THE EFFECT OF THE IT CUSTOMER EXPERIENCE ON LEARNING OUTCOMES IN HIGHER EDUCATION

by

JASON MARCEL LEARY

B.S., Albany State University, 2006

M.S., Middle Georgia State University, 2020

A Research Paper Submitted to the School of Computing Faculty of

Middle Georgia State University in

Partial Fulfillment for the Requirements for the Degree

DOCTOR OF SCIENCE IN INFORMATION TECHNOLOGY

MACON, GEORGIA
2024

The effect of the IT customer experience on learning outcomes in higher education

Jason Leary, *Middle Georgia State University, jason.leary@mga.edu*

Abstract

Researchers have discussed the crucial effect that information technology (IT) personnel have in a variety of industries. However, a knowledge gap exists in analyzing the effect that interactions between higher education IT personnel and their customers (learners, faculty, and staff) have on the ability to learn, teach, and achieve. The current quantitative study examines the interactions between IT personnel, learners, instructors, and support staff to understand the effect the IT customer experience has on learning outcomes in higher education. Data was collected from a sample of learners, faculty, and staff from higher education institutions, who responded to a self-designed 5-point Likert-type instrument with 17 items. Multiple regression analysis was performed to determine which predictor variable (dependability, security, and communication) was most influential in predicting the effect of the IT customer experience on learning outcomes (satisfaction). The results revealed that communication emerged as the most significant factor, which underscores the crucial role of effective communication in fostering positive experiences and interactions within educational environments. This finding has implications for higher education IT departments and executive leaders seeking to enhance the learning experience through IT initiatives.

Keywords: Higher education, learners, faculty, staff, information technology, customer experience

Introduction

Customer experiences have been a driving force for companies and organizations across every industry. From a customer's experience eating at a restaurant to the customer being assisted in locating an item at the local hardware store, customer experiences have been a reliable indicator of longevity. Companies like Nordstrom, having been in operation for over 120 years, continuously adjust their customer experience models to meet customers where they are today, as well as being agile to meet customers where they will be in the future (Solomon, 2018). Higher Education is similar to Nordstrom in the necessity of continuously adjusting operations to provide learners with an environment conducive to quality education. Researchers have forecasted the necessity of higher education institutions adjusting at, or near, the rate of change within IT as technology would become a major driver in the delivery of modern instruction (Agre, 1999; Green & Gilbert, 1995).

Modern learning environments have extended past the traditional on-campus experience into global learning from anywhere, at any time. Higher education institutions are no longer solely competing for regional student enrollment and faculty/staff recruitment. To keep up with the demands of a global learning environment, higher education institutions rely on the work of information technology (IT) professionals to provide the technological tools needed for learning and instruction, as well as to ensure minimal downtime of mission-critical computing systems to accommodate all learners and instructors, regardless of their location (Borwick, 2013).

Higher education IT departments encounter similar challenges as most companies, such as addressing the negative perceptions of IT personnel and assessing IT's position and value to the corporate ecosystem aside from being a cost center (Choudhary & Vithayathil, 2013; Cordray, 2015; Network Computing, 2013). While perception may not always be the reality, researchers have discussed the effect of

perception on the decision to utilize a service or patronize a certain establishment (Andreassen & Lervik-Olsen, 2008; Baek & Kim, 2022; Liao et al., 2022). Opportunities to receive IT assistance or collaborate on certain technological initiatives are missed due to the perception that IT personnel are difficult to communicate with or, plainly, unapproachable.

Problem statement

Researchers have discussed the effect IT has on customer service outcomes in several industries, such as banking, retail, and hospitality (Siebert et al., 2020). However, there needs to be more research detailing how the interactions between IT personnel, learners, and instructors when receiving assistance can play a role in success or failure in the classroom. This knowledge gap presents an opportunity for Higher Education IT (HEIT) departments to explore the IT customer experience through the eyes of their customers (learners, instructors, non-technical staff) to understand the parts of the experience being delivered correctly and which parts need improvement.

With the rapid ascension of online learning programs, researchers and educators noted that a learner's list of considerations for choosing one institution's online program over another should include the quality of the technological tools available to them and their ability to receive quality technology assistance through the institution (Georgia Tech Professional Education, 2019; Kapp, 2003; Skopec, 2021). Achieving the former would require educators, IT personnel, and executive leadership to equally collaborate to develop quality technological tools and initiatives to provide unique experiences for learners; achieving the latter would require IT personnel to study the feedback provided by their customers and take intentional steps to provide positive IT experiences through knowledge, clear communication, and empathy (Foret, 2019; Heltzel, 2023).

Purpose of the study

This paper examines the interactions between IT professionals, learners, instructors, and support staff to understand the effect the IT customer experience has on learning outcomes in higher education. While IT departments are widely viewed as essential groups in most businesses, historical views of IT departments include being non-innovative and not supportive of various projects (Network Computing, 2013). Those views can stem from several areas, including miscommunication from IT professionals, lack of knowledge of the issues being addressed, and, at times, dismissive mentalities from IT professionals and their customers (Mahajan, 2015). Customers with positive experiences tend to reach out and ask for help from IT, even if it is just for reassurance that they are doing the right thing. Conversely, customers with negative or neutral experiences may attempt to bypass IT support and attempt to resolve an issue independently, which could worsen the problem and result in IT intervention. These interactions influence the views learners and instructors have toward the level of technological support being provided. Just as a customer in a jewelry store may feel less inclined to patronize the establishment if their experience could have been better, a learner may feel less willing to obtain assistance from their IT professionals if they, or a fellow learner, had a poor experience.

The findings from this study will provide a better understanding of how these interactions affect outcomes in the learning process and can guide IT and college/university leadership groups to improve these interactions and, by extension, heighten the probability of learners excelling in the classroom. The findings from this study can provide a roadmap for removing any existing barriers created by misconceptions and perceptions between IT personnel and their customers. Removing barriers and forging genuine partnerships will allow for enhanced opportunities for technological collaborations aimed at providing unique experiences to attract and retain learners. Consistent with the purpose of the study, the researcher will ask the following question.

Research question

RQ1: Which of the three predictor variables (dependability, security, and communication) are most influential in predicting the effect of the IT customer experience on learning outcomes (satisfaction)?

The three predictor variables were chosen on their relevance and importance to customer satisfaction across various industries. Researchers noted that the dependability of service personnel has a direct impact on customer satisfaction and customer retention (Kumar, 2010; Kumar et al., 2011; Kumar et al., 2013). Kumar et al. (2013) noted that dependability was a key driver in creating competitive advantage and a significant factor in obtaining customer satisfaction and customer loyalty (retention) (p. 494, para. 1). While researchers noted that employees view cybersecurity as necessary and important to protect the IT infrastructure and to foster customer satisfaction and trust, they also considered cybersecurity one of their largest perceived blockers to productivity in their day-to-day work (Borkovich & Skovira, 2020). Researchers also noted that perceptions of information security are influenced by how cybersecurity policies and standards are explained by technology personnel (Massarczyk & Winzer, 2017; Pabian et al., 2020; Thielsch et al., 2018). Whether it be the perceived lack of empathy being delivered by IT personnel or the inability to tailor instruction to fit all customers regardless of their level of technological knowledge, researchers noted the inability to effectively communicate with their customers as a primary factor in attracting and retaining customers (Sahai et al., 2014; Salomonson et al., 2012; Taylor et al., 2019; Webster & Sundaram, 2009). Satisfaction was chosen as the dependent variable as researchers and experts, from higher education to e-commerce, have postured that satisfaction is a primary indicator of success (Bloemer & Lemmink, 2010; Hansemark & Albinsson, 2004; Herbert, 2006; Pantouvakis, 2010; Ranaweera & Prabhu, 2003). Researchers considered satisfaction to be among the six most important components of academic success, along with career success, attainment of learning objectives, acquisition of skills and competencies, persistence, and academic achievement (Alyahyan & Düştegör, 2020; Herbert, 2006; York et al., 2019).

