STUDENT USE OF TECHNOLOGY FOR LEARNING: A USER RESEARCH CASE STUDY OF GEORGETOWN UNIVERSITY

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By

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User experience research is a field that seeks to improve the design and development of tools, products, and systems by understanding the needs, abilities, and experiences of an end user. These methods are usually applied to the examination and development of a single technology or product, but they can also be applied broadly to nearly any experience or process that can be designed, from buying a loaf of bread to finding a romantic partner. In this project, the researcher applied user research methods to an investigation of the role of technology in the learning experiences of Georgetown students. Through interviews and focus groups, the researcher sought to better understand the role that technology plays in students’ goals, their best and worst learning experiences, and their daily habits and strategies for learning. This research led to the development of a set of recommendations for Georgetown faculty and administrators who seek to improve the student learning experience through technology.

*Keywords:* user experience research, educational technology, innovation, higher education, formal learning, ethnography, contextual inquiry, user-centered design
This thesis is dedicated to Beak and the CCT Class of 2016.

With love,
Linda Huber
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INTRODUCTION

User-centered research is an applied investigation method gaining popularity among organizations that seek to create more efficient, effective, and pleasing products for their consumers. For instance, in order to ensure that the final product meets users’ needs, a prominent method of software development called “agile software development” has baked user-centered practices right into the development process itself. Large technology corporations like Microsoft, Google, and IBM leverage user research to investigate pathways towards new technologies and products that address unmet user needs or aspects of the human experience that had not previously been considered. Some of the key questions that drive any user-centered research project include: What are the user’s main motivations or goals when using a product or service? How could the experience or product be made more efficient, effective, and pleasant for the user? What is the larger context (environmental, social, experiential) of use? Ultimately, these questions help to improve a product or experience by holistically addressing the experiences of the end user beyond the edges of the screen or the borders of the store parking lot.

For the past several decades, major higher education (“higher ed”) institutions have devoted time, energy, and money towards adopting new technologies and innovations to improve the student experience. However, as in many fields, this rush towards innovation has often been top-down, driven by the needs and goals of administration and faculty without deep consideration for the experience of student end users. In a 2014 article in *EDUCAUSE*, Groom and Lamb describe how Learning Management Systems (LMS) and Massively Open Online Course (MOOC) platforms
have the ability to be easily scaled and centrally managed, but also explain that these affordances make platforms extremely rigid, which prevents cross-pollination between different classes, isolates students from other tools and content available online, and does nothing to teach important digital literacy skills.

While the LMS is certainly one of the most extreme examples of educational technologies adopted primarily for administrative and operational reasons rather than a positive student learning experience, this general principle also seems to apply at smaller scales (Gunn, 2010; Sharpe, Benfield, and Francis, 2006; Bates, 2000; Lisewski, 2004). While the needs of faculty and administrators are important to address, the complexity of the actual student learning experience is too often forgotten in favor of improved cost-effectiveness, faculty ease-of-use, or quantitative learning outcomes like student retention and grades (Porter, Graham, Spring & Welch, 2014).

Ultimately, the process of developing and implementing educational technologies is more difficult than in other industries because a) educational technologies need to be usable not just for a single end user, but for an entire ecosystem of faculty, staff, and students with varied capabilities and goals, and b) these technologies need to be not only usable and pleasing, but also improve the messy and complex process of human learning. To do this effectively, the field needs to better understand and prioritize the student experience of learning using technology.

This research project leverages the methods of user research to develop a clear picture of the student experience of using technology for learning at Georgetown University. Through interview and focus groups, I explored students’ larger goals for their time at the university, their best and worst learning experiences, their daily habits
and strategies for learning, and the role of technology in each of these. The findings from this research inform a set of concrete recommendations to support and improve the student learning experience at Georgetown. While this project will likely have some practical applicability to other higher education institutions, the more vital theoretical take-away is that the design of effective and transformative learning experiences relies on a thorough understanding of the experiences, capabilities, and goals of the student.

The current study falls under the category of research on educational technology. The literature review in Chapter 1 describes the current state of educational technology research, including goals and best practices, as well as historical blind spots in the field. I also briefly introduce the field of user experience research and user-centered design, and highlight how these methods are influencing current research and practice. Chapter 2 describes my research methodology, including participant recruitment, structure of the interviews and focus groups, and my data analysis process. Chapter 3 presents the findings from this research, which are organized via the overarching themes discovered through a qualitative coding and affinity diagramming process. In Chapter 4, I select a few of these key findings to discuss more fully and consider some possible explanations for and implications of these findings. Chapter 5 concludes with a set of recommendations for faculty and administrators to support student learning with technology, including suggestions for both incremental and radical improvements.
CHAPTER I - LITERATURE REVIEW AND BACKGROUND

“Design is really an act of communication, which means having a deep understanding of the person with whom the designer is communicating.”

— Donald A. Norman, The Design of Everyday Things

The State of Educational Technology in Higher Education in 2016

Educational technology (or “ed tech”) is a field of study that can be traced back to the early 20th century, beginning with the growth of “instructional media” such as films, slides, photographs, and radio (Saettler, 1990). The term ed tech is used for both the field itself and for the actual technologies it concerns, including the hardware and software used in a class for teaching and learning and the peripheral activities and administrative tasks that surround education. Everything from enterprise software like Blackboard, to the mobile phones and other devices that students carry in their pockets, to simple online quiz applets can be categorized as “educational technology.” Theoretically, even paper and pencil or a blackboard might be called educational technologies; in practice, however, the term has been used increasingly in reference to digital technologies that have emerged within the past 15-20 years.

Ed tech has seen a relative explosion of activity and interest in the past few decades, propelled by the proliferation of new information and communication technologies (ICTs) that have redefined nearly every industry around the world. These new technologies held revolutionary promise for the field of education. In particular, “Web 2.0” technology was seen by many in the field as a powerful tool for bringing higher education into the 21st century. As Conole and Alevizou describe in their
2010 review of the use of Web 2.0 tools in higher education, “there seems to be a tantalizing alignment between the affordances of digital networked media (the focus on user-generated content, the emphasis on communication and collective collaboration) and the fundamentals of what is perceived to be good pedagogy” (p.10). Zemsky and Massy describe this revolutionary promise of technology for education in even more dramatic terms: “The convergence of personal computers and ubiquitous connectivity sparked a utopian vision in which teachers taught and students learned in fundamentally different ways. Just over the horizon was a world of active learners with teachers who guided and facilitated rather than proclaimed and judged” (2004, p. 7).

Elite higher education institutions also face the concomitant fear of disruption that might be enabled by new ICTs; in 2013, Harvard Business professor Clayton Christensen targeted higher ed for massive disruption within the next five years. In response to both the promise and threat of emerging technologies, they have poured significant time and money into implementing new educational technologies in classrooms and on campuses across the country (“The Digital Degree”, 2013; Straumsheim, 2016; EDUCAUSE, 2015).

Several decades into the ed tech “revolution,” the field still seeks to answer three key questions: What are the larger goals or purpose behind implementing ed tech? What are best practices for implementing different kinds of ed tech across different educational contexts? And what is the impact or outcome of implementing educational technologies? This current project addresses these three questions in the specific context of Georgetown University using the principles and methods of user-centered design. The next three sections of this chapter explore the current state of each of these problems in the broader
context of higher ed. In the fourth section, the concept of user-centered design is introduced and its relevance to these three questions explained.

**Ed Tech in Higher Education: The Why**

In a very naïve sense, it seems obvious that the central purpose of implementing educational technology is to improve learning. But “learning” is an extremely broad goal with many different definitions, and a close examination shows that educational technologists often do not have a nuanced understanding of what the actual purpose is of educational technology. Selwyn (2010) and others have criticized the field of educational technology for its assumption that the introduction and adoption of new technologies will inherently make education better with no other effort. Amiel and Reeves (2008) suggest that the field tends to be more preoccupied with means than ends: “Educational technologists are frequently more concerned with the possibilities of using a new technology (means), such as a newer course management system or the hottest wireless device, than seriously considering the ultimate aims of its use and its consequences” (p. 33).

In its 2009 report, the Higher Education Funding Council (HEFC) categorized three key potential benefits of educational technology:

- “Efficiency – existing processes carried out in a more cost-effective, time-effective, sustainable or scalable manner
- Enhancement – improving existing processes and the outcomes
- Transformation – radical, positive change in existing processes or introducing new processes” (p.2)
Along these lines, the literature suggests that much of the current educational technology does improve learning “efficiency,” but that there is little to no evidence that technology helps *transform* learning.

**Improving the efficiency of learning.** Much of the buzz around ed tech has to do with two general affordances of ICTs: their accessibility and their scalability. ICTs enable students to have greater access to information and resources beyond traditional academic “gatekeepers”, including universities and colleges with increasingly high tuition rates (accessibility). ICTs also allow experts and content providers to reach a much bigger audience at a fraction of the cost that prior technologies allow (scalability). Increasing the scale and accessibility of learning has been a key factor in the massive push towards MOOCs and online learning by higher ed institutions seeking to reduce costs and reach a wider and potentially global audience (Yuan and Powell, 2013; Hollands and Tirthali, 2014).

