Title: Managing Innovation - E-Services in Higher Education

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Abstract

In today's increasingly digital age, and fueled by consumers' expectations for robust and personalized digital experiences, the adoption and use of e-services by customers and constituents is critical. This rings true in higher education, where there is immense pressure for institutions to build service and digital experiences that match what students experience in their broader lives. In the context of recent critiques of higher education, and corresponding demands from policymakers, the general public and students/customers to lower costs, deliver more educational value, and provide an educated workforce to meet economic demands, this work is critically important. However, while students view e-services as a total package that includes administrative and learning services that together constitute a collective digital experience, little is known about this overarching landscape, as most studies on e-services in higher education focus on particular categories of e-services, such as mobile learning. Through an exploratory literature review, this study seeks to fill in gaps in the literature by clearly defining higher education e-services and anchor their importance in societal and institutional goals to improve undergraduate degree attainment. This paper sets the stage for further research into the critical factors that drive the adoption and use of e-services in higher education.

Introduction

Innovation management is concerned with not only developing innovations, but also with how innovations perform when released into the marketplace, organizations or other contexts where they have the potential to solve critical issues. Thus, a key issue for the innovation management field is to understand the critical factors that influence the adoption of innovations,

in an effort to gauge early challenges or understand successes so that the innovations can be managed for optimal performance.

With an eye toward this goal, this paper seeks to define and describe e-services in a higher education context, as a field of innovation that has received little attention in the academic literature. This paper lays the groundwork for additional research to investigate the factors that influence students' adoption and use of online services/e-services in higher education. To my knowledge, there is no comprehensive literature review of e-services in the higher education domain. This lack of understanding about e-services in higher education presents a large performance gap for administrators, faculty and staff. Addressing this issue could provide opportunities to reduce significant barriers for students generally, and particularly those undergraduates who are the first in their families to attend college, for whom challenges in navigating toward degree completion have more of a profound impact. There is a strong promise of how more knowledge and insights in this area can influence practice, as innovating e-service delivery can enable universities to provide more seamless and efficient ways for students to experience their institutions, thereby improving student learning and graduation rates, removing administrative barriers to accessing education and enhancing brand perception.

This paper is organized as follows: description of the research methodology; review of academic literature to illustrate the service imperative facing the broader economy; define e-services in a higher education context; discuss the role of mobile services; articulate why researching e-services ought to matter for the broader public and in particular, institutions whose goals are improve student success; present a summary of the data demonstrating the importance that technology plays in the lives of today's students; and a synthesize findings from this paper.

Methodology

In order to better understand e-services in higher education this paper uses an exploratory literature review as its research method, as very little research exists on this topic. In May and June 2017, keyword searches were conducted using Google Scholar, as well as critical journals in the technology management and higher education technology fields. Key words included: e-services, higher education, service innovation, e-learning, e-government services, technology adoption factors, and higher education students. Specific journals that were explored include: IEEE Transactions on Engineering Management; Research Policy; Computers in Human Behavior; Information & Management; Research Policy; Journal of Product Innovation Management; International Journal of Information Technology & Decision Making; Computers & Education; and Internet and Higher Education. After a sufficient pool of articles was identified, I reviewed the articles and narrowed to those that are most germane to the research topic. I then read the relevant articles and grouped the readings into themes that are reflected in the major sections of this paper.

The Service Imperative

An area of ongoing innovation, fueled in large part by mass customization and the experience economy, is in the delivery of services, many of which now depend heavily on technology. Services now account for an incredibly large part of economies around the world, including in the United States. As of 2016, services in the United States accounted for nearly 80 percent of Gross Domestic Product, whereas agriculture was one percent and industry 20 percent [1]. In this era of services, technology has become prominent and is fundamentally altering the relationship between customer and firm [2]. Customers routinely utilize the Web for research

about products and services before buying and online shopping has exploded in use. A 2016 Pew Research Center Survey found that 79% of Americans have made an online purchase and 51% have purchased something using a cellphone [3]. Given that such a large part of the world economy consists of services, one would expect substantive academic research on this topic. However, there is a void in this research. In response, Bittner and Brown call for a "service imperative" for firms to improve their competitiveness and thrive in this "new world," and for academic institutions to foster graduates who can build services knowledge and their careers in this domain [4]. The imperative is clear - organizations "must actively manage and measure service delivery across all site types and access methods to ensure the quality of the entire customer experience" [5]. The mandate for higher education is just as clear - that formal education must change in the same ways that the working world and the broader economy are changing - yet this will be challenging for large swaths of the educational system, include higher education [6].