Review of literature

Defining customer experience

Customer experience has taken many forms and definitions over the years. The term is defined by the sum of its parts: customer and experience. The Merriam-Webster Dictionary defines a customer as “one that purchases a commodity or service” (Merriam-Webster, 2023). The Oxford Advanced Learner’s Dictionary defines a customer as “a person or an organization that buys goods or services from a shop or business” (Oxford University Press, 2023). Given these definitions, the learners, instructors, and non-technical staff would be viewed as customers. Taking this position, particularly that of viewing students as customers, has been discussed and debated on a global scale for at least the last 30 years. One side of the debate finds it offensive to view students as customers as it potentially undermines the ability to hold students accountable for their role in the learning process (Cuthbert, 2010; Guilbault, 2016). On the other side of the debate, researchers argue colleges and universities need to embrace the concept of viewing students as customers to enhance the learning experience by making students active participants in each portion of the learning process (Campbell-Perry & Williamson, 2017; Guilbault, 2018). From the student's point of view and the definitions of a customer, the rising costs associated with attending a higher education institution contribute to the student as a customer viewpoint (Cuthbert, 2010). From this view, students see themselves as customers paying for a service (education).

Depending on the source, experience is defined and interpreted differently, sometimes within the same source. The Cambridge Dictionary defines experience as "the process of getting knowledge or skill from doing, seeing, or feeling things" and "something that happens to you that affects how you feel" (Cambridge Dictionary, 2023). The second definition has resonated with businesses across all industries. Businesses understand that merely providing a service is not enough to maintain a loyal customer base. The way a customer feels about the service has a greater impact than the service itself. This is not a new concept, as researchers have discussed how customers seek experiences that are unique, enjoyable, and satisfying, thus leading to customer retention (Abbott, 1956; Holbrook, 2006; Palmer, 2010). Transposing this concept to higher education is not new, either. Higher education institutions attempt to blend the two definitions by using classroom experiences as an opportunity for students to learn and understand by being active participants in the learning process, as well as delivering the material in a way that grabs the attention of the learner. The experience for learners extends beyond the classroom. Researchers have discussed the importance of linking experiences in the classroom with certain auxiliary or non-academic services to enhance experiences for learners (Dropulić et al., 2021; Luke et al., 2000).

Bringing the individual terms together, customer experience refers to the period when a customer initially receives service from a provider through the moment the customer stops paying for the service (Fontaine, 2014). Transposed to higher education, the customer experience begins from the moment a student is accepted to a college and pays their tuition, then ends, preferably, once the student earns and receives their degree. Researchers have discussed how colleges and universities utilize customer experience to attract students to their programs and campuses and retain them through graduation (Alshamsi et al., 2020; Fontaine, 2014). While arguments and discussions still exist regarding the effectiveness of viewing students as customers, the focus on customer experiences in other industries has proven effective, allowing those companies to stand out among others within their industries. Eskiler and Safak (2022) performed a study on the effect of customer experience quality on customer loyalty within the fitness industry, where they found the quality of the customer experience affected customer loyalty. From the retail industry to the telecommunication industry, researchers consistently concluded that customer experience has a direct effect on customer loyalty (retention) (Imbug et al., 2018; Kursunluoglu, 2011; Lin & Bennett, 2014). Despite the debate over how students should be viewed, higher education institutions are noting the importance of customer experience and its role in increasing marketability and student retention (Booker & Rebman, 2005; Bornschlegl & Cashman, 2018)

IT and higher education

Academic and administrative services, both individually and collectively, are vital to the delivery of the customer experience to the learners. Researchers have noted multiple variables impacting a learner's overall view of the customer experience, including knowledgeable faculty and advisors, secure campuses, and adequate computer labs (Fontaine, 2014). As learners spend most of their time either in a classroom (in-person or virtual) or utilizing auxiliary services (libraries, dining services, recreational facilities, etc.), both groups must work together to provide a unique experience for the learner community (Roberts, 2018). When administrative services are considered, researchers have largely focused on the quality of auxiliary services, such as dining services, library, and housing services, and how those services are key factors in learner satisfaction and retention (Booker & Rebman, 2005; Bornschlegl & Cashman, 2018; Elliot & Shin, 2002). However, the effect IT services have on learning outcomes, student satisfaction, and retention are rarely discussed. In the age of normalizing working and learning at a distance, IT's contributions are vital to multiple aspects of the successful delivery of academic and administrative services.

Aside from standalone IT services, such as IT help desks, many of the auxiliary services Elliot & Shin (2002) noted contain significant IT components. For example, IT contributes to providing safe and secure campuses by ensuring surveillance systems are operational and connected to backup power sources to

ensure continuous monitoring, as well as ensuring the physical alarm systems are connected. IT professionals also contribute to timely access to important information, either through a learner's learning management system (LMS) or campus email systems. From the integration of AV systems in classrooms designed to broadcast instructor lectures globally to the ability to pivot to fully remote learning at any moment, IT has proven to be essential to the student experience (Al-Alwani, 2014; Draxler-Weber et al., 2022). Despite the presence of IT in virtually every aspect of the learning process and day-to-day operations of colleges and universities globally, the IT customer experience is rarely discussed, if at all.

Considering the definitions of customer experience discussed here, IT customer experience can be defined as the period when a customer interacts with IT personnel to receive IT services until the moment the service is completed, and the customer leaves. The events between the two points are "something that happens to you that affects how you feel" (Cambridge Dictionary, 2023). In higher education, IT has multiple customers: learners, instructors, technical and non-technical staff. Essentially, the IT customer base includes everyone, including other IT personnel. This presents thousands of opportunities to provide a unique, memorable experience while resolving the technology issue being presented.

The focus on the IT customer experience will allow IT leaders to take a look at their approaches to providing positive experiences. Historically, IT departments deal with internal and external perceptions of their work quality. Externally, IT departments are often perceived as cost centers that only act when something is broken, a group of nerds who make others feel unintelligent when it comes to technology issues, and the group that says "no" to any request to avoid doing work (Choudhary & Vithayathil, 2013; Cordray, 2015). Researchers have noted that these perceptions often lead to the circumventing of IT, which could lead to the utilization of unapproved and unvetted technology that could be vulnerable to malware (Borkovich & Skovira, 2020). Internally, IT professionals tend to lose sight of organizational goals due to being siloed within their specific section of IT, as well as failing to engage external stakeholders often to ensure strategic and organizational alignment (Bygstad et al., 2015; Pirkkalainen et al., 2020). From an organization's ability to obtain favorable loan terms based on the reputation of its IT department to the overall marketability of the organization, researchers have discussed the effect these perceptions can have on organizations (Kim et al., 2018; Lim et al., 2014). Bringing the IT customer experience into focus could dismiss these perceptions and build trust between IT professionals and their customers.

The synergy between HEIT and the learning process

In higher education, every employee should have the same goal of providing a unique and efficient experience for the learners. HEIT's responsibility towards the goal as a department is to ensure that not only do the learners have the technological tools needed to succeed in the classroom but also ensure the instructors have the technological tools needed to provide adequate instruction and equip the non-technical support staff to provide adequate technological support for the instructors. Considering HEIT's reach across virtually every portion of the student experience, HEIT professionals need to audit their best practices in customer service to provide memorable experiences for every customer. Researchers have commented on the necessity of governments and organizations worldwide to focus on improving the customer experience to positively impact customer value (Gaulė & Jovarauskiene, 2022). There is room for HEIT to have a similar urgency to improve the customer experience to positively impact customer value for learners, instructors, and non-technical staff.

The landscape of technology has changed at a pace that higher education has had challenges keeping up with. Researchers note some challenges stem from the unwillingness of instructors to adopt newer

technologies, the lack of effective communication between stakeholders and technical staff, and the knowledge levels of the technical staff responsible for implementing the technology (Hoyer et al., 2020; Hussain & Safdar, 2008). The importance of overcoming these challenges becomes crucial as the number of online programs being developed is rising. The COVID-19 pandemic saw a sudden shift to distance learning that is starting to become a standard method of education delivery. The National Center for Education Statistics (2022) reported that in fall 2021, when most colleges and universities were returning to fully on-campus operations, approximately 60 percent of students were enrolled in at least one online course, with 30 percent taking classes exclusively online. Negotiating these changes requires synergy with HEIT professionals, instructors, and non-technical staff to provide unique and exceptional experiences in a competition for students that has expanded due to the increased availability of online programs (Morris et al., 2020). Despite historical objections to the contrary, there is a growing sentiment that students are not only customers, but colleges and universities are, and should be, operating like businesses (Greenberg, 2004). Businesses have leaned heavily on stellar customer experiences to cultivate customer loyalty, doubling down on those experiences in the COVID-19 landscape to retain customers when many businesses were closed (Haudi et al., 2022; Syafarudin, 2021). Higher education institutions are in a similar place where customer experience should be on the list of primary program or service outcomes for each department within each college and university.