These two goals seem to be less relevant in the case of elite research universities, however (Guri-Rosenblit, 2011), as their core values are built on a foundation of exclusivity and intimate interactions between students and faculty. Early experiments in online learning emphasized that the most effective learning typically results from direct human interaction between experts and students, and elite research universities with low student-to-faculty ratios have established their reputations precisely by offering this kind of learning experience. In this sense, universities like Georgetown have less incentive to improve either the scale or accessibility of learning. Instead, they have greater incentive to pursue the second two benefits described by the HEFC: enhancing and transforming learning (Guri-Rosenblit, 2011).
Enhancing and transforming learning. Kirkwood and Price (2014) commented on the three potential benefits described by the HEFC, noting that while efficiency is most likely to be of interest to administrators and transformation most likely to be of interest to “those more directly involved in teaching and supporting students” (p. 8), evidence suggests that the majority of ed tech is employed for the purpose of enhancement, or incremental improvements. In their meta-analysis of 47 articles published between 2005 and 2010 that were related to technology-enhanced learning in higher ed, the authors found that “the potential of technology to transform teaching and learning practices does not appear to have achieved substantial uptake, as the majority of studies focused on reproducing or reinforcing existing practices” (p.26).

They conclude that there is an underlying lack of clarity in the phrase “technology-enhanced learning,” saying “[it] conflates of two very distinct aims: ‘changes in the means through which university teaching happens; and changes in how university teachers teach and learners learn’” (p.26). They also acknowledge that transforming learning is not an inherent outcome of technology; rather, it requires significant time and effort on the part of instructors. They suggest that further research is necessary to examine this limiting factor on technology’s ability to transform teaching and learning practices.

In short, it seems that often times the goals of ed tech interventions are not explicit in the minds of instructors, and whether intentional or not, faculty efforts are more directed towards using technology for enhancing rather than transforming teaching and learning. Selwyn (2010) described this as the “rhetoric/reality gap” – educational technology research is good at describing the possibilities of technology and less capable
of making those lofty possibilities manifest. The next section explores a few of the best practices and strategies that the literature suggests for actually implementing educational technologies.

**Ed Tech in Higher Education: The How**

Effectively implementing educational technology in a university involves coordination across a number of pedagogical, technological, and organizational elements. Outlined below are some of the best practices in each of these areas described in the literature.

**Pedagogical best practices.** In 1983, Richard E. Clark notoriously argued that educational technology is tangential and superfluous to teaching and learning:

The best current evidence is that media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition. Basically, the choice of vehicle might influence the cost or extent of distributing instruction, but only the content of the vehicle can influence achievement (p. 445). While this statement has been hotly contested (Kozma 1991, 1994), and indeed flies directly in the face of Marshall McLuhan’s famous claim that “the medium is the message,” educational experts increasingly acknowledge the secondary importance of technology relative to other more fundamental teaching tools and practices. It is not that technology does not have an impact on student learning, but technology *alone* does not seem to have a particularly meaningful effect: “it's the pedagogy, not the technology that
matters, although more correctly it is the synergistic relationship of these two (Schmid et al., 2014, p. 284).

In the spirit of backward design (an educational best practice that begins with defined educational goals and works backward to find instructional tools and practices that match those goals), Bass (2012) asks how technology can be put into service to support and extend the reach of Kuh’s 10 “high-impact practices” (2008). These 10 practices represent a set of educational activities and experiences linked to improved student success. Bass emphasizes that many of these 10 practices fall outside of what he calls the “formal curriculum,” and suggests that technology may have a role in re-centering these proven high-impact practices within the traditional, formal course setting: “Technologies can play a key role here as new digital, learning, and analytics tools now make it possible to replicate some features of high-impact activity inside classrooms, whether through the design of inquiry-based learning or through the ability to access and manipulate data, mount simulations, leverage ‘the crowd’ for collaboration and social learning, or redesign when and how students can engage course content” (p.5).

This notion reflects a growing sense in the field that ed tech is most effective when used in service of pedagogies and practices that improve student learning, of which Kuh’s high-impact educational practices are just one. Conole et al. (2004) provide a kind of overview of this phenomenon by presenting seven different prominent pedagogical theories and describing how educational technology might be leveraged to improve learning (as defined by that specific body of theory). For example, constructivist learning favors “hands-on, self-directed activities oriented towards design and discovery” (p. 19). In this case, student learning could be improved by increased access to online resources
and expertise, thus leading to the development of “more engaging and student-centered, active and authentic learning environments” (p. 19).

**Trends and types of technologies.** In addition to the underlying pedagogical rationale motivating ed tech implementation, there are a few general best practices and “rules of thumb” around types of technology that are considered valuable.

The New Media Horizon Report (Johnson et al., 2016) is a good indicator of the kinds of technologies that are currently seen as “ripe for implementation.” In 2016, some of the key technologies and technologically-informed practices include: learning analytics and adaptive learning, redesigning learning spaces, blended learning, improving digital literacy, and integrating students’ personal devices like phones and computers (Bring-Your-Own-Device or BYOD). While these are not explicitly framed as “best practices,” they are described in the report as the key trends in educational technology of the current and near future.

In contrast to a more trend-driven adoption pattern, Schmid et al. (2014) explore some different categories of educational technology that show evidence of the biggest impact on student learning. Their meta-analysis of the experimental literature on technology use in higher education from 1990 to 2010 segments technologies according to four key pedagogical uses: communication support, cognitive support, search and retrieval support, and presentation support. They found that the technologies which provided “cognitive support” seemed to have a greater impact on student outcomes as compared to the others, and were particularly useful to tools used for presentation support. Indeed, Schmid et al. used this as evidence to debunk Clark’s 1983 claims about
the irrelevance of technology for learning, on the basis that the technologies of the time were used almost exclusively for presentation support.

Although this provides some guidance as to the type of technologies which may be more or less likely to effect a “transformative” change in student learning and/or attitudes, Schmid et al. are careful to emphasize that these same technologies are also “more variable and they can seemingly fail under certain conditions” (p. 284). Unlike PowerPoint and other presentation tools, tools that provide cognitive support are not simply “plug and play.” The authors note that not enough is known about when and how to integrate cognitive support tools into instruction, and that part of the remaining unknown in this equation is the “nature of students’ learning goals, their expectations for success, and their causal attributions for learning outcomes in connection with the use of cognitive support tools” (p. 285). Unfortunately, this deeper understanding of students’ personal motivations and perspectives falls into a “blind spot” of educational research, as described in the next section.

**Institutional strategies for implementing ed tech.** In addition to highlighting the key trends in educational technologies, the 2016 New Media Horizon report also offers a clue about how higher education institutions define success in their ed tech initiatives. The report has three sections (“Key Trends Accelerating Technology Adoption,” “Significant Challenges Impeding Technology Adoption,” and “Important Developments in Educational Technology for Higher Education”) with sub-headings broken out by “Time-to-Adoption.” This focus on time-to-adoption, along with accelerators and challenges to adoption, highlights the underlying assumption of the New
Media Horizon report that the key marker of success in ed tech is the speed and ubiquity of adoption.

This perspective is a good example of the assumption described earlier: that implementing new forms of technology *de facto* enhances learning. Additionally, Sewlyn (2010) criticizes this paradigm of defining *adoption* as a key measure of success, which puts the burden of ed tech’s success or failure on the individuals who do or do not adopt a given technology: “All told, the emerging received wisdom amongst many educational technologists regarding the apparent ‘failure’ of educational technology in practice is that educational institutions and those within them often lack what it takes ‘to go with the technological flow’ (Dale et al. 2004).” A key tenant of user-centered design holds that the end user should not be blamed for the success or failure of a technology – instead, these technologies and practices should be designed to account both for the characteristics of the individuals and the larger sociocultural environment that may inhibit the success of a given technology.

**Ed Tech in Higher Ed: The Outcomes**

In addition to defining the “why” and “how” for ed tech, a significant amount of research is devoted to measuring the educational impact of different ed tech interventions. In 2011, Tamim et al. published the findings from a second-order meta-analysis of 40 years of experimental research comparing the relative impact of technology-enhanced courses versus non-enhanced courses on student achievement. Their findings suggested “a significant positive small to moderate effect size favoring the
utilization of technology in the experimental condition over more traditional instruction (i.e., technology free) in the control group” (p. 16).

While the literature abounds with descriptions of the qualitative effects of educational technology intervention on things like students’ abilities, attitudes, and behaviors, assessments about the impact of ed tech tend to be constrained to the more measurable or “visible” aspects of learning. Biesta (2007) criticizes the dominance of “evidence-based practice,” which privileges this kind of rigorous, statistically proven assessment of outcomes, as a major constraint on the field of educational practice. He argues that education is ultimately a “thoroughly moral and political practice that requires continuous democratic contestation and deliberation” (p. 1). Ultimately, in order to understand this broader set of potential effects and outcomes, educational research needs to reach outside the standards of assessment established in the field of medicine.

In addition to the impact on students, educational technologies were thought to have the potential to radically alter the basic nature of teaching and learning. However, as Guri-Rosenblit describes in her book, Digital technologies in higher education: Sweeping expectations and actual effects (2011), “there are currently very limited, unequivocally compelling data to support the belief that fundamental changes took place in teaching/learning practices” (p. 16).

**User-Centered Design and Ed Tech**

As laid out in the previous section, the field of ed tech is struggling to find coherent answers about how and why to implement educational technology, as well as understand the exact impact and outcomes of this implementation. The following sections
describe the unique potential for user-centered research and design methods to help answer these three questions.