Service innovation, which refers to the development and changes of services and is heavily influenced by new technology, is critical to this service imperative paradigm and thus organizational success. It includes services delivery, innovation adoption, service strategy and service process improvements [7]. Technology-enabled services range from mobile banking apps, to enhanced point-of-sale experiences (e.g. tap and pay), to moving paper processes to online digital environments, to more self-service options for busy customers, to smart city/Internet of Things-driven sensors that improve urban transportation systems.

One sector where technology-enabled service innovations is garnering some, although not nearly sufficient attention, and where its research is attempting to catch up to the pioneers in

the business world, is in higher education. E-services innovations in higher education range from moving processes online, to developing and deploying mobile apps and their accompanying push technologies to help students navigate these unreasonably complex bureaucracies, to developing self-service applications that enable students to make degree plans tied to their career objectives, to facilitating up-to-date communications between students and advisors (e.g. text messaging, social media, etc.). While from an outsider perspective, these might not appear to be innovations, given the technology developments in our broader economy and how this has shaped students' expectations for e-services, combined with the lags in higher education technology innovations, they are indeed novel in many higher education institutions [8] and as such constitute "innovations" [9]. With an estimated approximately 20.5 million students enrolled in postsecondary institutions in the United States [10], higher education has a large footprint and is ripe for service innovation.

Defining E-services in a Higher Education Context

In an effort to anchor this paper it is helpful to define electronic-based services, or "e-services," in a higher education context. First, a definition of services is helpful. Per Bittner and Brown, services are "deeds, processes and performances...provided to customers in exchange relationships among organizations and individuals" [4]. Services are prominent in healthcare, transportation, telecommunications, business services and IT services industries and are increasingly ubiquitous throughout the United States and the globe.

In order to define e-service in a higher education context, since scant research exists, one must draw from research in other more well established fields - the public and private sectors. E-government, established in the United States in 1993 [11], provides a useful jumping off point

for defining e-services, as a significant body of research has been conducted in this field. A definition from the public sector literature provides the groundings for defining e-services in higher education. According to [12], "E-government is the use of information technology to enable and improve the efficiency with which government services are provided to citizens, employees, businesses and agencies." Another useful definition, again drawing from the public sector literature, is: "An e-Service in the government context consists in the provision of transactions by the online channel" [13]. Another angle, drawing on e-commerce literature is that e-services are, quoting Tiwana and Ramesh as cited in [14], "Internet based applications that fulfill service needs by seamlessly bringing together distributed, specialized resources to enable complex, (often real-time) transactions." Yet another perspective is to consider online services, which "offer a combination of proprietary and open Internet-based content (e.g., news, weather, sports), features (e.g., software downloads, financial research data), and services (e.g., e-mail, bulletin boards, web access) to individual and business users" [15]. Drawing on the limited higher education literature on e-services, [16] describe that the root of e-services delivered to students stems from a desire to automate "the process of delivering learning and administrative services more efficiently and effectively" and to support student agency, and thus university workload, by enabling self-service processes.

I draw from these definitions to define e-services in a higher education context: the use of information and communication technologies to enable web-based service delivery that seamlessly brings together distributed resources to enable complex transactions. E-services provide higher education institutions with the ability to improve the efficiency and effectiveness with which services are provided to students, employees, the public, community partners, and

other stakeholders. This paper focuses solely on the students - as they are consumers and participants in e-services, and the primary users of higher education services.

E-services in higher education can be categorized into two broad camps - e-learning and administrative services. While very little research exists on administrative e-services, fairly extensive research exists on student and faculty adoption of e-learning [17], learning management systems [18] and m-learning (mobile learning) [19].

E-learning consists of a continuum of enhanced, blended and online learning [20] that uses electronic technologies to deliver educational curriculum outside of a physical (i.e. traditional) classroom. It often refers to degree programs or courses that are delivered online [21]. E-learning is delivered through various information and communication technologies, including the internet, telephone, computers radio, computer, video and others [22]. The primary job a student is trying to accomplish through e-learning to acquire new knowledge and/or skills when pursuing a course of a study, often toward completing a degree program.

In contrast, administrative e-services are e-services that students use when accomplishing tasks related to maintaining their enrollment. Little research exists on this topic. These services include items such as scheduling advising appointments, paying bills, applying for financial aid, signing up for campus clubs, finding on-campus parking, applying for scholarships, applying for admission and accessing academic supports. Many e-services, both inside and outside of higher education, are considered self-service technologies, where customers/students can use a service with very little, if any, involvement from a direct service employee. These services are gradually replacing or supplementing labor-intensive high-touch human service delivery [23].