Potential biases and literature gaps

Reviews of the current literature exposed a gap specifically exploring the interactions between IT personnel and their customers within higher education. The exposed gap required the researcher to lean towards examples of the synergy between IT personnel and their customers from other industries. As the leadership structure of most higher education institutions may differ from other industries, examples outside of higher education may not produce a 1:1 relationship to higher education, which will require extended analysis and interpretation of any findings.

Researchers noted the hesitancy and, at times, the unwillingness of higher education faculty, staff, and administrations to view students as customers, noting the differences between higher education and other businesses (Dean & Clarke, 2019; Rosowsky, 2020; Wagner et al., 2011). Certain service-related sentiments, such as the customer always being right, have influenced the viewpoints on students being their customers, giving the perception that faculty and staff should compromise on their established mandates to ensure students remain happy, satisfied, and enrolled (Franz, 1998; George, 2007; Tight, 2013). Considering this, literature stemming from researchers with higher education backgrounds could be biased towards any notion that viewing and treating students as customers would be seen as positive and necessary.

The review of the literature also exposed a gap detailing areas where IT personnel prioritized customer service. The literature presents examples of IT organizations prioritizing project completion and proper leadership structure but does not present examples of IT organizations prioritizing customer service as a mechanism to complete projects and bridge perception gaps with their customers (Peykani et al., 2022; Smith, 2012). Considering this, literature stemming from researchers with IT backgrounds could be biased against shifting focus to a more customer-centric view.

Methodology

Instrument

The instrument for this study was self-designed using Microsoft Forms. This researcher used four constructs from the instrument for the present study extracted from 17 items. The constructs are 1) dependability – 6 items, 2) security – 4 items, 3) communication – 3 items, and 4) satisfaction – 4 items. This researcher utilized factor analysis to examine and determine the reliability and validity of the instrument. See Appendix A for a copy of the instrument. The instrument is a 5-point Likert-type and includes the following scoring strategy: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree.

A 5-point Likert-type instrument was utilized in the design of this study for its historical reliability and validity in capturing perceptions. Researchers have noted the common use of Likert scale instruments to reliably measure perceptions, values, and behaviors (Larrouy-Maestri et al., 2019; Moura, 2020; Olaniya, 2019). The reliability and inter-item consistency of the instrument is measured by Cronbach's Alpha, which is the correlations and comparison of scores from individual survey item scores (Goforth, 2015; Hartley & MacLean, 2006; Olaniya, 2019). A Cronbach's Alpha between 0.70 and 0.90 or higher is expected for reliability of the instrument. A factor analysis of the instrument will determine its validity. The validity measures ensure that each survey item maps with the expected construct. The validity analysis should result in items mapping to more than one construct being removed from the analysis. Researchers noted limitations of the selected methodology include, but are not limited to, concerns over personally-biased responses from participants and the desire to provide socially acceptable responses (Demetriou et al., 2015; Razavi, 2001). Researchers noted limitations of the selected methodology include, but are not limited to, concerns over personally-biased responses from participants and the desire to provide socially acceptable responses (Demetriou et al., 2015; Razavi, 2001). Researchers also note that Likert-type surveys can miss opportunities to gain in-depth understanding by limiting responses to "strongly disagree" or "agree (Bishop & Herron, 2015; Heo et al., 2022).

Subjects and procedure

This researcher administered the instrument/survey by providing a web link to the instrument/survey. This researcher utilized two social media sites (Facebook and LinkedIn) to contact potential participants. Before this, this researcher received IRB (Institutional Review Board) approval to use human subjects. The survey was distributed to and completed by 22 subjects. The subjects for this study were 18 years and older; 32% (n = 7) were male, and 68% (n = 15) were female. The subjects fell into one of the following categories within public and private higher education institutions: current students (n = 5) and recent graduates (two years or fewer) (n = 3), instructors (current (n = 3) or retired (n = 0)), and staff (current (n = 9) or retired n = 2)). Table 1 provides a detailed breakdown of the participants. The participants were provided with an informed consent form to review, sign, and return to this researcher before receiving the web link to the survey. All participants were assured confidentiality and anonymity. The survey took about seven minutes to complete. The collected data was inspected by this researcher before analysis to ensure data integrity and completeness. Incomplete data was eliminated before analysis.

Table 1: Demographics (n = 22)

Gender	Age	Race/Ethnicity	Highest level of education completed	Current Status (ex. Student, Faculty, etc.)
Male = 7 (32%)	18-24 = 9 (40%)	White = 7 (32%)	HS diploma or equivalent = 1 (5%)	Student = 5 (23%)
Female = 15 (68%)	25-34 = 2 (9%)	Black/African American = 12 (54%)	Some college, no degree = 1 (5%)	Faculty = 3 (14%)
Other = 0 (0%)	35-44 = 7 (32%)	Hispanic/Latino = 0 (0%)	Associate's degree = 2 (9%)	Staff = 9 (40%)

Prefer not to answer = 0 (0%)	45-54 = 1 (5%)	Asian = 3 (14%)	Bachelor's degree = 8 (36%)	Retired Faculty = 0 (0%)
	54-65 = 1 (5%)	Native American or Alaska Native = 0 (0%)	Graduate degree (Master's, PhD, etc.) = 10 (45%)	Retired Staff = 2 (9%)
	65+ = 2 (9%)	Native Hawaiian or Other Pacific Islander = 0 (0%)		Recent Graduate (two years or fewer) = 3 (14%)
		Two or More Races = 0 (0%)		
		Prefer not to answer = 0 (0%)		

Participant perception of the HEIT Customer Experience

The participants' perception of the IT customer experience at their higher education institution was assessed by gauging their responses across the 17 items in the survey (Table 2). The highest perception identified by mean score was "My experiences receiving services through the information technology department at my institution affects my ability to learn/teach/perform job duties" (4.41); the lowest perception was "The information technology department is proactive in providing training for new technologies" (2.95).

Table 2: Participants' Perception of the IT Customer Experience

Perception	Mean
My experiences receiving services through the information technology department at my institution affect my ability to learn/teach/perform job duties.	4.41
The information technology department does a great job of protecting my privacy.	4.27
The information technology department at my institution is helpful and knowledgeable.	4.23
It is easy for me to receive assistance from my information technology department.	4.18
The information technology infrastructure at my institution is secure.	4.09
I would recommend the information technology department at my institution to others.	4.05
I am confident that the information technology department at my institution can meet my needs.	3.95
The information technology department at my institution is responsive to my needs.	3.95
The information technology department at my institution adequately explains the importance of cybersecurity policies.	3.91
I am satisfied with the services provided by the information technology department at my institution.	3.77
I am satisfied with the level of collaboration I receive from the information technology department at my institution.	3.68
I am satisfied with the level of communication I receive from the information technology department at my institution.	3.68
The information technology department is proactive in providing access to educational resources.	3.59
The information technology infrastructure at my institution is reliable.	3.59
The information technology department is an active participant in preparing students for the workforce.	3.32
I am satisfied with the level of creativity in problem-solving from the information technology department at my institution.	3.32
The information technology department is proactive in providing training in new technologies.	2.95

Learning Outcome Factors

The means and their associated standard deviations for each learning outcome factor were evaluated and presented in Table 3. The highest mean response identified is in the dependability of higher education information technology professionals indicating above-average agreement among participants, while communication between higher education professionals and their customers (learners, instructors, staff) was the lowest mean response indicating a neutral stance on this factor.

Table 3: Means and SDs of Learning Outcome Factors

Factor	Mean	SD
Dependability of higher education information technology professionals	4.13	.59
Security concerns and awareness	3.97	.80
Satisfaction with the service provided by higher education information technology professionals	3.61	.78
Communication between higher education information technology professionals and their customers (learners, instructors, staff)	3.29	1.03

Data analysis

To answer the research question, this researcher used multiple regression analysis to determine the predictor variables (dependability, security, and communication) that are most influential in predicting the effect of the IT customer experience on learning outcomes (satisfaction). Researchers use multiple regression analysis to assess how multiple independent variables can potentially affect a dependent variable (Alexopoulos, 2010; Ghosal et al., 2020). Researchers and business forecasters have utilized multiple regression analysis to predict the role of the hotel industry on a country's economy, the number of COVID-19 deaths within a targeted date, and in machine learning (Ghosal et al., 2020; Maja et al., 2022; Zhou et al., 2021). Relevant to this study, researchers have utilized multiple regression analysis to determine which factors, such as career success, attainment of learning outcomes, and satisfaction, were most influential in predicting academic success in higher education institutions (Alyahyan & Düştegör, 2020).