User-centered research and design are methods typically used to help clarify the needs of an end user, and then iteratively test and refine a product or service to find the solution that best meets that user’s needs. In this way, user-centered methods are a good fit for helping the field of educational technology gain greater clarity about the “value-add” of educational technology and the best strategies and practices for implementing it, and for iteratively testing for and assessing exactly whether those outcomes are being reached. Unfortunately, while many industries and organizations struggle to implement user-centered practices, the field of education has a particularly rich history of not studying the end user. Instead, the field has focused primarily on two centers of gravity: technology and instruction. Indeed, the focus on these two areas over the past few decades may help explain why the field continues to struggle to answer these three fundamental questions.

**Technology as a Center of Gravity**

The field of ed tech grew out of “audiovisual communications,” or A/V. As new materials and interfaces were developed that could be used in the classroom, researchers began exploring and experimenting with them to understand how they could facilitate teaching and learning. Although the field quickly grew to incorporate more theoretical concerns about communications, learning, and media, the basic orientation towards reactively assessing and experimenting with new technologies is a major driver in the field to this day. As Goodyear & Ellis (2008) suggest, too often “technological carts come before educational horses” (p. 142). For example, some of the major questions in
the field in 2016 are: How can we leverage mobile devices for learning? How can faculty be encouraged to adopt new technologies? How can learning analytics be used to create more customized learning experiences? (Johnson et al, 2016). These are valuable questions, but are all based on the assumption that new technologies have inherent value to the learning process, and that the only remaining question is how to get them integrated into the teaching process. As described earlier, this “technology first” perspective does little to enhance or transform learning, and does little to take into account the actual needs, behaviors, or experiences of the students using these technologies.

**Instruction as a Center of Gravity**

In addition to being skewed towards a techno-optimist perspective, the field of ed tech tends to naturally focus more on the instructor perspective than the learner perspective. This is a natural bias, as ed tech research is often done by and for other instructors. Even though ed tech is increasingly used by students for interactive knowledge-making activities, it is nonetheless the instructor who initiates this activity as part of their course. This leads to a natural emphasis in the field on the goals, behaviors and experiences of the instructor, while learning is understood in terms of aggregate quantitative learning outcomes.

As noted by Barr and Tagg (1995), this instruction-centered perspective has been increasingly destabilized within the field of higher ed. Under the instruction-centered paradigm, “colleges have created complex structures to provide for the activity of teaching conceived primarily as delivering 50-minute lectures - the mission of a college is to deliver instruction” (p. 13). The authors describe this as mistaking means for an end:
“We now see that our mission is not instruction but rather that of producing learning with every student by whatever means work best” (p. 13).

This more learner-centered philosophy is increasingly infused into both current theory and best practices around teaching. Trending ideas in higher ed like “competency-based learning” (a recalibration of teaching and assessment practices to ensure that students leave a class or a university with demonstrable skills) reflect this paradigm shift towards “the ends” — thinking deeply about the actual student experience and learning outcomes and leveraging backward design to find the appropriate means.

Nonetheless, there are still many instructors who see their primary duty as delivering 50-minute lectures to students and then testing or otherwise assessing them on their absorption of that information. This time-tested approach is not without merit, and certainly has lead to meaningful learning experiences — but it is an approach akin to the development of new products and technologies based on a CEO’s or an organization’s ideas rather than evidence of the customer’s needs. Sometimes this “top down” process leads to the development of a product that is extremely useful and enjoyable for the user, and sometimes it leads to bankruptcy. A more user-centered approach leverages user research and iterative design practices to ensure that the customer (or student) needs are being met in a precise way.

Unfortunately, shifting from a top-down or instruction-centered perspective to a more learner-centered approach requires a reconceptualization of both the purpose and process of designing a learning experience. In a higher education setting, this requires more time, energy, and institutional support systems than many faculty have.
User-Centered Perspectives in Ed Tech Research

While the learner-centered perspective has yet to achieve prevalence within university classrooms (Palak & Walls, 2009), some of the essential theories and methods of user-centered design are appearing in the field of educational and ed tech research. The central hallmarks of user-centered design are a) a deep understanding of the end user, and b) directly involving users in the process of designing, developing, and/or testing the product.

Ed tech research has devoted a lot of time to understanding the end-user (students), but typically only from a limited set of perspectives focused on what is quantitatively measurable, or centered around particular tools or technologies and the outcome or impact of those technologies. One of the best examples of industry-leading research about students from this perspective is the EDUCAUSE Center for Analysis and Research (ECAR) annual study of faculty and students’ use of information technology. They frame their 2016 student report as providing essential research to help both higher ed information technology (IT) organizations and faculty understand what undergraduate students think of technology, how they use it, and what their experiences and expectations are for using digital technology in their work (p.3).

While this report provides some important basic behavioral and demographic data about students, it does not document their goals, daily behaviors, or feelings about technology or learning. For example, the ECAR report notes that 58% of students said that “learning works best for them when there are at least some online components” (p. 19), but doesn’t give any insight into why students felt that way – what experiences they had had that led them to this conclusion, what evidence they might have that blended
learning “works best” for them, etc. Understanding this larger narrative motivating students’ opinions and experiences is essential for a true user-centered perspective.

This is not to say that the field of ed tech research is totally without an understanding of the more nuanced cultural, psychological, and sociological factors of student goals and behaviors. Indeed, there is an increasing amount of educational research devoted to learning about a growing new category of students: “digital natives.” Margaryan and Littlejohn (2011) conducted a study using a series of surveys and in-depth interviews with students to learn more about this incoming generation of undergraduates who have grown up in a technology-enhanced environment. Other researchers have suggested that these digital natives bring a fundamentally different set of skills, desires, and interests into the college classroom than the generations that came before. Through in-depth qualitative research, Margaryan and Littlejohn found that, although students may use social networking tools and other technologies unfamiliar to their professors, they do not use these tools to support or transform their learning: “Educators therefore cannot presume that all young students are ‘digital natives’ who understand how to use technology to support and enhance their learning” (p. 22).

Margaryan and Littlejohn’s research is an example of user research that leverages in-depth qualitative research methods in order to understand students’ on-the-ground reality. However, theirs is a rare example of high-level hypotheses and theory about how students’ behaviors and motivators are eschewed in favor of time-intensive qualitative research to investigate the story behind the story.
Along these lines, Goodyear and Ellis (2008) highlight that even successful ed tech interventions must be closely inspected to understand the hidden work that goes into creating a successful learning experience:

A successful educational activity is never as simple as taking a pill…Whether patient or student, complex activity is involved in creating a treatment. Students need to read instructions, talk with peers, turn up, apply themselves, locate resources... and manage a range of calls on their time, energy, attention, and interest. These activities are affected, though not determined, by a range of influences - including the affordances of the social, material, and digital world(s) within which the activities are located, as well as the students’ beliefs and goals and their interpretations of the tasks set for them (p. 143).

The hidden complexity and user effort behind the use of any tool, technology, or service is precisely what user experience research is best at uncovering, but the dominant mode of ed tech research focuses instead on quantitative student learning outcomes, which flattens our ability to understand the larger context and process.

One area where educational research may have a “leg up” on user experience is the body of literature around different kinds of learner skills and abilities. While typical user research almost always categorizes users in terms of whether they are advanced, intermediate, or novice users of a new technology, and while there is often an effort to make technology usable for the young or differently abled, there often isn’t a nuanced exploration of the cognitive and psychological aspects of individual users. In educational and ed tech literature, however, there are a few relevant measures of student skills and abilities, three of which are particularly useful for understanding how and why students
use technology in their learning: 1) digital and media literacy, 2) intrinsic and extrinsic motivation, and 3) self-regulated learning skills.

Digital and media literacy are distinct but strongly related sets of criteria that provide a fairly direct indicator of individual students’ knowledge and behaviors surrounding educational technology. The United Kingdom’s Office of Communications (Ofcom) (2005) defines media literacy as “the ability to access, understand and create communications in a variety of contexts” (p. 2), and the ICT Literacy Panel (2002) defined digital literacy as “the use of digital technology, communication tools, and networks to access, manage, integrate, evaluate, and create information to function in a knowledge society” (p. 2). The field of educational research is embroiled in debate about how to define and quantitatively measure digital and media literacy, but these theories provide an important heuristic measure of whether students have the background experience necessary to make them either naïve or proficient users of technology for educational purposes.

Self-regulated learning (SRL) is a more general measure of student learning behaviors and strategies, apart from their use of educational technologies. Instruments that measure SRL look at how active students are when it comes to monitoring, controlling, and regulating their own learning. Behaviors that indicate a student is self-regulating include goal setting, monitoring their progress, forming strategies about how to perform different tasks, and reflecting on the outcomes of their learning process/strategies (Zimmerman, 2000; Pintrich, 2004). In a colloquial way, if a student exhibits self-regulated learning strategies, it suggests that they are a high-performing
student and therefore also more likely to be able to adopt and adapt to useful learning technologies. (Sharma, Dick, Chin, & Land, 2007; Vovides, Garrett, 2010).

Measures of self-regulated learning also take into account not just students’ behaviors, but also their motivation. A common dimension of student assessment is whether students are more *intrinsically* or *extrinsically* motivated. This measure can indicate why certain technologies or tools are a better match for particular students, because they align either with *intrinsic* motivations (like having a deeper or more active learning experience) or with *extrinsic* motivations (like allowing students to get their work done more efficiently).