Mobile Services in Higher Education

The technologies through which e-services are delivered in universities and colleges primarily includes websites and content accessed by laptops, desktop computers and mobile devices, and apps delivered through mobile devices and tablets. In this ecosystem, mobile services are quite prominent.

Mobile services, often delivered through smartphones, are interactions between mobile customers and technology systems or employees when supported by a mobile telecommunications network [24]. There are many categories of mobile services, including Short Message Service (SMS), Multimedia Messaging Service (MMS), email and the prevalent mobile content and information services (such as news, entertainment, music, and location-based services), and also transaction-based services, such as mobile banking [24]. Mobile Instant Messaging is also becoming more prevalent in higher education [25], as is interest in augmented reality, which seeks to promote learning that is both autonomous and collaborative [26]. Importantly, compared with traditional means of electronic commerce or services, mobile services provide more freedom, as customers/clients can access services independent of physical location [27].

Kakihara and Sorensen argue that there are three primary dimensions of mobility - spatiality, temporality and contextuality - that can be understood beyond just where, when and in what way. They extend conventional thinking by adding that spatiality can also include geographical movement of more than just humans, and that temporality can also include objective and subjective measures of time. Contextuality, they state, is related to social networks and the obtrusiveness (or lack thereof) of technological interactions [28].

Table 1: Extended Perspectives on Mobility [28])

Dimensions of Mobility	**Aspects of Interaction**	**Extended Perspectives**
Spatiality	- Where	Geographical movement of not just human but objects, symbols, images, voice, etc
Temporality	- When	- Clock time vs. Social time (objective vs. subjective) - Monochronicity vs. Polychronicity
Contextuality	- In what way - In what circumstance - Towards which actor(s)	- Multi modality of interaction (Unobtrusive vs. Obtrusive; Ephemeral vs. Persistent) - Weakly & strongly tied social networks

In higher education, mobile services are becoming increasingly prominent. By far the majority of research related to mobile services in higher education is about mobile learning (m-learning), which includes communication between students and faculty/instructors; learning materials; and sharing assignments [29]. Some argue m-learning consists of two main branches - learning material services and learning administrative services [30]. M-learning has been researched broadly, as well as in specific geographical or institutional contexts (see for example [31], which studied mobile learning in Saudi Arabia).

A variety of features and technology have been used for electronic learning approaches as articulated by Alzaza and Yaakub (2011) [29], highlighting that m-learning is somewhat distinct from e-learning and w-learning in that it is accessed from mobile devices anywhere at any time.

Table 1: Comparison features of e-learning, w-learning and m-learning (adapted from [29])

Feature	**E-learning**	**W-learning**	**M-Learning**
Protocol	Web-based	Web-Based	Wireless Application Protocol-based
Accessibility	Anywhere	Campus	Anywhere and anytime
Network	Wired	Wireless	Wireless
Device size	PC or laptop	Laptop or tablet PC	Mobile phone, smart phone or PDA phone
Screen size	“Normal” screen size,	“Medium” screen size,	Very small (mobile phone) to a maximum of 480×640

Mobile services are critical components of e-services, particularly with the growing adoption of smartphone technology.

E-Services and Student Success

E-services are increasingly important in higher education for many reasons, including the growing prominence of technology in service delivery, student demands for services (both administrative and learning) that they can access independent of time and space, and institutional goals to improve organizational efficiency and efficacy. One area in particular that is critically important, is the role of e-services in aiding institutions' and students' goals of enhancing undergraduates' persistence toward graduation. Student-facing e-services in this domain include communication campaigns delivered via email, SMS for coaching and advising, and mobile app notifications to support students in completing critical tasks, such as resolving account holds that prevent registration or completing mandatory advisor meetings; online tutoring; online advising; and self-service tools for academic planning (such as degree audits and degree planning).

Understanding more about e-services in support of student success is critical, as universities across the United States, particularly public schools (that tend to serve those from lower socio-economic backgrounds), are making significant investments to innovate and upgrade their services to better serve students, and provide a digital experience that more closely resembles what today's students expect. Massive efforts and energies across the United States are occurring to improve college attendance and graduation rates, particularly for those who could benefit most by earning college credentials. This includes students who are motivated to

use education as a means to assist themselves and their families out of poverty and to new levels of income, civic engagement and prosperity.