The coefficients table in the multiple regression analysis determined the variables influential in predicting the dependent variable. Before any interpretation of the results in the coefficients table, the following tests were performed: 1) The model summary test, 2) the ANOVA test, and 3) the multicollinearity test. All tests were performed using the IBM SPSS version 29 software.

Results

Reliability and validity

The four-construct instrument was sent to 22 participants. Table 4 shows the results of the reliability analysis. The dependability subscale consisted of 6 items ($\alpha = .83$), the security subscale consisted of 4 items ($\alpha = .80$), the communication subscale consisted of 3 items ($\alpha = .86$), and the satisfaction subscale consisted of 4 items ($\alpha = .79$). Based on the alpha level of each factor, shown in Table 5, Dependability5 should be removed. The removal of Dependability5 is the only item where Cronbach's Alpha would improve from its initial value (initial value: $\alpha = .83$; value if Dependability5 is deleted: $\alpha = .87$). Removal of the other items would result in weakening Cronbach's Alpha for each factor. The four constructs meet the expected reliability between 0.70 and .90.

Table 4: Reliability Analysis

Factor	Cronbach's Alpha	N of Items
Dependability	$\alpha = .83$	6
Security	$\alpha = .80$	4
Communication	$\alpha = .86$	3

Satisfaction	α = .79	4

Table 5: Item-Total Statistics

Item	Scale Mean if Item Deleted	Scale Variance is Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Dependability1	20.82	9.108	.630	.803
Dependability2	20.55	9.022	.700	.792
Dependability3	20.73	7.255	.766	.771
Dependability4	20.82	8.442	.727	.782
Dependability5	20.36	10.719	.232	.872*
Dependability6	20.59	8.729	.641	.800
Security1	12.27	6.208	.552	.787
Security2	11.77	6.089	.614	.755
Security3	11.59	5.968	.805	.675
Security4	11.95	6.236	.536	.796
Communication1	6.91	4.372	.711	.822
Communication2	6.27	4.398	.785	.750
Communication3	6.55	4.736	.701	.828
Satisfaction1	10.77	4.660	.700	.681
Satisfaction2	10.77	6.374	.482	.789
Satisfaction3	11.14	6.219	.566	.749
Satisfaction4	10.68	6.323	.685	.706

*Initial value for Dependability: α = .83; value if Dependability5 is deleted: α = .87.

Exploratory factor analysis was used to determine the validity of the instrument by determining if cross-loading is present among the variable scores. Researchers recommend running factor analysis at least twice, removing items that contain cross-loadings (Koostra, 2004; Stapleton, 1997). The result of the analysis was a Promax-rotated pattern matrix consisting of our four factors: dependability, security, communication, and satisfaction. The factors accounted for 75.48% of the variance. The factor loading minimum for the analysis was set to .40. A cross-loading was found for Satisfaction4, which was removed during the subsequent factor analysis (Table 6). The subsequent factor analysis produced no cross-loadings. The removal of Satisfaction4 increased the variance to 76.47% (Table 7).

Table 6: Initial Factor Analysis with Cross-loadings[a]

Item	Dependability	Security	Communication	Satisfaction
Dependability4	1.020			
Dependability1	1.019			
Security1	.772			
Satisfaction2	.692			
Satisfaction4	.483	.404		
Dependability3	.453			
Communication1		1.095		
Communication2		.764		
Satisfaction3		.737		
Communication3		.636		
Satisfaction1		.610		
Security4		.494		
Security2			1.002	
Security3			.961	
Dependability2			.729	
Dependability6			.669	
Dependability5				.873

Extraction Method: Principal Component Analysis.

Rotation Method: Promax with Kaiser Normalization
[a]. Rotation converged in 6 iterations.

Table 7: Factor Analysis with Cross-loadings Removed[a], [b]

Item	Dependability	Security	Communication	Satisfaction
Communication1	1.086			
Communication2	.790			
Satisfaction3	.689			
Communication3	.675			
Satisfaction1	.618			
Security4	.533			
Security2		.992		
Security3		.952		
Dependability2		.733		
Dependability6		.689		
Dependability4			1.023	
Dependability1			.975	
Security1			.775	
Satisfaction2			.696	
Dependability3			.458	
Dependability5				.918

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization
[a]. Rotation converged in 6 iterations.
[b]. Satisfaction4 was removed due to its cross-loading.

The Model Summary test and ANOVA test

The Model Summary and ANOVA tests, illustrated in Tables 8 and 9, indicated a collectively significant effect between the predictor variables (dependability, security, and communication), as indicated by an F-statistic of 16.279 with a p-value less than .001 ($F(3,18) = 16.279$, $p < .001$, $R^2 = .686$), suggesting that the model explains a significant portion of the variance in the dependent value (satisfaction). The adjusted R^2 value of .686 further illustrates that the model can account for approximately 69% of the satisfaction variability, highlighting the included predictors' substantial impact.

Table 8: Model Summary Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.855[a]	.731	.686	.43831

[a]. Predictors: (Constant), Communication, Security, Dependability

Table 9: ANOVA Test[a]

Model		Sum of Squares	df	Mean Square	F	Sig
1	Regression	9.383	3	3.128	16.279	<.001[b]
	Residual	3.458	18	.192		
	Total	12.841	21			

[a]. Dependent Variable: Satisfaction
[b]. Predictors: (Constant), Communication, Security, Dependability

The Multicollinearity test

The Multicollinearity test is used to determine if two or more predictor variables are moderately or highly correlated with each other (Bayman & Dexter, 2021; The Pennslyvania State University, 2018). Researchers note that moderate to high multicollinearity in a regression model can cause issues in interpreting the results as the predictor values should be independent of each other (Ahmad et al., 2006; Bayman & Dexter, 2021; McClelland et al., 2016). The variance inflation factor (VIF) is a measure utilized to assess the degree of multicollinearity among the predictor variables (citation needed). Researchers note that VIF scores should be close to 1 but under 5; VIF scores greater than 10 suggest high collinearity and correlation between the predictor variables (Bayman & Dexter, 2021; Marshall, 2023; The Pennslyvania State University, 2018).

The Multicollinearity test, illustrated in Table 10, indicated VIF scores under 5 for each predictor variable. The VIF scores of the predictor variables suggest that each predictor variable's impact and significance on satisfaction are independent of each other.

Table 10: Multicollinearity Test[a]

Factor	VIF
Dependability	3.440
Security	3.107
Communication	1.768

[a]. Dependent Variable: Satisfaction

The coefficients table

The multiple regression testing produced the coefficient table, illustrated in Table 11. While the Model Summary and ANOVA test convey that statistical significance is present within the model, the coefficients table provides context for the level of significance each predictor variable has on the dependent variable. As previously discussed, results of the Model Summary and ANOVA tests indicated that there is a collective significant effect between dependability, security, and communication ($F(3,18) = 16.279$, $p < .001$, $R^2 = .686$). The individual predictors were examined further and indicated that communication ($t = 3.067$, $p = .007$) is most influential in predicting satisfaction, with dependability falling slightly outside of the significant range ($t = 2.092$, $p = .051$).

Table 11: Coefficients Table[a]

		Unstandardized Coefficients				
Model		B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-.105	.709		-.148	.884
	Dependability	.633	.303	.475	2.092	.051
	Security	-.037	.211	-.038	-.175	.869
	Communication	.381	.124	.499	3.067	.007
		Correlations			Collinearity Statistics	
Model		Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)					
	Dependability	.767	.442	.256	.291	3.440
	Security	.649	-.041	-.021	.322	3.107
	Communication	.784	.586	.375	.566	1.768

[a]. Dependent Variable: Satisfaction

Discussion

This study aimed to examine the interactions between IT professionals, learners, and instructors to determine which of the predictor variables (dependability, security, and communication) are most influential in predicting the effect of the IT customer experience on learning outcomes (satisfaction). Through the utilization of exploratory factor analysis and multiple regression analysis, this study identified communication as the most significant factor contributing to predicting satisfaction with higher education IT personnel among their customers (learners, faculty, staff). This finding is consistent with the previous research detailing the importance of effective communication in fostering positive relationships and satisfaction within educational settings (Aristovnik et al., 2020; Bruggeman et al., 2021; Ortiz-Rodriguez et al., 2005; Tang, 2018).