While these different measures of student capacity are helpful in understanding how and why students use technology in their learning, they don’t do much to provide the contextual factors that determine individual behavior. Recognizing this, Selwyn (2010) calls for ed tech researchers to study not just “how technology-based learning can take place, but “why technology-based learning actually takes place (or not) in ‘real-life’ contexts” (p.67) — “moving beyond making sense of the ‘science’ of learning, and pursuing what can be termed the critical study of technology-based social action and social life within the social world of education,’’ including “acknowledging the clear linkages between educational technology use and ‘macro’ elements of the social structure of society such as global economics, labour markets, and political and cultural institutions,’’ and “at the ‘micro’ level of the individual, the act of technology-based learning also needs to be understood as being entwined with many other dimensions of social life” (p. 68).
By responding to the dearth of user-centered research approaches in the field of ed tech, this project leverages in-depth conversation and dialogue with students to explore the micro-level determinants of why technology-based learning does and does not happen. Ultimately, this project reframes the problem of learning with technology as a problem simply of learning, working backwards to understand the role that technology does or can play in affecting student goals and behaviors.
CHAPTER II - METHODOLOGY

This research methods used in this project combine aspects of both ethnographic and user experience research. The data collection and analysis process is similar to a typical user experience research model, but the goals and style of inquiry is more open-ended. This is what gives the project more of an ethnographic flavor than you might see in a typical UX research project, which is usually targeted to studying a particular product or service. Ultimately, this research is guided by the principles and theories of user-centered design.

User-Centered Design Process

This project aligns with the very early stage of a typical user-centered design (UCD) process. Figures 1 and 2 are selections from Pascal Raabe’s popular poster (2010) illustrating the UCD process. This study corresponds to the “conceptualization stage” as described by Raabe, the steps of which are highlighted in the boxed areas (author’s annotation). This project leverages open-ended ethnographic interviews and focus groups to understand students’ general goals, capabilities, and behaviors. The data was then used to create user personas and user journeys, which are tools used in UCD to crystallize and re-present a rich set of findings about users to inform the rest of the user-centered design process.
As this project is not looking at a specific digital tool or technology but instead the overall experience of learning with technology, the outcome of this process is a set of insights and design questions for further exploration. Despite this project’s broadened scope, these findings are very much in-line with the outcomes of a typical UCD process.
and could easily be leveraged to create or implement a specific technology or tool in the classroom.

The key objectives of this project are:

- To define typical student goals
- To define and describe characteristics of “high impact learning experiences”
- To identify the role technology plays in supporting both high-impact learning experiences and helping students to meet their learning goals
- To define factors that motivate and enable successful technology-enhanced learning, including student characteristics, characteristics of the learning environment/scenario, and characteristics of the technology or tools themselves

Figure 3 illustrates the student-centered research domain of this project. The three concentric circles represent three domains of student life that were of interest in this project: life as a Georgetown student overall, including interests, hobbies, and larger goals; learning experiences and processes within this overall student experience; and formal learning (i.e., class-based and institutionally-organized learning experiences), specifically on formal learning as it takes place outside of an actual classroom. I highlighted this as a particular area of focus since my recommendations are geared towards faculty and administrators, who have the most direct control over formal learning – but I also focus on what happens outside of the classroom, as this part of the experience is more opaque than what is directly observed by faculty inside the classroom. Nonetheless, all three domains are essential for understanding the full student learning experience.

Figure 4 illustrates the larger system that encompasses these three domains. In order to develop a robust understanding of the learning system and what improvements might be made, a larger user research study than falls within the scope of this project should be done to explore the goals, behaviors, and experiences of other key institutional stakeholders.

The following data was collected in order to understand the role of technology in the student learning domain:
• Basic demographic information for each respondent (i.e., gender, grade, major)
• Information about students’ self-directed and self-regulated learning abilities and behaviors, as well as demonstrated digital media literacy
• Descriptions of students’ learning goals, experiences, and behaviors within four time scales:
  o within the context of a single class session
  o within the context of a course
  o within the context of an academic year
  o over the course of their 4 years as Georgetown students
• Accounts that highlight the role of technology in students’ learning goals, experiences, and behaviors

What is the role of technology in each of these domains?
How and why is tech adopted? How does it create positive experiences & support user goals? Where does it not, where could it be improved?

Figure 3. The current research domain
Study Limitations

This case study is meant to address design specifications and actions to be applied locally. As such, its external validity is intentionally extremely limited. Additionally, the study also has limited reliability as a qualitative research study. A typical user research project would involve a small team of collaborating researchers, who would be better able to overcome individual subjective bias or perception by collectively coding the data, achieving inter-rater reliability, and framing the findings through a consensus process. As a single researcher conducted this study, it is unlikely that another researcher would come to the exact same findings or results.

Additionally, this study only addresses one portion of the typical ethnographic or UX research process – the interview or focus group portion. This method is typically
complimented by a certain amount of direct observation of users as they use a product or service. Observation of students in formal and informal learning settings would help to compare what students say they do versus what they actually do.

**Data-Collection and Analysis Process**

**Recruiting participants.** Participants were recruited for this study in two key ways: through in-person class solicitation visits and through working with Georgetown’s Research Volunteer program, in which undergraduate students participate in research studies in exchange for course credits in their psychology classes. I reached out to several faculty contacts to gain permission to visit their class and spent 4-5 minutes explaining the project and its motivations, and encouraged students to participate either in a focus group or one-on-one interview, depending on their availability and interest. This participation was further incentivized by free pizza and snacks made available to students. This recruitment strategy was ultimately based on a convenience sample, and while there is a good distribution across age and gender, there is some resulting skew towards psych and pre-med majors.

**Interview procedure.** Students who signed up for a one-on-one interview met with the researcher in the campus library for approximately an hour. The interview was based off a set of predetermined open-ended questions (see Appendix 1 for a sample set of questions). The interview questions were revised after the first two interviews in order to improve the structure and clarity, and before the last two interviews in order to address topics or ideas not yet fully addressed in previous interviews and to skip over questions that had reached a point of saturation.
Focus group procedure. In addition to one-on-one interviews, I conducted two hour-long focus groups with students to see if different ideas or responses might be elicited when students are put in conversation with each other, rather than responding directly to a researcher. This format also helped me cover a greater breadth of student experiences in a shorter amount of time. The questions for the focus groups were similar to the interview questions, but involved little to no “probing” or follow-up questions; instead, additional time was dedicated to a short 10-minute activity wherein the participants were asked to reflect on the full focus group discussion and develop a technology or tool that could help them in their learning. Participants were instructed to ignore the constraints of time and money and simply design a hypothetical or even “magical” technology to crystallize and address their own learning pain points.

Data analysis procedure. The full audio of all interviews and focus groups was recorded and transcribed verbatim. I then created a table (see Fig. 5) which organized individual user responses along each row (focus group respondents’ responses were pulled out individually and categorized). From each individual’s full transcribed responses, the pulled-out paragraphs and sections were roughly organized in a table according to six central topics:

1. User goals (semester and over the course of time at Georgetown)
2. General study habits and “identity as a learner”
3. Preferences and reflections regarding in-class learning
4. High-impact learning experiences
5. Tech skills (strengths and weaknesses)
6. Role of technology in learning (in class and independently)
For statements that addressed more than one potential topic, I categorized the response according to the topic or question that the user had directly addressed in the flow of the interview.

<table>
<thead>
<tr>
<th>Name</th>
<th>ExtraCurricular &amp; Special Interests</th>
<th>Study Habits / WHO YOU ARE AS A LEARNER</th>
<th>In-class learning / teaching styles</th>
<th>High Exp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>one of my really good friends is Turk I like that I'm doing more structured I have always thought of myself as For me writing flashcards is really hard I have a really good mentor - my boy I'm in a psych class and he just spoke to me I think there's a time and a place for it I think I think.</td>
<td>This semester in particular I found out when I think there's a time and a place for it I think I think.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>planning out your day. Looking at a daily developed strong study habits during I just figure out what the class needs really like reading the textbook, I think I really like professors who are good I really love my major because I really like discussions. I have not had many discussions that I like primary sources...my past I don't like assignments that are BS-I want anything that's in between the level I want anything that's in between the level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Try to keep up to date with financial I really enjoy small study groups - in I am hands-on, I like to write stuff. If I want Deadline driven. Procrastinator. That in HS I was so used to doing things I think Assistant sound design - I just walk into the room. I had to be self-motivated and I had gotten very good at managing my time. I've gotten very good at time managem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Want to do something about mixed if I like to do work at home. I want to let Most of work is writing-based. In Ital Korean - every day we hang out we For me - in the past if things weren't Most of work is writing-based. In Ital A lot of students come from diverse For me I'm just trying to learn a lot of A lot of students come from diverse for I'm just trying to learn a lot of</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 5. Initial categorization of student responses*

**Affinity diagramming & open coding.** The second analytic step was creating an affinity diagram (Fig. 6). The full paragraph-length responses in the table were shortened to a single phrase and written on a Post-It note. Six colors of Post-Its were used to correspond to the six original data categories. Quotes or phrases that shared similar ideas or messages were grouped together and named. These category names are used as open codes, the first product of a grounded theory analysis. Although most data points stayed within the original high-level category (i.e., with other Post-Its of the same color), some data points migrated to join other new subcategories (i.e., the “content review and self-
assessment” category contains Post-Its from both the “study habits” category and the
“role of technology in learning” category).

