students that neither disagreed or agree and disagreed/strongly disagreed, it is important to note that this survey was sent to all transfer students whether they used the chatbot or not. It can be assumed that some participants have never used the chatbot before completing the survey.

Table 7 Results from the Likert Scale Statements on the Chatbot Student Experience Survey

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
This tool is easy to find on my college's website.	73%	16%	0%	11%	0%
I received answers to my questions quickly.	54%	22%	6%	18%	0%
The answers to my questions were accurate and helpful.	68%	15%	6%	7%	4%
After using the chatbot to answer a simple question, I did not need to contact a staff member to answer that same question	64%	10%	6%	12%	8%
I would use this tool again.	88%	6%	4%	2%	0%

The next question on the survey is multiple choice and asked the student, how did you learn about the chatbot at the College? The data showed that 73% of respondents learned about the chatbot through the transfer student website, 22% learned from faculty/staff, and 5% through other methods such as a high school counselor or friend.

The third section on the chatbot asks how frequently have you used the chatbot this past semester. Out of all the respondents, 93% of students have used the chatbot at least one time with 7% having never used it at all. A small percentage (4%) used the chatbot three or more times (see Table 8). As mentioned above, 7% of students who completed this survey never used the chatbot while an overwhelming majority used it at least one time. 93% is a high percentage of students, but there are assumptions behind this number. Students who have previously used the chatbot or enjoyed using the chatbot were more likely to complete the survey. Another theory is that this survey may have inadvertently brought marketing attention to the chatbot, drawing students to test it out before providing their responses to the survey. Additionally, the survey responses that were removed for being incomplete or left blank may have also been students who were not familiar with the chatbot. These possibilities may explain why the percentage of students using the chatbot at least once was so high.

Table 8 Frequency of Use from the Chatbot Student Experience Survey

	Didn't know about this	0 times	1 times	2 times	3+ times
How frequently have you used the chatbot this past semester?		7%	78%	11%	4%

The fourth section contained two true and false statements, as a result of using the chatbot “I understand more about transferring” and “I am more comfortable transferring”. Students responded true at 89% and 92% respectively to these two statements. There were 9% and 7% of students who responded false (see Table 9).

Table 9 Results of True or False Statements on the Chatbot Student Experience Survey

	True	False	Neither true nor false
I understand more about transferring	89%	9%	2%
I am more comfortable in transferring	92%	7%	1%

The last section contained open-ended questions to provide context around the student responses. These questions included:

What has been most helpful about the chatbot in your transfer planning/transfer process? Given this question was optional, a total of fourteen students responded or indicated what specifically was helpful. Of the students who responded, a common theme of receiving answers to questions in fast and timely manner was something students seemed excited about. A student mentioned, “I usually have to email or schedule an appointment with my counselor when I don’t know something. It was cool that the chatbot was able to answer some of my questions on the spot.” Students also referenced that they were able to ask the chatbot questions that otherwise would have caused fear or embarrassment if they were to ask an advisor or another person instead. For example, testing and accommodations were some of the questions that students asked the chatbot about.

What challenges (if any) have you faced with the chatbot or in your transfer journey?

The vast majority of respondents either skipped this question or indicated that they had not faced any specific challenges. Of the six respondents who indicated that they had faced a challenge, most noted the largest challenge was trying to determine which (if not all) credits would transfer to a bachelor degree-granting institution. One student mentioned that “It is hard to tell if I am doing

the right classes to graduate with my bachelor's degree in four years." This request speaks to a more robust question and answer (Q&A) inventory as well as a higher level of personalization.

What changes would you make if you could? Most students expressed no recommendations for changes they would like to be made to the chatbot, indicating they were satisfied with the functionality. Of the four students who provided suggestions, the recommendations fell into two major categories: advertising the tool more so that other students are aware and expanding the question and answer inventory.

4.5 Summary

This chapter analyzed back-end utilization and front-end student survey data to assist with determining overall student satisfaction. After reviewing the back-end data, it was good to see over 336 interactions and over 100 sessions with the chatbot in the first six months of implementing this tool for transfer students. The vast time periods in which these students access them outside of business hours demonstrates that this chatbot can fulfill certain needs that staff are unable to at that time.