Effective communication from higher education IT personnel encompasses various channels, including formal channels such as official announcements, policies, and procedures, as well as informal channels such as interpersonal interactions and feedback mechanisms. As mentioned earlier, the manner that IT professionals use to not only deliver announcements and policies but to also explain announcements and policies is important to provide as much clarity as possible. The results underscore the importance of both formal and informal communication channels in shaping perceptions of satisfaction with higher education IT personnel.

One plausible explanation for the significance of communication in predicting satisfaction lies in its role in facilitating transparency and clarity for the customers of IT. Tasa (2023) ranked the lack of communication between IT personnel and other departments within the business as the number one concern for IT managers to overcome (para. 3). Researchers have noted how clear and transparent communication regarding institutional technology policies, decisions, and expectations can enhance trust among students, faculty, and staff (Grajek, 2022; Sweett, 2020). Additionally, effective communication fosters a sense of inclusivity by ensuring that customers of IT are a part of the process of adopting IT policy, thus contributing to positive interactions and experiences between higher education IT personnel and their customers (Sweett, 2020; Tasa, 2023).

Implications of findings

The significance of communication in predicting satisfaction underscores the need for higher education IT departments to prioritize communication strategies and initiatives. IT personnel have credited the difficulties of adopting policies to not being seen as an active partner with other departments in the organization (Tasa, 2023). This sentiment has been shared within higher education as IT personnel have noted a desire to be active partners with all stakeholders within the institution to produce better learning outcomes for students (Grajek, 2022). Within higher education, IT departments have begun to incorporate student and staff success initiatives into their IT strategies. According to Sweett (2020), 74% of higher education institutions incorporated student success initiatives into their strategies, resulting in improved learning outcomes and academic success metrics (para. 8). Effective communication from IT personnel can consistently provide positive outcomes by investing in training programs for IT personnel to enhance their communication skills, following up on feedback received from their customers and providing timely and transparent communication.

Limitations of the study

Despite the insights gained from this research, some limitations should be acknowledged. Firstly, the sample size in this study did not meet the recommended quota for multiple regression analysis. While the

appropriate population was chosen, the limited sample size may have impacted the interpretations of the findings. A larger sample size would provide additional depth and robustness to the findings of the study.

Secondly, another significant limitation pertains to the researcher's acquaintance with all of the participants. This familiarity may have introduced bias or influenced participants' responses, potentially impacting the accuracy and reliability of the data collected. Though anonymity was guaranteed, participants may have been more inclined to provide socially desirable responses or suppress certain information due to their relationship with the researcher, thereby affecting the validity of the study results. Future research should strive to minimize potential bias by involving a broader participant population outside of the researcher's acquaintances.

It is important to acknowledge that the findings of this study may be influenced by contextual factors specific to the higher education institutions represented by the participants. Institutional differences in organizational culture, communication practices, and resource allocation may impact the generalizability of the findings to other educational settings.

Recommendations for future research

While communication emerged as the most significant factor in the analysis, it is important to acknowledge that satisfaction with higher education is generally influenced by other factors, including campus facilities and administrative support, and allocated resources. The COVID-19 pandemic resulted in many workers transitioning to remote work opportunities, leaving many IT managers with talent shortages across multiple areas, primarily in areas such as help desks (Sweett, 2020; Tasa, 2023). Future research could explore the connections to communication with IT personnel and these general factors to gain a more comprehensive understanding of satisfaction with IT personnel and its role in achieving positive learning outcomes.

Conclusion

The findings highlight the role that effective communication has in predicting satisfaction with higher education IT personnel among their customers. As mentioned previously, satisfaction is a primary indicator of success in most businesses (Sahai et al., 2014; Salomonson et al., 2012; Taylor et al., 2019; Webster & Sundaram, 2009). The successes gained from satisfaction lead to repeat customers as they see value in the service and feel supported by the personnel assisting them. Grajek (2022) noted the importance of higher education IT personnel contributing their expertise more directly as many institutions embrace remote/hybrid classes and work (para. 20). Ensuring that students, faculty, and staff have reliable and efficient IT resources becomes not only an aide to effecting learning outcomes for higher education IT's customers, but also a potential recruiting tool to gain a competitive advantage in enrolling the top students, wherever they may be.

References

Abbott, L. (1956). Quality and Competition: An Essay in Economic Theory. *The ANNALS of the American Academy of Political and Social Science, 304*(1), 158-159. https://doi.org/10.1177/000271625630400134

Agre, P. (1999). Information Technology in Higher Education: The "Global Academic Village" and Intellectual Standardization. *On the Horizon, 7*(5), 8-11.

Ahmad, M. H., Adnan, R., & Adnan, N. (2006). A Comparative Study On Some Methods For Handling Multicollinearity Problems. *Malaysian Journal of Industrial and Applied Mathematics (MATEMATIKA), 22*, 109-119. https://doi.org/10.11113/matematika.v22.n.179

Al-Alwani, A. (2014). Information Technology Integration in Higher Education: A Novel Approach for Impact Assessment. *International Journal of Emerging Technologies in Learning, 9*(6), 32-36. https://doi.org/10.3991/ijet.v9i6.4036

Alexopoulos, E. C. (2010). Introduction to Multivariate Regression Analysis. *Hippokratia, 14*(1), 23-28.

Alshamsi, A., Alshurideh, M., Al Kurdi, B., & Salloum, S. A. (2020). The Influence of Service Quality on Customer Retention: A Systematic Review in the Higher Education. *International Conference on Advanced Intelligent Systems and Informatics.* Cairo: Spring. https://doi.org/10.1007/978-3-030-58669-0_37

Alyahyan, E., & Düştegör, D. (2020). Predicting academic success in higher education: literature review and best practices. *International Journal of Educational Technology in Higher Education, 17*(3), 1-21. https://doi.org/10.1186/s41239-020-0177-7

Andreassen, T. W., & Lervik-Olsen, L. (2008). The impact of customers' perception of varying degrees of customer service on commitment and perceived relative attractiveness. *Managing Service Quality, 18*(4), 309-328. https://doi.org/10.1108/09604520810885581

Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., & Umek, L. (2020). Impacts of the COVID-19 Pandemic on Life of Higher Education Students: A Global Perspective. *Sustainability, 12*(20). https://doi.org/10.3390/su12208438

Baek, H., & Kim, K. (2022). An Exploratory Study of Consumers' Perceptions of Product Types and Factors Affecting Purchase Intentions in the Subscription Economy: 99 Subscription Business Cases. *Behavioral Sciences, 12*(6), 179. https://doi.org/10.3390/bs12060179

Bayman, E. O., & Dexter, F. (2021). Multicollinearity in Logistic Regression Models. *Anesthesia & Analgesia, 133*(2), 362-365. https://doi.org/10.1213/ANE.0000000000005593

Bishop, P. A., & Herron, R. L. (2015). Use and Misuse of the Likert Item Responses and Other Ordinal Measures. *International Journal of Exercise Science, 8*(3), 297-302. Retrieved February 21, 2024, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4833473/

Bloemer, J. M., & Lemmink, J. G. (2010). The importance of customer satisfaction in explaining brand and dealer loyalty. *Journal of Marketing Management, 8*(4), 351-363. https://doi.org/10.1080/0267257X.1992.9964204

Booker, Q. E., & Rebman, C. M. (2005). E-student retention: Factors affecting customer loyalty for online program success. *Issues in Information Systems, 4*(1), 183-189. https://doi.org/10.48009/1_iis_2005_183-189

Borkovich, D. J., & Skovira, R. J. (2020). Working From Home: Cybersecurity in the Age of COVID-19. *Issues in Information Systems, 21*(4), 234-246. https://doi.org/https://doi.org/10.48009/4_iis_2020_234-246

Bornschlegl, M., & Cashman, D. (2018). Improving Distance Student Retention Through Satisfaction and Authentic Experiences. *International Journal of Online Pedagogy and Course Design, 8*(3), 60-77. https://doi.org/10.4018/IJOPCD.2018070105