![Affinity diagram](image)

*Figure 6. Affinity diagram*

**Axial coding.** After the affinity diagram was completed, the final step of analysis
involved axial coding, in which the relationships between different open codes were
examined. Per Strauss and Corbin (1998), axial coding helps to elaborate on distinct
codes and answer questions about “when, where, why, who, how, and with what
consequences” (p.125). This was done by adding an additional layer of “meta-
commentary” notes to the affinity diagram, noting relationships between different open
codes.
CHAPTER III - RESULTS

The researcher conducted nine interviews and two focus groups \((n = 5 \text{ and } 7)\), for a total of 21 participants. Nine participants identified as male, 11 participants identified as female. There was a nearly even spread of participants across each year (Freshman \(n = 6\), Sophomore \(n = 4\), Junior \(n = 6\), Senior \(n = 5\)). Table 1 shows a breakdown of the participants by major and minor across the three categories of major (Humanities and Social Science; Language and Linguistics; Science and Mathematics) described on the Georgetown website (https://college.georgetown.edu/academics). This table includes students’ intended major, even if they are officially undeclared. Due to the inclusion of double majors, the total \(n\) is greater than the number of students interviewed.

Table 1: Participant breakdown by major and minor categories

<table>
<thead>
<tr>
<th>Type of Major</th>
<th>Major (n)</th>
<th>Minor (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humanities and Social Sciences</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>Language and Linguistics</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Science and Mathematics</td>
<td>11</td>
<td>1</td>
</tr>
</tbody>
</table>

**Student Goals**

In order of prevalence, students are primarily driven by 1) getting good grades, 2) being prepared for post-grad life, and 3) learning about the world. Table 2 provides an overview of each of these goals, the reasoning behind them, and some behaviors or strategies of exemplary students striving to meet these goals.

**Getting good grades.** Students are driven by grades for two key reasons. First, grade point average has direct relevance in the context of post-graduation plans, including applying to jobs and schools. Additionally, since good grades are valued and
rewarded by their parents and the college admissions process, many Georgetown students acknowledge that they have spent most of their lives striving to get them. By junior and senior year, some students are less driven by grades, but this seems to be partially because they have finely tuned their skills for “getting the grade” and can do it without much conscious effort or intention.

Preparing for post-grad plans. Students see their time in college as a means of preparing for their post-graduation lives. Their key strategy for “being prepared” seems to be choosing a major that will be pertinent to their post-graduation skills and then doing well in it. Supplementary activities and behaviors for preparing for post-graduation life include identifying very specific skills that will be useful after graduation and dedicating time to learning them inside and outside of class (i.e., learning a language, learning business skills, teaching oneself Excel). Additionally, a few students identified “learning how to think” as a particular skill that they would find useful in their post-grad lives. They sought to develop this skill through dynamically processing and reflecting on experiences both in and outside of class.

Learning about the world. Many freshman and sophomore students cited wanted to generally “learn about the world,” particularly when considering their overall goals for their time at Georgetown. Students saw this as something that could be done in a passive way, simply by spending time exploring D.C. and by talking to other students and people from different backgrounds. They also cited activities like doing internships, participating in clubs, and going to hear speakers as opportunities to broaden their worldview, meet new people, and become a more balanced and well-rounded person.
Table 2: Overview of student goals

<table>
<thead>
<tr>
<th>Student Goals</th>
<th>Reasoning</th>
<th>Behaviors, Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Getting good grades”</td>
<td>Social approval, impact on post-grad plans (getting into schools, getting a job)</td>
<td>Prioritizing time &amp; distributing effort across classes in order to optimize overall GPA Reverse-engineering study habits and behaviors from what is assessed</td>
</tr>
<tr>
<td>Be prepared for post-grad plans</td>
<td>Helps them in interviews, in applying for schools, and in going about daily work</td>
<td>Choosing a major that will be relevant to their post-grad plans Take classes that are skills-based (languages, business classes) “Learning how to think”</td>
</tr>
<tr>
<td>Learning about the world</td>
<td>Inherent value, being a “well rounded person”</td>
<td>Experiencing DC Extracurricular activities (going to speakers, internships, clubs, studying abroad) Meeting people from different backgrounds</td>
</tr>
</tbody>
</table>

**High-Impact Learning Experiences**

In order to investigate and define high-impact learning experiences, students were asked to identify what learning experiences were particularly meaningful or memorable to them, or to explicitly define characteristics of a meaningful learning experience. Table 3 gives an overview of these key characteristics, roughly in order of frequency, as derived from direct student statements and inferred from the description of their experiences.

Table 3: Characteristics of high-impact learning experiences

<table>
<thead>
<tr>
<th>Key characteristics of high-impact learning experiences</th>
<th>Example behaviors or strategies</th>
<th>Student quotes</th>
</tr>
</thead>
</table>
| Professor cares about students and their learning      | Formative assessment, open lines of communication and dialogue with students, holds students to a high standard | “I probably would have never realized I liked psych unless he [high school psych teacher] was so passionate about his work...He wasn’t just repeating information to us and showing us slides, he was really
<table>
<thead>
<tr>
<th>Key characteristics of high-impact learning experiences</th>
<th>Example behaviors or strategies</th>
<th>Student quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students are given a chance to take a more active role in their own learning</td>
<td>Open-ended or choose-your-own-adventure assignments, independent research</td>
<td>“I took a senior level research class to fulfill a major requirement...You had a lot more independence than your general intro to econ class, which is very structured...I learned a lot of things in that class.”</td>
</tr>
<tr>
<td>Students have a chance to apply or connect learning to real world</td>
<td>Hands-on experiences, community-based learning, clearly connecting content to immediate, real world phenomena</td>
<td>“My US political systems class - taught me a lot about WHY certain things are in politics...I've learned a lot about WHY its getting hyper-polarized, how the structure is promoting those same trends.”</td>
</tr>
<tr>
<td>Professor forces students to think - designs assessments such that students are required to think dynamically</td>
<td>Cold calling, assessments that are open-ended vs. multiple choice, assessments that require you to “think on your feet”</td>
<td>“I LOVED physics...because you're given a problem and you've got to map it out and actually THINK during the problem, as opposed to just regurgitating information...Its frustrating because so much is lost in learning when it becomes predictable.”</td>
</tr>
<tr>
<td>Discussion-based learning</td>
<td>Faculty-moderated discussions, small study groups</td>
<td>“freshman proseminar. One professor with 10-15 students. Basically there's a lot of class discussion. I went to a big public high school and my classes were very big so I was never exposed to this kind of Socratic teaching method.”</td>
</tr>
<tr>
<td>Students feel that they are learning how to think rather than memorizing facts</td>
<td>Courses that emphasize critical thinking skills; assessments that require students to think on their feet vs. restate facts</td>
<td>“I’m motivated in my classes that are less about remembering facts, and more, &quot;here's how you approach a problem&quot;</td>
</tr>
</tbody>
</table>
| Change in worldview or perspective | Talking with people from different backgrounds, courses or | (Women & Gender Studies major) “It's interesting to see how different groups have experienced different
Key characteristics of high-impact learning experiences | Example behaviors or strategies | Student quotes
--- | --- | ---
 | experiences that explore a broader societal reality than students are used to | forms of oppression. Its opened my mind because I never really thought about a lot of things, because living here I only experience my general surroundings…”

Students as Technology Users
In addition their larger learning goals and experiences, students were asked to describe the role of technology in their learning process. Table 4 gives an overview of some of the key findings. It combines students’ direct statements about the role of technology, as well as some inferences pulled from the larger contextual questions.

Table 4: Technology-based learning strategies and behaviors

<table>
<thead>
<tr>
<th>Technology-Based Learning Strategies and Behaviors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students find their laptops and mobile devices extremely distracting, in and out of class.</td>
</tr>
<tr>
<td>PowerPoint is the educational technology that students encounter most often in their classes. In many cases it serves as a study guide and key tool to “get the grade.”</td>
</tr>
<tr>
<td>Students find that they are better able to retain ideas and information when they write things by hand.</td>
</tr>
<tr>
<td>Students’ informal learning and self-teaching practices are often grounded in face-to-face social interactions (i.e., apprenticeships, extracurriculars) more than online learning. I.e., students often do not have very advanced practices of self-teaching through ICTs.</td>
</tr>
<tr>
<td>Many students use technology as a way to stay organized - using Google Drive, Google calendar, and digital to-do lists.</td>
</tr>
<tr>
<td>Many students use the flashcard app Quizlet to help them self-assess in preparation for a test or exam.</td>
</tr>
<tr>
<td>Students described having compelling experiences with in-class polling tools (Clickers, PollEverywhere) - it made them feel more engaged with the lecture and with their peers, even in large lectures.</td>
</tr>
<tr>
<td>Students see technology as “unnecessary” for many of their courses, particularly humanities courses. (Very few students have experienced a “transformative” use of technology in their courses).</td>
</tr>
</tbody>
</table>
Learning new tools or technologies. Students’ adoption of new tools or technologies varied significantly from person to person. Two male students, both computer science minors, had different mindsets about new tools and technologies. The freshman student described frequently visiting a website devoted to showcasing new tools and products to try them out. He admitted that most tools were too new and had not yet been perfected, or did not quite fit with his needs, but that he still liked to visit the site. The senior student, however, only used technology “to the extent that I find it useful,” and described relating more to the IT savviness of professors than his peers, since he had never joined any of the social media platforms so popular among the latter. Nonetheless, he described working in a tech consulting firm over the summer and felt confident that he could learn things quickly if needed, but did not see a need to otherwise adopt new tools or technologies.