There is generally broad agreement in the United States that a college degree is a prerequisite for gainful employment. Since 2011 the U.S. economy has added 11.5 million jobs for workers with education needed beyond high school, while only 80,000 jobs were added for those with only a high school diploma [32]. Yet, while Americans support higher education, "there is a consensus in the literature that attainment barriers exist for members of traditionally underrepresented minority groups" [33] and that the U.S. is falling short in its aspirations to make higher education an equalizer in terms of social mobility. Many also feel that higher education is not functioning adequately [34] and that the costs of education are keeping many from realizing these opportunities [35]. Further, at the same time that demand is increasing for workers with a college degree, undergraduate departure and graduation rates are still abysmally low. Despite significant efforts, these data points remain largely stagnant, varying little between 1983 and 2010 - "45 percent of students enrolled in two-year colleges depart at the end of their first year, whereas approximately 28 percent of first-year students enrolled in four-year colleges and universities depart at the end of their first year" [36]. Additionally, only a little more than half of undergraduate college students complete their postsecondary degrees within six years [37].

E-services are positioned to substantially enhance efforts to improve student success, as the locus of change to move stubborn persistence rates and driven by research findings has moved from faulting individuals to looking at the environments that higher education institutions create. While several decades ago, student retention was viewed as a reflection on individuals'

skills and motivations, this view has changed substantially, where today, research widely recognizes that "the role of the environment, in particular the institution, [is critical] in student decisions to stay or leave" [38].

The opportunity in front of higher education institutions and society at large to improve student attainment is quite substantial, given the size of the higher education sector - in 2014-15, the number of students enrolled in postsecondary institutions was 27,386,275 in 7,014 institutions [39] - and the large and fast-growing educational technology (edtech) sector. The edtech sector, according to recent research, is growing incredibly quickly, with the global market projected to grow at 17 percent per year to $252 billion by 2020. Further, the global education market, at $5 trillion, is eight times larger than the software market, yet is only 2 percent digitized [40].

What all of this means for higher education institutions is that they have profound responsibilities, pressures and goals to improve student success, and in particular, critical choices to make about how they promote or inhibit student persistence. Improving and innovating delivery of e-services provides a ripe opportunity for institutions to minimize barriers to access, not to mention address students' frustrations with antiquated digital experiences, so that students can focus on what is most important - their learning.

Higher Education Students and Technology

To further contextualize this inquiry into e-services in a higher education context, and as we look to future research that considers the factors that influence students' use and adoption of e-services, it is important to understand who today's higher education students are and how they relate to technology.

The higher education student body in the United States is shaped by the demographics of its students and is quite different from what it has been in recent decades:

- 61 percent receive Pell grants (Federal grants for students with financial need)
- 26 percent are employed full-time
- 28 percent have children
- 37 percent are enrolled part-time
- 42 percent are students of color
- 73 percent take classes in the classroom only
- 47 percent are 22 years of age or older [41]

With these demographics, one can easily understand why access services independent of time and space is critical to today's students.

The far majority of twenty-first century students are comfortable with technology and expect that institutions keep up their technologies and delivery of services up-to-date. A recent report from the EDUCAUSE Center for Analysis and Research provides useful information about today's U.S. undergraduate students. Its key findings include:

- Student ownership of technology continues to grow - from 2015 to 2016, smartphone ownership increased from 92 percent to 96 percent and laptop ownership rose from 91 percent to 93 percent - almost all students own a laptop or a smartphone.
- Students own more devices, proportionally, than the general public - more than half of students own a laptop, a tablet, and a smartphone, compared with only a third of the American public.

- Female and first-generation students view technology as a tool by which they might be able to overcome structural or institutional disadvantages [42].

Additional research adds texture to these trends, showing for example that university students demonstrate positive attitudes about using the Internet and that they view it as a functional tool to support their learning [43]. Also, the Internet is in high use for a variety of purposes, including communicating with professors, conducting research for courses, accessing online courses and accessing library services [44].

Synthesis and Future Research Possibilities

This paper has used an exploratory literature review methodology to define and understand e-services in a higher education context, articulate the importance of e-services to higher education students, and relate e-services to higher education institutions' goals to improve undergraduate student persistence and degree attainment, and the broader public's goals of an educated and financially sound society.

Key findings from this line of inquiry are: while not yet fully defined in the literature, e-services are nonetheless critical to higher education institutions and to enhancing the technology management literature; there is benefit in researching e-services in higher education as a package, mirroring research about public sector e-services/e-government and e-commerce; and that this topic has relevance in today's world, as a service imperative, combined with the prominent role that technology plays in service delivery, compels businesses and organizations to better service customers, clients and key stakeholders through e-services; and finally, there is increasing importance in identifying ways that support institutional and societal aspirations to graduate more students with college degrees to meet the needs of today's economy and society.

In closing, these findings set the stage for inquiry into the factors that influence the adoption and use of e-services by students in a higher education context. By improving service delivery with this knowledge, universities will not only improve services in support of a more modern digital experience, they can add tremendous value to students and society by removing barriers that stand in the way of millions of more caps and gowns.

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