Borwick, J. (2013, March 25). *The Information Technology department's role in higher education, seen through the "TPACK" model*. Retrieved June 4, 2023, from HEIT Management:

http://www.heitmanagement.com/blog/2013/03/the-information-technology-departments-role-in-higher-education-seen-through-the-tpack-model/
Bruggeman, B., Tondeur, J., Struyven, K., Pynoo, B., Garone, A., & Vanslambrouck, S. (2021). Experts speaking: Crucial teacher attributes for implementing blended learning in higher education. *The Internet and Higher Education, 48*. https://doi.org/10.1016/j.iheduc.2020.100772
Bygstad, B., Hanseth, O., & Le, D. T. (2015). From IT Silos to Integrated Solutions. A Study in E-Health Complexity. *ECIS 2015.*
Cambridge Dictionary. (2023). *Experience.* Retrieved June 21, 2023, from Cambridge Dictionary: https://dictionary.cambridge.org/us/dictionary/english/experience
Campbell-Perry, S., & Williamson, E. (2017). Are Students Customer in Higher Education? Should We Care About The Answer? *INTED2017 Proceedings.* Valencia: IATED Digital Library. https://doi.org/10.21125/inted.2017.0508
Choudhary, V., & Vithayathil, J. (2013). The Impact of Cloud Computing: Should the IT Department Be Organized as a Cost Center or a Profit Center? *Journal of Management Information Systems, 30*(2), 67-100. https://doi.org/10.2753/MIS0742-1222300203
Cordray, R. (2015, February 19). *Why people look down on the IT department and why they're wrong*. Retrieved from ITBusiness.ca: https://www.itbusiness.ca/blog/why-people-look-down-on-the-it-department-and-why-theyre-wrong/51984
Cuthbert, R. (2010). Students as Customers? *Higher Education Review, 42*(3), 3-25.
Dean, J. W., & Clarke, D. Y. (2019). How Are Businesses and Universities Different? How Are They Similar? In J. W. Dean, & D. Y. Clarke, *The Insider's Guide to Working with Universities* (pp. 12-30). The Univesity of North Carolina Press.
Demetriou, C., Ozer, B. U., & Essau, C. A. (2015). Self-Report Questionnaires. In I. John Wiley & Sons, *The Encyclopedia of Clinical Psychology, First Edition.* John Wiley & Sons, Inc. https://doi.org/10.1002/9781118625392.wbecp507
Draxler-Weber, N., Packmohr, S., & Brink, H. (2022). Barriers to Digital Higher Education Teaching and How to Overcome Them—Lessons Learned during the COVID-19 Pandemic. *Education Sciences, 12*(12), 870. https://doi.org/10.3390/educsci12120870
Dropulić, B., Krupka, Z., & Vlašić, G. (2021). Student Customer Experience: A Systemic Literature Review. *Journal of Contemporary Management Issues, 26*(2), 211-228. https://doi.org/10.30924/mjcmi.26.2.12
Elliot, K. M., & Shin, D. (2002). Student Satisfaction: An alternative approach to assessing this important concept. *Journal of Higher Education Policy and Management, 24*(2), 197-209. https://doi.org/10.1080/1360080022000013518
Eskiler, E., & Safak, F. (2022). Effect of Customer Experience Quality on Loyalty in Fitness Services. *Physical Culture and Sport. Studies and Research, 94*, 21-34. https://doi.org/10.2478/pcssr-2022-0003
Fontaine, M. (2014). Student Relationship Management (SRM) in Higher Education: Addressing the Expectations of an Ever Evolving Demographic and Its Impact on Retention. *Journal of Education and Human Development, 3*(2), 105-119.
Foret, W. (2019, December 9). *5 Things IT Professionals Have Trouble Communicating To Management*. Retrieved February 15, 2024, from Forbes: https://www.forbes.com/sites/forbesbusinesscouncil/2019/12/09/5-things-it-professionals-have-trouble-communicating-to-management/?sh=236978e465d1
Franz, R. S. (1998). Whatever you do, don't treat your students like customers! *Journal of Management Education, 22*(1), 63-69. https://doi.org/10.1177/10525629980220010
Gaulė, E., & Jovarauskiene, D. (2022). Customer Value First: Improving the Customer Experience in Public Services. *Public Policy And Administration, 21*(1), 129-142. https://doi.org/10.5755/j01.ppaa.21.1.29900
George, D. (2007). Market overreach: The student as customer. *The Journal of Socio-Economics, 36*(6), 965-977. https://doi.org/10.1016/j.socec.2007.01.025

Georgia Tech Professional Education. (2019, June 21). *7 Key Factors to Consider When Choosing an Online Degree Program*. Retrieved February 16, 2024, from Georgia Tech Professional Education: https://pe.gatech.edu/blog/working-learning/choosing-online-degree-program

Ghosal, S., Sengupta, S., Majumder, M., & Sinha, B. (2020). Linear Regression Analysis to predict the number of deaths in India due to SARS-CoV-2 at 6 weeks from day 0 (100 cases - March 14th 2020). *Diabetic & Meabolic Syndrome: Clinical Research & Reviews, 14*(4), 311-315. https://doi.org/10.1016/j.dsx.2020.03.017

Goforth, C. (2015, November 16). *Using and Interpreting Cronbach's Alpha*. Retrieved February 21, 2024, from University of Viriginia Library: https://library.virginia.edu/data/articles/using-and-interpreting-cronbachs-alpha

Grajek, S. (2022, October 31). *Top 10 IT Issues, 2023: Foundation Models*. Retrieved October 31, 2024, from Educause Review: https://er.educause.edu/articles/2022/10/top-10-it-issues-2023-foundation-models

Green, K. C., & Gilbert, S. W. (1995). Great Expectations: Content, Communications, Productivity, and the Role of Information Technology in Higher Education. *Change: The Magazine of Higher Learning, 27*(2), 8-18. https://doi.org/10.1080/00091383.1995.9937733

Greenberg, M. (2004). A University Is Not a Business (and Other Fantasies). *EDUCAUSE Review, 39*(2), 10-16.

Guilbault, M. (2016). Students as customers in higher education: reframing the debate. *Journal of Marketing For Higher Education, 26*(2), 132-142. https://doi.org/10.1080/08841241.2016.1245234

Guilbault, M. (2018). Students as customers in higher education: The (controversial) debate needs to end. *Journal of Retailing and Consumer Services, 40*, 295-298. https://doi.org/10.1016/j.jretconser.2017.03.006

Hansemark, O. C., & Albinsson, M. (2004). Customer satisfaction and retention: the experiences of individual employees. *Managing Service Quality: An International Journal, 14*(1), 40-57. https://doi.org/10.1108/09604520410513668

Hartley, S. L., & MacLean, W. E. (2006). A review of the reliability and validity of Likert-type scales for people with intellectual disability. *Journal of Intellectual Disability Research, 50*(11), 813-827. https://doi.org/10.1111/j.1365-2788.2006.00844.x

Haudi, H., Rahadjeng, E. R., Santamoko, R., Putra, R. S., Purwoko, D., Nurjannah, D., . . . Purwanto, A. (2022). The role of e-marketing and e-CRM on e-loyalty of Indonesian companies during Covid pandemic and digital era. *Uncertain Supply Chain Management, 10*(1), 217-224. https://doi.org/10.5267/j.uscm.2021.9.006

Heltzel, P. (2023, June 29). *8 problematic IT team members — and how to deal with them*. Retrieved February 15, 2024, from CIO: https://www.cio.com/article/482319/8-problematic-it-team-members-and-how-to-deal-with-them.html

Heo, C. Y., Kim, B., Park, K., & Back, R. M. (2022). A comparison of Best-Worst Scaling and Likert Scale methods on peer-to-peer accommodation attributes. *Journal of Business Research, 148*, 368-377. https://doi.org/10.1016/j.jbusres.2022.04.064

Herbert, M. A. (2006). Staying the Course: A Study in Online Student Satisfaction and Retention. *Online Journal of Distance Learning Administration, 9*. Retrieved from https://ojdla.com/archive/winter94/herbert94.pdf

Holbrook, M. B. (2006). Reply to Bradshaw, McDonagh, and Marshall: Turn Off the Bubble Machine. *Journal of Macromarketing, 26*(1), 84-87. https://doi.org/10.1177/0276146705285696

Hoyer, W. D., Kroschke, M., Schmitt, B., Kraume, K., & Shankar, V. (2020). Transforming the Customer Experience Through New Technologies. *Journal of Ineractive Marketing, 51*, 57-71. https://doi.org/10.1016/j.intmar.2020.04.001

Hussain, I., & Safdar, M. (2008). Role Of Information Technologies In Teaching Learning Process: Perception Of The Faculty. *Turkish Online Journal of Distance Education, 9*(2), 46-56.