A junior described avoiding learning new things for another reason: “If I get overwhelmed by technology quickly, I have a tendency to just say, ‘Look this is easier with a pencil and paper.’” However, she was curious about tinkering with music editing software that her professor had shown her, and volunteered to be an apprentice in the theatre company to learn sound design. This student shows both curiosity and a willingness to learn, but readily admits that she does not have much patience for teaching herself things above a certain level of difficulty.

Similarly, many students cited Excel as a technology that they knew they needed to learn to do well in interviews and in jobs, but that they didn’t have the time to teach themselves. However, one freshman male described teaching himself Excel by using it to
track and compute baseball stats. Ultimately, students seemed to vary widely in both their interest in and dedication to adopting new tools or technologies.

**The laptop as a source of mystery.** When asked about their perceived strengths and weaknesses as technology users, participants typically described themselves as having only a very basic understanding of the technologies they use every day. This perceived lack of understanding particularly centered around the laptop computer tool that many recognized to be very complex, but described having very little advanced knowledge of: “If someone came up to me and was like, ‘my laptop is broken’ I would have no idea what to do.” “I use my laptop all the time, but not in an advanced way. I don’t know how to use the different applications of it.”

**Distraction.** Students very frequently cited distraction as one of their key weaknesses when it comes to technology. In particular, social media and notifications and Netflix were the most commonly cited forms of distraction.

In the case of Netflix, this seemed to be a distraction for prolonged periods of time, but students could easily stop or resist when necessary. However, social media and incoming notifications were described as a more insidious distraction, since they happen in smaller, less visible time-increments. One girl described the pernicious cycle of being disrupted by notifications on her phone while trying to do work:

“I’ll open my phone sometimes to check my email and I’ll see a notification on Snapchat and a notification on Instagram. I’ll end up turning my phone off, putting it away, and realize I haven’t even checked the email. So I’ll end up doing the whole thing all over again, and by that time it’s already been 5 minutes. Everything seems so quick when you're doing it, but you realize it’s been like 10
minutes. And you have to put your phone away, and get everything set up and be like ‘what am I doing again?’ And you do that so many times and it ends up adding up. You realize that you could have done that so much more quickly if you weren't SO distracted.”

Several students noted that they will proactively do things to prevent distraction, like turn off the sound on their device, turn off notifications, put their phone away, or even activate an app that blocks or prevents them from accessing certain sites - but that these strategies were not particularly effective. As one described it, “they can prevent distractions from coming in, but they can’t prevent you from distracting yourself.”

**Information-seeking, research.** In contrast, students seemed most confident in their ability to use technology as a general tool for information seeking and research:

“I’m definitely an instant-gratification Wikipedia person. If I don’t know what something is, I will look it up.”

“I use technology a lot for news, for general knowledge-building…”

“It sounds silly, but I can find really good websites, I’m good at bookmarking things…”

“Social media allows you to see different opinions and perspectives from around the world from a global scale.”

Interestingly, two different interviewees noted that they appreciated the research and information literacy skills taught by their professor and a research librarian: “They're trying to get us familiar with how to find published and valid information...if the teacher teaches you how to facilitate your learning IN THAT CORRECT WAY - that’s terrific.”
**Organization.** Another common strength that students identified was their use of technology to stay organized. This included creating daily to-do lists on their phones, using apps like Google Calendar, and keeping documents organized and centralized on their computer or in the cloud.

**Learning strategies and behaviors.** When asked about their learning strategies and behaviors, most students described strategies for note taking and reviewing content. This warrants further investigation to understand whether this is a result from a) a skew towards one-way information absorption as the primary learning model students are experiencing, or b) students being more readily able to perceive and reflect on this mode of learning as compared to other more active and spontaneous learning behaviors.

**Note-taking.** Typically, one of the first study behaviors students would volunteer information about was their personal note-taking strategies. These note-taking strategies were used both during class to remember and engage with the lecture content, and after class as a way to review and re-absorb the content in preparation for a test. For both of these instances, many students identified writing notes by hand as the key to thoroughly absorbing content. Several students described writing and re-writing notes in different formats as part of a study strategy. Students identified three key reasons why they preferred note-taking by hand: 1) because it helped them to avoid the distractions involved in using a laptop, 2) because the physical act of writing was more enjoyable and seemed to lead to greater retention, and 3) because it allowed for greater creativity in note taking, including using diagrams and illustrations.

Students also described incorporating the professor’s PowerPoint into their notes, either annotating them digitally or printing them out and adding their own notes by hand.
Interestingly, three different students described receiving pre-structured notes from their professor with “blanks” that students had to fill in with information from the lecture. They appreciated this as a strategy for sparking curiosity and engagement, and because they felt it helped them to better structure their notes “properly.”

As with all study strategies, students noted that their behaviors varied depending on the professor’s expectations and the nature of the course:

“With chem, it's a lot of equations so I HAVE to handwrite everything. With bio I find that's easier to type because I can type a lot faster so it's easier to keep up.”

“I really do go with what the teacher's philosophy is for the most part. Some faculty are like "you shouldn't have your laptop out in class." That's more of an old-fashioned type class. And I don't need [my laptop] after class. You're taking notes in a notebook and you're going online later to look at the lectures online.”

**Review and self-assessment.** The second most commonly described study strategy (after note taking) related to content review and self-assessment in preparation for tests. Many students cited Quizlet as a simple tool that helped them in their studying:

“For classes where I need to memorize...it's easy for me to just type it all in and have it as a resource to go back and study from.”

In addition to writing and rewriting and self-quizzing, some students reviewed faculty lecture captures when available. However, they were skeptical as to the value of this behavior, noting that the return on their time investment was often minimal since they had absorbed 90% of the content already on the first listen. (Interestingly, for students who had missed class, the lecture captures became a time *saver*, because they
can be listened to at a faster speed setting, and because students can fast-forward through sections that are irrelevant, making their absorption of the lecture much more efficient.)

**High-impact study strategies.** In addition to note taking and review strategies, a few students were able to identify their own “high-impact learning practices.” The most common one identified was the ability to “teach it back,” whether as a TA or working in small study groups or presenting to a class. Being able to articulate and clearly explain something to an audience was a central strategy that helped students learn content at a very deep level.

Several students also noted that they were better able to learn “facts” when they contextualized them into a broader narrative:

“Imore of a concept-based learner - I like learning the ways that things work instead of memorizing facts.”

“In most of my classes the tests are solely based on PowerPoints but I really...like reading the textbooks and getting a better understanding of the concepts. I'm someone who can't memorize something if I can't understand the concepts.”

**Prioritizing time.** Essential to being an effective student is learning how to prioritize your time. Reading assignments were an area where students had developed nuanced strategies for prioritizing their time, as the volume of pages assigned for each class could be significant. These strategies varied from student-to-student, although nearly everyone agreed that it would be “impossible” to do all the reading required for every class.

In one focus group, students discussed how their reading strategy was heavily tailored to the faculty member’s assessment strategy:
“I think what a lot of people do is read things that are important for the class. Like things might be assigned and not important... It depends if they need to know it for the test, or if it's important for you to be able to discuss something in class and be knowledgeable about it. You can gauge...if you've been in a class for like a week or so and they only talk about the readings a little bit or if they just teach the same thing that you read in class.”

One senior described waiting to do the readings until she had a sense of exactly what she would be assessed on: “I kind of don't do my readings until I'm about to be quizzed or tested and I see what's most important and I just read like, those sections.

Alternately, two of the students described reading in a way that best fit their learning style, rather than the professor’s assessment style:

“I'm a list taker. I write down exactly what I need to do, specific reading or whatever, and then if I don't do it...I don't know what to do. I have to do the specific readings.”

“I find that I do my best work learning the material before it's gone over in lecture or before a teacher teaches it. Sometimes playing catch up, I feel like I'm trying too hard to learn what the teacher was doing or trying too hard to focus on the exact words of the lecture. Whereas, if I already go in having taught the material to myself or having looked up that material I can better focus on just listening to what they're saying.”

As always, students noted that their reading strategy also varies significantly from class to class, depending on both their interest and what they need to “get the grade:”
“Classes that I'm interested in, like my languages, I spend hours on, 90% of my time. English classes that I enjoy, I'll skip the readings because I don't have the time.”

“In human biology I don't read the textbook because his PowerPoints have everything on there. Whereas with chemistry I'm always in the textbook because I'm like - holy shit what'd I learn.”

**Technology for Formal Learning**

Students’ use of technology for learning can roughly be divided into two camps: technology that is introduced by faculty for use in a formal learning setting, and technology that students independently select and leverage for both formal and informal learning. While the former tends to be a reflection more of the faculty member’s needs and goals for students, technology that is self-selected by students for their own learning tends to be a better reflection of their own needs and goals.