The front-end analysis containing the chatbot student experience survey had a strong response rate, rich with diversity. The majority of these students (more than 50%) strongly agreed or agreed all five statements presented in the first section showing an overall positive experience. A small population of students disagreed or strongly disagreed to these questions which will be addressed in Chapter 5. The survey results also showed the majority of students (93%) who took the survey used the chatbot at least once. A small percentage used the tool multiple times as defined

by sessions, but still shows promising preliminary results for how many questions are asked during a session. The true and false questions demonstrated that the majority of students who took the survey now understand more about the transferring process and feel more comfortable transferring as a result of using the chatbot.

The survey results provided the connection to analyze student satisfaction by asking direct questions regarding their chatbot experience. In total, the survey contained 12 questions that the utilization data could not answer. Five key questions in particular helped show that the chatbot had an overall positive impact on transfer student satisfaction. The initial chatbot launch proved to be successful with the majority of students strongly agreeing/agreeing or answering true to five critical statements on the survey:

1. The answers to my questions were accurate and helpful.
2. After using the chatbot to answer a simple question, I did not need to contact a staff member to answer that same question
3. I would use this tool again.
4. I understand more about transferring
5. I am more comfortable in transferring

More than 60% of students strongly agreed or agreed to the first three statements and close to 90% said true to the last two questions.

The open-ended questions provided context and a space for students to describe what was most helpful and/or challenging during their experience using the chatbot as well as what changes they may recommend. The vast majority of students did not respond to these optional questions on the survey, but those that did provided constructive responses to help prove initial effectiveness

and guide the future work on this chatbot moving forward. The next chapter will discuss these findings in greater detail.

5.0 Discussion

This study examined the impact of implementing a chatbot solution to scale existing student support or service models on one community college campus, specifically for students preparing to transfer to a bachelor degree-granting institution. The chatbots evaluated in this study use AI solutions that mimic advisors as a means to help guide transfer students in their transition to earning a bachelor's degree.

To determine the merit of this hypothesis and to answer the inquiry questions, the study analyzed a chatbot on the website of a large, public community college that has a strong focus on transferring students to four-year, bachelor-degree granting institutions. To determine the overall impact on student satisfaction, this evaluation looked at the college's chatbot preliminary launch utilization data and student experience survey data.

5.1 Discussion of Findings

The results presented in chapter four showed data that was collected from back-end utilization data and front-end student experience survey responses. The utilization data was strategically pulled first to identify at a high level how many sessions and interactions were occurring. After seeing over 300 interactions and over 100 students using this tool after six months, students were then surveyed to understand in more detail what their experience with the chatbot was like. The utilization data provided a rough benchmark of how many students might respond

to the survey. These data also included the times students were accessing the chatbot when staff were not available.

This preliminary utilization data and feedback from students help make the case that community colleges should continue to invest in these tools to improve student satisfaction and assist students in transferring to a bachelor degree-granting institution. As discussed in the literature review, IHEs are looking to scale their services for students without damaging their quality of student-customer service. When students are satisfied they are more likely to be loyal to the college, which increases student success outcomes (Douglas et al., 2007). One element of satisfaction is timeliness of the college's response to their questions. The findings showed students accessing the chatbot at all hours. By providing twenty-four hour, seven days a week service through artificial intelligence, these data suggest that college administrators can achieve the goal of timeliness without investing in additional human resource costs while also improving student satisfaction. Another element of satisfaction is providing students security to ask questions. Data demonstrated that students can trust or ask questions that they thought were too "dumb" or "embarrassing" to ask another human-being. This tool is powerful for many reasons, but especially that it creates a safe space for students to ask questions about testing/learning accommodations, financial aid verification, and other sensitive subjects. This eliminates barriers for transfer students in accessing resources that will help them be successful.

Overall, the data suggested a need to better present the chatbot option to students and to expand the chatbot abilities. The open-ended survey questions, for example, recommended a need for more focus on chatbot advertising/marketing, expanding Q&A inventory, and continuing to save time for students if an appointment with an advisor is not needed to answer relatively simple questions. For example, launching a strategic marketing campaign to make students more aware

that this tool exists would be necessary to increase transfer student satisfaction across the college. Grant and Anderson (2002) recommended that institutions take a very student-centric view of the entire student life cycle, so the email campaign can drive students to the chatbot at different times in their student journey. This marketing content can include everything from the Free Application for Federal Student Aid (FAFSA) questions to how to apply for graduation.

Secondly, based on the feedback that students provided in the survey, another lesson learned was to expand the Q&A inventory to include questions around whether specific courses will transfer to bachelor degree-granting institutions. Last, that data suggests that advisors might facilitate use by sharing a link to the chatbot for students to ask simple questions before their advising appointments. Time with advisors could then be more productively focused on more complex questions.