Imbug, N., Ambad, S. N., & Bujang, I. (2018). The Influence of Customer Experience on Customer Loyalty in Telecommunication Industry. *International Journal of Academic Research in Business and Social Sciences, 8*(3), 103-116. https://doi.org/10.6007/IJARBSS/v8-i3/3909

Kapp, K. (2003). Five Technological Considerations When Choosing an E-Learning Solution. *eLearn, 2003*(6). https://doi.org/10.1145/863928.2134469

Kim, J.-B., Song, B. Y., & Stratopoulos, T. C. (2018). Does Information Technology Reputation Affect Bank Loan Terms? *The Accounting Review, 93*(3), 185-211. https://doi.org/10.2308/accr-51927

Koostra, G. J. (2004). *Exploratory Factor Analysis.* Gerrit Jan Kootstra. Retrieved February 21, 2024, from https://www.let.rug.nl/nerbonne/teach/rema-stats-meth-seminar/Factor-Analysis-Kootstra-04.PDF

Kumar, V. (2010). *An Empirical Investigation of the Linkage between Dependability, Quality and Customer Satisfaction in Information Intensive Service Firms.* University of Exeter.

Kumar, V., Batista, L., & Maull, R. (2011). The Impact of Operations Performance on Customer Loyalty. *Service Science, 3*(2), 158-171. https://doi.org/10.1287/serv.3.2.158

Kumar, V., Kumari, A., Garza-Reyes, J. A., & Lim, M. K. (2013). Dependability a Key Element for Achieving Competitive Advantage: A Study of Information Service Firms. *IFIP International Conference on Advances in Production Management Systems.* Guiyang: Springer. https://doi.org/10.1007/978-3-642-41266-0_59

Kursunluoglu, E. (2011). Customer Service Effects on Customer Satisfaction and Customer Loyalty: A Field Research in Shopping Centers in Izmir City - Turkey. *International Journal of Business and Social Science, 2*(17), 52-59.

Larrouy-Maestri, P., Harrison, P. M., & Müllensiefen , D. (2019). The mistuning perception test: A new measurement instrument. *Behavior Research Methods, 51*, 663-675. https://doi.org/10.3758/s13428-019-01225-1

Liao, S.-H., Hu, D.-C., & Chou, H.-L. (2022). Consumer Perceived Service Quality and Purchase Intention: Two Moderated Mediation Models Investigation. *SAGE Open, 12*(4). https://doi.org/10.1177/21582440221139469

Lim, J.-H., Stratopoulos, T. C., & Wirjanto, T. (2014). Does IT reputation matter? Role of Senior Executives. *47th Hawaii International Conference on System Science.* Waikoloa: IEEE. https://doi.org/10.1109/HICSS.2014.571

Lin, Z., & Bennett, D. (2014). Examining retail customer experience and the moderation effect of loyalty programmes. *International Journal of Retail & Distribution Management, 42*(10), 929-947. https://doi.org/10.1108/IJRDM-11-2013-0208

Luke, R. H., Pettijohn, C. E., & Pettijohn, L. S. (2000). Capturing College Students as Customers: Measuring the Satisfaction with and Perception of Zip Card Services. *Marketing Management Journal, 10*(1), 12-23.

Mahajan, R. (2015, February 4). *IT Stereotypes: Time To Change*. Retrieved June 6, 2023, from InformationWeek: https://www.informationweek.com/it-life/it-stereotypes-time-to-change

Maja, B., Suzana, H., & Kristijan, C. (2022). Application of Multiple Regression Analysis in modeling the role of the hotel industry in a country's economy. *Journal of Economic and Social Development, 9*(2), 11-20.

Marshall, E. (2023). *Multiple linear regression in SPSS.* Retrieved from University of Sheffield: https://www.sheffield.ac.uk/media/35116/download?attachment

Massarczyk, E., & Winzer, P. (2017). Influence of the Perception of Data Security and Security Importance on Customer Usage of Internet Services. *International Journal on Advances in Internet Technology, 10*, 1-22. Retrieved from https://personales.upv.es/thinkmind/dl/journals/inttech/inttech_v10_n12_2017/inttech_v10_n12_2017_1.pdf

McClelland, G. H., Irwin, J. R., Disatnik, D., & Sivan, L. (2016). Multicollinearity is a red herring in the search for moderator variables: A guide to interpreting moderated multiple regression models and

a critique of Iacobucci, Schneider, Popovich, and Bakamitsos (2016). *Behavior Research Methods, 49*, 394-402. https://doi.org/10.3758/s13428-016-0785-2

Merriam-Webster. (2023). *Customer.* Retrieved June 20, 2023, from Merriam-Webster.com Gictionary: https://www.merriam-webster.com/dictionary/customer

Morris, N. P., Ivancheva, M., Coop, T., Mogliacci, R., & Swinnerton, B. (2020). Negotiating growth of online education in higher education. *International Journal of Educational Technology in Higher Education, 17*, 1-16. https://doi.org/10.1186/s41239-020-00227-w

Moura, F. T. (2020, April 5). *Likert Scales: How to Use it to Measure Perceptions and Behaviors*. Retrieved February 20, 2024, from LiveInnovation.org: https://liveinnovation.org/likert-scales-how-to-use-it-to-measure-perceptions-and-behaviors/

National Center for Education Statistics. (2022, December). *Number and percentage of students enrolled in degree-granting postsecondary institutions, by distance education participation, location of student, level of enrollment, and control and level of institution: Fall 2020 and fall 2021 [Table].* Retrieved June 24, 2023, from National Center for Education Statistics: https://nces.ed.gov/programs/digest/d22/tables/dt22_311.15.asp

Network Computing. (2013, January 9). *IT Perceptions, End User Realities*. Retrieved June 4, 2023, from Network Computing: https://www.networkcomputing.com/data-centers/it-perceptions-end-user-realities

Olaniya, A. A. (2019). Application of Likert Scale's Type and Cronbach's Alpha Analysis in an Airport Perception Study. *Scholar Journal of Applied Sciences and Research, 2*(4). Retrieved February 20, 2024, from https://www.researchgate.net/publication/332627312_Application_of_Likert_Scale_Type_and_Cronbach's_Alpha_Analysis_in_an_Airport_Perception_Study

Ortiz-Rodriguez, M., Telg, R. W., Irani, T., Roberts, T. G., & Rhoades, E. (2005). College students' perceptions of quality in distance education: The importance of communication. *The Quarterly Review of Distance Education, 6*(2), 97-105. Retrieved February 26, 2024, from https://www.researchgate.net/publication/313559738_College_students'_perceptions_of_quality_in_distance_education_The_importance_of_communication

Oxford University Press. (2023). *Customer.* Retrieved June 20, 2023, from Oxford Learner's Dictionaries: https://www.oxfordlearnersdictionaries.com/us/definition/english/customer#:~:text=%2F%CB%88k%CA%8Cst%C9%99m%C9%99r%2F,from%20a%20shop%20or%20business

Pabian, A., Pabian, B., & Reformat, B. (2020). E-Customer Security as a Social Value in the Sphere of Sustainability. *Sustainability, 12*(24). https://doi.org/10.3390/su122410590

Palmer, A. (2010). Customer experience management: a critical review of an emerging idea. *Journal of Services Marketing, 24*(3), 196-208. https://doi.org/10.1108/08876041011040604

Pantouvakis, A. (2010). The relative importance of service features in explaining customer satisfaction: A comparison of measurement models. *Managing Service Quality: An International Journal, 20*(4), 366-387. https://doi.org/10.1108/09604521011057496

Peykani, P., Namazi, M., & Mohammadi, E. (2022). Bridging the knowledge gap between technology and business: An innovation strategy perspective. *PLoS One, 17*(4). https://doi.org/10.1371/journal.pone.0266843

Pirkkalainen, H., Salo, M., & Makkonen, M. (2020). IT engagement as a blessing and a curse? Examining its antecedents and outcomes in organizations. *International Journal of Information Management, 53*, 102130. https://doi.org/10.1016/j.ijinfomgt.2020.102130

Ranaweera, C., & Prabhu, J. (2003). On the relative importance of customer satisfaction and trust as determinants of customer retention and positive word of mouth. *Journal of Targeting, Measurement and Analysis for Marketing, 12*, 81-90. https://doi.org/10.1057/palgrave.jt.5740100

Razavi, T. B. (2001). *Self-Report Measures: An Overview of Concerns and Limitations of Questionnaire Use in Occupational Stress Research.* Tiffani Betts Razavi. Retrieved February 21, 2024, from https://www.researchgate.net/publication/5074603_Self-