**Technology as unnecessary, burdensome in a class setting.** Many students seemed to feel that technology had a very limited role in their academic lives. This may partially be based on a biased idea of what “counts” as technology-based learning; i.e., these students have been using chat, word processing, and Wikipedia their whole lives and thus may not even notice the presence of these technologies as a part of their academic work flow. It may also speak to the relatively advanced level of technological integration that students have in other aspects of their lives – socially, personally, and in work environments. As one student described it, as opposed to her personal and work life, technology is the “least formally integrated” into her school life.
However, several students suggested that they didn’t mind this low-tech status quo:

“95% of the time, you are going to be able to teach yourself the technology before your 60 year old professor.”

“If anything, I like not having technology in my classroom.”

“[In reference to her struggles as a TA to use a professor’s Blackboard grading system] Some people just use technology in the worst way...it just ends up making things harder for everyone.”

“I’ve had experiences where technology is a struggle, because professors haven’t had enough training or experience. When it works, it’s great, but…”

“With my English class we didn’t use tons of technology because there wasn’t much of a need.”

One aspect of these responses that may warrant further investigation is that few of the students seem to have experienced a class that integrated technology (beyond PowerPoint or email) in a meaningful and natural way, which may have negatively influenced their perspective on even the potential value of technology in the classroom. Interestingly, four students did describe powerful experiences with technology in the classroom, but three of these examples were drawn from high school courses rather than courses at Georgetown.

**Clickers and polls.** The most commonly cited “good experience with technology in the classroom” was clickers and real-time polling tools. In particular, students appreciated these as a tool to see the opinions of other students in the class. Several students highlighted a psych professor who uses class polls to demonstrate psychological
concepts in real-time, revealing the students’ own biases or thought-processes and then framing them in terms of a psychological theory or concept.

**PowerPoint.** In almost every discussion or interview, students cited PowerPoint as the central technology used in their classrooms, regardless of major or year. Students readily voiced their opinions about what makes a good or bad PowerPoint:

“I had one class that would send the PowerPoints beforehand but with blanks. That was the most I’ve ever been engaged with PowerPoints and with the material, because it was exciting to look out for a certain topic or word, and be like ‘oh that’s important and a really cool fact.’”

“I like it when my professors put *all* the information you need to know on [the PowerPoint]. I’ve had professors in finance that put so many words that it’s nonsensical, or professors that just put the summary but it doesn't contain everything they're saying. So there's kind of a happy-medium of having...all the info you need is there but its nicely boxed and highlighted and bolded.”

“[the professor] did a really good job with using different types of media. She had PowerPoints but did a really good job of keeping it short and concise and *talking* with us more about it and showing us videos that apply to what was just taught.”

Students could also very clearly articulate why they find PowerPoint valuable or beneficial to their learning: “The textbook has too much. Using a PowerPoint speeds up the class discussion and allows us to go in-depth on the point, rather than going on what the point *is.*” “If a lecturer doesn’t have a PowerPoint and goes on a tangent, you don’t know if it’s relevant or not.” “I have really bad A.D.D, and PowerPoints are essential for *structure* when I’m reviewing.”
**Canvas & Blackboard.** Several students, when asked about technology in the classroom, voiced opinions about the LMS Canvas, which is being adopted by many Georgetown professors as of fall 2016 as a replacement for the previous LMS, Blackboard. Four students voiced the opinion that Canvas seemed more user friendly, and that they had had extremely frustrating experiences with Blackboard. However, they did not seem to have particular thoughts about the impact of LMS’s in general on their learning. One student did describe a heavily Canvas-based course as causing her to use her laptop as a more integral part of her work in that class, but given that the laptop seems to be a source of distraction for so many students, it is worth further investigation to learn whether online course activities supported by Canvas may also increase student propensity for distraction.

**Technology for Informal Learning**

Outside of explicitly assigned materials, students also select and leverage technologies as part of their studying strategy and for informal learning practices that fall outside of their classes altogether.

**Elaboration.** Students in all disciplines looked up materials online to support their formal, in-class learning. In particular, Khan Academy and YouTube were sources that students in the hard and soft sciences cited as places to clarify or elaborate on a concept that they didn’t understand. One pre-med freshman described the value of videos to illustrate chemical and biological processes that are just described in textbooks in a more intuitive fashion..
Web 2.0 and social media. Several students leveraged social media and other Web 2.0 resources as part of their own informal learning processes, outside of any of their classes. Two underclassmen described the value of social media as a low-effort tool for exploring their world, including using Instagram to learn about other people and cultures, and using Yelp and other websites to plan expeditions out into the surrounding city (Washington, D.C.).

Web 2.0 and social media platforms also seem important for students to stay “relevant” in a particular topic area or field. One student, preparing for interviews in finance, describe the value of “specifically online resources” like her daily subscription-based emails with highly tailored news and headlines from the investment world. In this case, the ability to select news and have it delivered to her inbox was particularly helpful in integrating learning about her own interests into her daily habits. Similarly, a journalism major described signing up for Twitter in an effort to be more proactive in seeking out and reading news.

Online learning. Many students described actively using online resources to teach themselves new skills and topics. They also identified aspects of each of these online learning technologies that they found valuable. Two students described using Kaplan’s online platform to prepare for the MCAT, and had high praise for the site:

“They had videos and live sessions with professors where you could ask questions. They’d be online via video and you could ask questions and there would be like 10 people online at a time...You would complete [a] diagnostic, and then there would be suggested things for you to do, and then everything else you
had available. So as you did things they would check it off. There were 10 minute videos, hour long videos for the important stuff...Kaplan was doing it right.”

One incoming international student used an online training platform over the summer to teach himself basic coding skills, and described sinking days and days into learning new languages, motivated by continually “racking up points like a game. I was climbing a ladder.” A senior psych major described using her free time one summer to watch several hour-long YouTube videos to teach herself American Sign Language (ASL). She has continued to practice with ASL club meetings at Georgetown. Another senior with a passion for learning languages used various apps on her phone to learn Korean characters and chat with native Portuguese speakers. She appreciated being able to engage with these things on her phone, because it is both more social and more authentic, which she described as an integral part of learning languages, and because she could engage in very small micro-interactions when she has time: “When I am in bed about to fall asleep I do it really quickly and it’s just a nice thing. I feel better because I learned something today.”

**Student Prototypes for Educational Technologies**

At the end of both focus groups, students were asked to reflect on everything that had been discussed about learning and technology and take three minutes to sketch out a prototype of a technology that could help them in their learning. They were instructed that this technology did not need to be realistic at all. Below are the 11 prototypes developed by focus group participants, described in their own words.

**Anti-distraction technology.** Several technologies specifically addressed difficulty focusing or preventing distraction:
"I know what I need. Something that helps me focus and increases my concentration because I get distracted. So like a study drug that's actually legal...I don't want to be a night owl but I am a night owl because I waste so much time. If I could force myself to be efficient during the afternoon, then go to bed by 12…” 

“I had a focus app - which would play off your internal motivation of why you're learning in the first place. So whenever you get like a text or try to check Facebook or something it pops up and it shows you like a picture of...a vacation scene if you could afford if you get a good job if you learn this. Or a quote that's like ‘knowledge is power,’ so it’s like ‘oh yeah, yeah, I need to focus.’ So instead of punishing you…”

A male freshman in the focus group commented on this second invention: “I feel like I would just close that out as soon as it popped up.” While probably not a realistic way of preventing distraction, this invention does speak to the desire to connect learning to longer-term goals in order to prevent distraction in the short term.

One freshman girl described having a hard time focusing and taking notes in class, and instead of trying to prevent distraction, she opted for a technology that would pay attention for her: “Mine is just an ear on my laptop that hears all the notes and types automatically.” Another student had a more proactive invention for preventing distraction (See Fig. 7):

“A walk-in phone booth that's like a study space. It’s a little bigger than a phone booth... and you just go in there and you can sit down if you want. Each side is a different thing. One side can be just for your notes, but you can swipe and keep going. One side is a whiteboard, if you want to just take down notes, and then
another side is a thing that can quiz you, and another side is something else, so you can customize it. There's no distractions.”

Figure 7. Distraction-free study booth (student prototype)

Five other students in the focus group were particularly impressed by this technology, which seemed to address and incorporate many different aspects of learning with technology, including the difficulty of overcoming distractions associated with a laptop, the value of taking notes by hand, and the usefulness of quizzing apps.

**Information search / accessibility.** One pre-med senior described an interface similar to the one appearing in the movie *Iron Man* – a 3-D holographic computer controlled by gestures and voice-interactions with a Siri-like intelligence:
“It just pops up all the information. I would be happy to have one of those as I write my research paper. Like, pull all the relevant information and show me. So you don't have to search for hours.”

Two different students also described language-specialized tools to keep reference information ready-to-hand:

“Mine's basically Google. But Latin specific. Because that's a very hard subject to try to bring technology into. But how do you learn the skill-set of actually translating a language that's not spoken? Its not like you need to memorize information, it’s more so having things available so that you can at any point bring in information. Maybe having a tablet that exists in the air - and in class, you just point at it, and the information comes up…”

“There's so many resources for older literature that’s in German...I made a digitalization of everything that's out there that's easily accessible to you when you're reading a text, whether it be Chaucer or something...and then you're going line-by-line and then you can click on the line and get vocab information, scholarly articles, stuff like that.”