Students also answered multiple-choice questions to understand how they heard about the chatbot option. The data showed that majority of respondents learned about the chatbot through the transfer student website, less than a quarter learned from faculty/staff, and very few through other methods such as a high school counselor or friend. This data confirms the recommendations noted above to launch a marketing campaign through email and through the advisor will help increase the overall awareness and frequency in which the students are interacting with the chatbot. By increasing the awareness, more students will give personal referrals to their friends to use the chatbot which we know through the literature is an example of high satisfaction Emery, Kramer and Tian (2001) shared that “happy students tell their high-school friends, so recruitment numbers are higher” (p. 2). If every time a student interacts with a particular office they have a positive experience or had an issue resolved, then these are the same students that are more likely to tell their friends, which can have a direct increase on enrollment (Emery, Kramer & Tian, 2001).

5.2 Implications for Practice

This study and its results may have possible implications for practitioners in higher education. Since chatbots are designed to mimic humans, specifically advisors in this case, staff are hesitant to embrace this tool for fear of being replaced. The idea of robots taking people's jobs is a real concern in the 21st century. While this study finds that chatbots do improve student satisfaction, humans are still needed to answer some of the more nuanced and complex questions. As mentioned in the literature review, Kane (2016) said chatbots should not replace traditional services but rather should enhance or fill gaps in traditional services. The data from this study supports Kane's assertion. The most common question asked during a session with the chatbot was "will my credits transfer?" and the answer to that depends on each student's individual case. The responses received in the open-ended questions recommended some future changes to the chatbot. This feedback included expanding the answer set to be as detailed and personalized as much as possible. However, the chatbot has limits to its functionality as it is not human and may need to refer students to other solutions. Driving students to degree-auditing tools, class registration, or the learning management system such as Blackboard to address those specific questions is recommend before referring to a specific staff member. As a last step, referring to an advisor or financial aid coordinator is another way to prevent dead-ends for students. This ensures that the chatbot is as helpful as possible, but also working as originally designed to answer simple questions allowing for advisor time to be devoted specifically to more complex matters.

5.3 Limitations

This study had a few limitations identified. First, the window in which the utilization data were collected was limited to six months. This short period of time showed promising results, but chatbots use the questions and interactions from students to continue to automatically build its inventory, allowing the responses from the chatbot to become more sophisticated over time. In other words, the longer a college has the chatbot and the more heavily it is used, improvements to responses over time should naturally be expected with very little human interaction.

The chatbot utilization dataset was limited as students were not expected to self-identify or login when they interacted with the chatbot. Student satisfaction was the safest to correlate these results to but more information and time are needed to correlate to retention, graduation, and other student success outcomes. Over time it will be possible to determine these other student success outcomes, but they were not in the scope or within the timeframe of this study.

Additionally, the survey was sent out over the summer when students are not the most active. While the response rate gave some insight into the student experience, a future survey in the fall or spring semester may show a higher response rate. It is recommended that this survey is launched at least annually to evolve the chatbot to meet the needs of students.

5.4 Areas for Future Research

Prior to this study, a published framework on how to evaluate chatbots in higher education for transfer student satisfaction did not exist. While this study has served as a starting place, future

research is needed to hone this evaluation model to create consistency across all chatbot implementations. Focusing on utilization rates and survey results is still only the tip of the iceberg. As analytics become more advanced, it is worth revisiting this framework to identify new ways to capture utilization such as using Google Analytics and determine if other evaluation tools such as focus groups or individual student interviews should be added.

Additionally, this study did not separately analyze the small quantity of students who disagreed/strongly disagreed and responded false to the five critical statements listed on the survey. A deeper analysis of these students' experiences with the chatbot to understand what they were trying to ask the chatbot and why their experience was not positive is recommended. These students are essential to improving the evolution of the chatbot and also to increase frequency of use.

Another point for future research is to analyze the impact of this chatbot longitudinally. It is possible to correlate the service provided from this tool to retention, graduation, and transfer rates as well as time-to degree. Over time if we see that these numbers increase for transfer students, it is possible that the chatbot and new resources can positively impacting student success.

The last area for future research is to determine why other students have not used the chatbot. The survey conducted for this study showed a large number of students used the chatbot at least once, more information is needed to understand what is blocking other students from taking advantage of this resource.