Report_Measures_An_Overview_of_Concerns_and_Limitations_of_Questionnaire_Use_in_Occupational_Stress_Research
Roberts, J. (2018). Professional staff contributions to student retention and success in higher education. *Journal of Higher Education Policy and Management, 40*, 140-153. https://doi.org/10.1080/1360080X.2018.1428409
Rosowsky, D. (2020, May 10). *If Colleges Are Businesses, Why Not Run Them That Way?* Retrieved February 19, 2024, from Forbes: https://www.forbes.com/sites/davidrosowsky/2020/05/10/if-colleges-are-businesses-why-not-run-them-that-way/?sh=7d0744cb5602
Sahai, V., Jain, A. K., & Bahuguna, P. C. (2014). Bridging the gap – interpersonal communication orientation to improving customer service. *Industrial and Commercial Training, 46*(4), 209-219. https://doi.org/10.1108/ICT-10-2013-0070
Salomonson, N., Åberg, A., & Allwood, J. (2012). Communicative skills that support value creation: A study of B2B interactions between customers and customer service representatives. *Industrial Marketing Management, 41*(1), 145-155. https://doi.org/10.1016/j.indmarman.2011.11.021
Siebert, A., Gopaldas, A., Lindridge, A., & Simões, C. (2020). Customer Experience Journeys: Loyalty Loops Versus Involvement Spirals. *Journal Of Marketing, 84*(4), 45-66. https://doi.org/10.1177/0022242920920262
Skopec, C. (2021, February 4). *Technology Considerations to Support a HyFlex Learning Model*. Retrieved February 16, 2024, from Collegis Education: https://collegiseducation.com/news/online-learning/tech-considerations-to-support-hyflex-learning/
Smith, G. (2012, June 13). *State of IT: bridging the perception gap between business and technology*. Retrieved February 19, 2024, from SiliconRepublic: https://www.siliconrepublic.com/enterprise/state-of-it-bridging-the-perception-gap-between-business-and-technology
Solomon, M. (2018, June 24). *How These 3 Companies Improved Their Customer Experience By Working On (Not In) Their Businesses*. Retrieved June 3, 2023, from Forbes: https://www.forbes.com/sites/micahsolomon/2018/06/24/how-3-businesses-improved-the-customer-experience-by-working-on-their-businesses-not-just-in-them/?sh=71beb6ae4440
Stapleton, C. D. (1997). Basic Concepts in Exploratory Factor Analysis (EFA) as a Tool to Evaluate Score Validity: A Right-Brained Approach. *Southwest Educational Research Association.* Austin: Texas A&M University. Retrieved February 21, 2024, from https://ericae.net/ft/tamu/Efa.htm
Sweett, S. (2020, December 17). *7 technology and IT challenges in higher education*. Retrieved February 27, 2024, from University Business: https://universitybusiness.com/7-technology-and-it-challenges-in-higher-education/
Syafarudin, A. (2021). The Effect of Product Quality on Customer Satisfaction Implications on Customer Loyalty in the Era Covid-19. *Ilomata International Journal of Tax and Accounting, 2*(1), 71-83. https://doi.org/10.52728/ijtc.v2i1.204
Tang, K. N. (2018). The importance of soft skills acquisition by teachers in higher education institutions. *Kasetsart Journal of Social Sciences, 41*(1), 22-27. Retrieved February 26, 2024, from https://so04.tci-thaijo.org/index.php/kjss/article/view/234867
Tasa, M. (2023, March 20). *Top 10 Challenges Faced by IT Managers and How to Overcome Them*. Retrieved February 27, 2024, from Medium: https://menitasa.medium.com/10-common-it-manager-issues-and-how-to-solve-them-79210d0f481d
Taylor, S. E., Balandin, S., Wilson, E., & Murfitt, K. (2019). Customer service communication with customers with disability. *Journal of Consumer Marketing, 36*(1), 228-239. https://doi.org/10.1108/JCM-10-2017-2400
The Pennslyvania State University. (2018). *10.7 - Detecting Multicollinearity Using Variance Inflation Factors.* Retrieved February 6, 2024, from STAT 462 Applied Regression Analysis: https://online.stat.psu.edu/stat462/node/180/

Thielsch, M. T., Meeßen, S. M., & Hertel, G. (2018). Trust and distrust in information systems at the workplace. *PeerJ, 2018*(6). https://doi.org/10.7717/peerj.5483

Tight, M. (2013). Students: Customers, Clients or Pawns? *Higher Education Policy, 26*(3), 291-307. https://doi.org/10.1057/hep.2013.2

Wagner, E., Alves, H., & Raposo, M. (2011). The process of change in university management: From the "Ivory tower" to entrepreneurialism. *Transylvanian Review of Administrative Sciences, 7*(33), 124-149. Retrieved from https://www.researchgate.net/publication/228995156_The_process_of_change_in_university_management_From_the_Ivory_tower_to_entrepreneurialism

Webster, C., & Sundaram, D. S. (2009). Effect of service provider's communication style on customer satisfaction in professional services setting: the moderating role of criticality and service nature. *Journal of Services Marketing, 23*(2), 103-113. https://doi.org/10.1108/08876040910946369

York, T. T., Gibson, C., & Rankin, S. (2019). Defining and Measuring Academic Success. *Practical Assessment, Research, and Evaluation, 20*(5). https://doi.org/10.7275/hz5x-tx03

Zhou, J., Yang, J., Sun, H., Liu, Y., & Liu, X. (2021). The Influence of Entrepreneurial Cognition on Business Model Innovation: A Hybrid Method Based on Multiple Regressions and Machine Learning. *Frontiers in Psychology, 12*. https://doi.org/10.3389/fpsyg.2021.744237

Appendix A

Instrument

Informed Consent Notice

You are invited to participate in a research study being conducted by Jason Leary at Middle Georgia State University. The purpose of this study is to understand respondents' feelings towards information technology departments in higher education. Your participation is voluntary and you can withdraw from the study at any time without penalty. The results of this study will be used to improve the services provided by information technology departments in higher education. Your confidentiality and anonymity will be assured and guaranteed.

Demographics

1. Gender:
    - Male
    - Female
    - Other
    - Prefer Not to Answer
2. Age:
    - 18-24
    - 25-34
    - 35-44
    - 45-54
    - 55-64
    - 65+
3. Race/Ethnicity:
    - White
    - Black or African-American
    - Hispanic or Latino
    - Asian
    - Native American or Alaska Native
    - Native Hawaiian or Other Pacific Islander
    - Two or More Races
    - Prefer Not to Answer
4. Highest level of education completed:
    - High school diploma or equivalent
    - Some college, no degree
    - Associate's degree
    - Bachelor's degree
    - Graduate degree (Master’s, PhD, Doctorate, etc.)
5. Current Status:
    - Student
    - Faculty
    - Staff

- Retired Faculty
- Retired Staff
- Recent Graduate (two years or less)

Information Technology Department Survey

Please rate your level of agreement with the following statements.

Construct #1 "Dependability of higher education information technology professionals (1-6)"

1. The information technology department at my institution is responsive to my needs.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

2. The information technology department at my institution is helpful and knowledgeable.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

3. I would recommend the information technology department at my institution to others.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

4. I am confident that the information technology department at my institution can meet my needs.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

5. My experiences receiving services through the information technology department at my institution affect my ability to learn/teach/perform job duties.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

6. It is easy for me to receive assistance from my information technology department.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Construct #2 "Security concerns and awareness (7-10)"

7. The information technology infrastructure at my institution is reliable.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

8. The information technology infrastructure at my institution is secure.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

9. The information technology department does a great job of protecting my privacy.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

10. The information technology department at my institution adequately explains the importance of cybersecurity policies.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Construct #3 "Communication between higher education information technology professionals and their customers (learners, instructors, staff) (11-13)"

11. The information technology department is proactive in providing training for new technologies.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

12. The information technology department is proactive in providing access to educational resources.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

13. The information technology department is an active participant in preparing students for the workforce.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Construct #4 "Satisfaction with the service provided by higher education information technology professionals (14-17)"

14. I am satisfied with the level of communication I receive from the information technology department at my institution.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

15. I am satisfied with the level of collaboration I receive from the information technology department at my institution.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

16. I am satisfied with the level of creativity in problem-solving from the information technology department at my institution.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

17. I am satisfied with the services provided by the information technology department at my institution.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Any additional feedback you would like to add about the information technology department at your institution?

Thank you for your participation!