5.5 Conclusion

We are in a challenging time for colleges and universities focused on increasing their enrollment. While many institutions are aware that transfer students can help with the decline of traditional graduating high school seniors or a thinning pipeline, many barriers exist to prevent transfer students from transitioning successfully to a bachelor degree-granting institution. Many of these challenges exist because students have many questions and a staff member may not always be readily available to assist; as a result, many of these students may not ever earn a bachelor's degree or it takes more than seven years to complete along with wasted money, credits, and time. By using AI, chatbots are a potential solution to solving this challenge and improving overall student satisfaction. The goal of this study was to provide more evidence on the effectiveness of chatbots in supporting transfer students in higher education through student satisfaction. The findings demonstrated high student satisfaction through timely responses, frequency of use (including outside of business hours), and more comfort transferring as a result of using the chatbot. While more work in this space must be done in the future, this study indicates the potential of innovative opportunities like chatbots in higher education to ensure transfer students have all the tools necessary to be successful as they transition.

Appendix A: Student Recruitment for Chatbot Student Experience Survey Emails

Email #1

Dear Student:

You have indicated that you have recently transferred into the college or are interested in transferring to a bachelor-degree seeking institution as a next step in your educational journey. Would you like to share feedback with us on your experience navigating your transition? As a current student planning to transfer, you are eligible to participate in a study about your experiences and overall satisfaction.

Interested students who are willing to participate must complete a 5-10 minute survey.

Participation in this study is entirely voluntary and students may terminate their participation at any time.

If you are interested in participating and sharing your thoughts about your transfer journey, follow this link to the survey:

<<Take the Survey>>

Please feel free to contact me with questions using the contact information provided below.

Thank you for your time and consideration.

----- a slightly modified reminder email will also go out to students -----

Email #2

Hello Student:

Reminder: Please complete a 5-10 minute survey regarding your transfer (or preparing to transfer) experiences, and overall satisfaction at the college. Participation in this study is entirely voluntary and students may terminate their participation at any time.

If you are interested in participating and sharing your thoughts about your transfer journey, follow this link to the survey:

<<Take the Survey>>

Please feel free to contact me with questions using the contact information provided below.

Thank you,

Appendix B: Chatbot Transfer Experience Survey

Chatbot Transfer Student Experience Survey

This research is being conducted to better understand transfer students' experience who utilized our chatbot tool online. In this survey, you will be asked to respond to a series of questions about your experiences and satisfaction using the chatbot. The survey should take approximately 5 minutes to complete.

CONFIDENTIALITY: Any potential loss of confidentiality will be minimized by maintaining electronic records that are de-identified with no personally identifiable information, including any recordings, transcripts or notes from your interview. In other words, the researcher(s) will maintain any results by assigning a participant code that will be connected to demographic information only with no real name, email, or real student ID. The de-identified data could be used for future research without additional consent from participants. All research files will be securely stored and password protected such that only members of the research team will have access. While it is understood that no computer transmission can be perfectly secure, reasonable efforts will be made to protect the confidentiality of your transmission. If we write a report or article about this research project, your identity will be protected to the maximum extent possible.

PARTICIPATION: Individuals are eligible to participate in this study if they are at least 18 years old, used the college's chatbot online, and you have recently transferred into the college or are interested in transferring to a bachelor-degree seeking institution as a next step in your educational journey. Your participation is voluntary, and you may withdraw from the study at any time and for

any reason. If you decide not to participate or if you withdraw from the study, there is no penalty or loss of benefits to which you are otherwise entitled. There are no costs to you or any other party.

CONSENT: If you agree to all of the above, please begin the survey.

<<begin survey>>

Student Survey

Please indicate the extent to which you agree/disagree with the following statements.					
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
This tool is easy to find on my college's website.					
I received answers to my questions quickly.					
The answers to my questions were accurate and helpful.					
After using the chatbot to answer a simple question, I did not need to contact a staff member to answer that same question					

I would use this tool again.					
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How did you learn about the chatbot at the College? Check all that apply.

- Ad
- Website
- High school counselor
- Parent
- Friend
- Friend of family
- Advisor or Counselor
- High School Teacher
- Professor
- Admissions representative
- Email
- Campus display screen
- Flyer
- Other _____

Frequency					
	Didn't know about this	0 times	1 times	2 times	3+ times
How frequently have you used the chatbot this past semester?					

Please indicate the extent to which you agree/disagree with the following statements.			
As a result of the chatbot online...			
	True	False	Neither true nor false

I understand more about transferring			
I am more comfortable in transferring			

(Open-ended Questions)

What has been most helpful about the chatbot in your transfer planning/transfer process?

What challenges (if any) have you faced with the chatbot or in your transfer journey?

What changes would you make if you could?

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