**Prioritizing information.** This invention was inspired by the group’s extensive discussion about how they prioritized doing readings for their classes:

“I did a reading scanner that takes the readings that your professor assigns and then they can highlight the most important parts that they want you to learn or think you're going to be tested on and then it scans it, so it shortens it and condenses it. It takes all the stuff you don't understand and condenses it. All the unnecessary stuff goes away.”
Another student described a compelling self-assessment tool that would help students optimize both what and how they study:

“A technology that can adapt to different subjects and different needs. So like, it could test you on the stuff that you don’t know already. I find myself going over material that I know already, and I’m like "ok I know this, I know this.." and then I kind of mentally skip over the stuff I don't really know. And then when I get to the tests it’s like "oh, I should've known this but I know everything else 20 times better than I should." So that type of stuff - focusing you in on what you don't know. And then like, the best ways to study for different subjects, because I think there are different methods and different technologies that could do that.”

**Interactive, immersive content.** Two students described interactive content that would help them to get a more “real world” experience with their subject matter:

“Mine's virtual reality glasses that can take you back through history. Like, community engagement but for history. So you can talk to people and interact...and move through time. Learn in a more sensory way rather than a textbook.”

“For pre-med stuff, if there was a way for every topic you talk about, just have an expert in that field. You could have them create mini Bill Nye type videos, maybe with a patient, showing how this effects this, or whatever. And then you could go on and manipulate the same variables, or do it yourself, so you see an expert who really knows what they're talking about, and then you can go ahead and get hands on experience also.”
Optimizing technology use. One student, realizing that many tools already exist to help him work better, described a technology that would help him be more aware of and make use of those already on his laptop. (This is the same student who was teaching himself to use Excel in his free time).

“An interactive device that can help you learn as you go along - there's a lot of things on my Mac that I don't know how to access...like, if I'm doing something on Word it says "Oh, you're doing THIS, maybe if you tried it over HERE…it would help you better, it would be a lot easier for you."
CHAPTER IV - DISCUSSION

Understanding the Georgetown Student

A typical deliverable for user experience researchers is a set of “user personas” that illustrate the archetypal end user for a given product or experience. These personas synthesize both the rich qualitative data collected through primary research with high-level demographics and market research, and are meant to act as a short hand for product designers to keep the needs and goals of actual users in mind. In this vein, I have created a sample persona for a Georgetown undergraduate, seen in Figure 8. It is based on an integration of the findings described in the previous chapter, secondary research on Georgetown students based on publicly available data released by the university, and some of the key theoretical lenses from educational research as described in the literature review. This particular persona was developed to follow some of the key characteristics of the five freshman included in this study, including high levels of curiosity, high levels of social engagement, and the general feeling of wanting to find a “path” or place in the world. The persona also explicitly incorporates two of the user characteristics described in the literature review: motivation and digital literacy. My findings suggest that the level of digital literacy depends heavily on previous experiences at jobs or internships—in this case, I have created the student persona of “Mike” to have previous experience as the
editor of his high school newspaper, which gives him higher digital literacy scores.

**Figure 8. Sample user persona**

A more typical user-centered design project would result in the creation of 3-5 archetypal personas to refer to at touch points throughout the design process as different features or functionalities are considered. In the current context, where the purpose is not to design something but to gain a greater understanding of the end-user, having multiple personas is not as useful as two other common user experience research deliverables – a workflow model and a user journey. These two heuristic tools give more insight into the user’s experience as a *process*. A user journey describes a high-level summary of a user’s experience with a product over a full “life cycle,” from the point of contact (i.e., considering whether to purchase a product) to the eventual end of the engagement with that product or experience.

Below is a sample user journey based on the persona presented above. While faculty and staff can know their students well in a certain context or timeframe (i.e., one
semester), it is rare to have a full picture of their experience across multiple contexts (social, academic, personal), or across all four years of a student’s time at the university, so widening the frame of reference to include these elements helps to highlight “gaps,” or possible areas for improvement, in the overall student learning experience.

The below user journey (Fig.9) looks at a student’s experiences over a single semester. This journey highlights some of the experiences and difficulties particular to the first semester of college. For example, we know from his persona that Mike is a highly curious person, interested in learning for its own sake, but his large lecture courses—most of which are required introductory courses—do not do much to engage or anchor him intellectually. As he becomes more involved in social and extracurricular activities, he begins to “cut corners” and do the bare minimum amount of work required. When paired with the fact that Mike is not yet good at understanding or inferring what is expected from him, the result is poor performance in some classes. Furthermore, his formal learning experiences do very little to help Mike find his “path”—his large introductory lecture courses do not provide much insight into possible career paths or applied topics or skills that are of interest to him.

Seeing this full picture of Mike’s experiences raises a few questions: What could be done to help first-year students get intellectually and academically engaged from day one? How can courses be streamlined to reduce “busy work” and ensure that students spend their time on assignments and readings that will be most impactful to their learning? What would help students get a broader sense of possible “paths” that they could take, in terms of major, career, or general interests? In a full user-centered design
process, each one of these questions could be “peeled off” and investigated further in order to suggest a possible programmatic or technological solution.

**Figure 9.** Sample user journey

“Getting the Grade”: The Importance of Assessment Design

It became clear during the interviews and focus groups that “getting good grades” was the driving goal for nearly all students. This does not necessarily seem to be by choice — and several students openly acknowledged that grades are relatively unimportant in the grand scheme of things — but they seem to be nonetheless driven by the same deeply ingrained need to get a good GPA that got them into Georgetown in the
first place, and by the sense that their GPA would be a key factor in future interviews or post-grad applications. Thus, in the context of needing to optimizing their GPA across 4-6 different courses while leaving time for extracurriculars and social or personal activities, grades are seen as a “necessary” focus while time spent “learning” is more of a “nice to have.”

This singular goal also drives their key learning behaviors and strategies. Students reverse-engineer their learning behaviors and strategies based on each professor’s expectations and assessments. They use the professor’s PowerPoints and assessments as the central guide of what is important to learn and pay attention to.

More than anything, this research highlights the importance of assessment strategies to the process of learning. Given how closely students tune their time and effort to assessment, this clearly mandates that assessments align with faculty learning goals as well as provide a multitude of ways for students to clearly understand what is important and what will be assessed (again, presumably both of these are aligned). Several students expressed frustration with assignments and assessments that seemed “inauthentic”:

“The biggest thing is NOT assigning things that feel fake. Rather than assigning things that the student and the professor know is not of importance, that's just going to get a grade and that’s all. Assigning things that really push you to investigate a topic seriously. For example in my music class, we have two essays in that class that are like both pretty lengthy, but you pick a topic within a time period that further interests you. Because the class moves so quickly, this is his way of saying, "I know we only spent two class periods on the classical period, but this is your chance to research it and make it your passion." Obviously as a
student I could still make that a B.S.-y assignment and do it all the night before and not really learn anything new, but I think that’s on me.”

“I LOVED physics - most people hate physics - because you're given a problem and you've got to map it out and actually THINK during the problem, as opposed to just regurgitating information. That was the only class as a pre-med student besides my immunology class that wasn't multiple-choice exams. It’s frustrating because so much is lost is learning when it becomes predictable. When you figure out what the teacher wants. You get stagnant in the way you learn...In the real world you're not going to be given 4 bubbles and asked to pick one. I think it’s really silly that that's how they assess us.”

Both of these students appreciated assessments that were linked to two different kinds of “authentic learning” - one that gave students the option to pursue their own interests, and another that forced them to think through an open-ended problem or situation, unable to fall back on a simplistic process-of-elimination.

Another student described the importance of formative assessments and check-ins to ensure that students learned from and understood every piece of material that was assigned:

“If you got a reading you'd be talking about it and he'd be asking you questions about it. It’s not just like, ‘good luck on the test,’ its like you read something, you have a very in-depth discussion about it with a group of people and then you bring it to the larger class. He makes sure you're thinking about it in multiple different ways. He would have discussions on Blackboard, blog posts you talk about in
class...making sure "do you understand what I'm giving you?" and not just testing you at the end. After you read each thing - do you understand what you read?"

Of course, creating this kind of authentic assessment is easier said than done. It requires more of both faculty and students. The pre-med student acknowledged that the dynamic tests that made him love physics were exactly what made most people hate it, and the girl in the last quote acknowledges that not only did many students drop out of that class early in the semester, but that “I would HATE doing that now because there's so much stuff, [while] in high school there's more time.”

While none of this is news to educational experts and researchers, it is interesting to hear students articulate this same need for improved assessment, and to learn with a greater level of granularity the nitty-gritty ways that students reverse-engineer learning strategies in order to “get the grade.”

PowerPoints are the key technology that students use in the process of “getting the grade.” By reviewing presentations after they have been posted online, a student is able to discern the most important content in a course, and what is most likely to appear on a test. Although seemingly mundane, the PowerPoint is the most ubiquitous form of ed tech in Georgetown classrooms, and the details of how a professor designs presentations, how they are incorporated into the class, and how the content is linked (or not) to later assessments is vitally important to understanding how a student learns in that class.

**Technology as Tool for Learning: What’s Working**

Although the student experience of learning (among the students sampled) seems to be relatively “low tech,” there were a few key technologies students identified as
having a positive impact. In regards to technology implemented by faculty for formal learning, students had positive things to say about clickers/in-class polls and PowerPoints (when “well done”). In-class polls were seen as a great way to engage students, to see the thoughts and perspectives of other students, and in some cases as a powerful way to demonstrate a “real world” phenomenon through students’ responses.

Students also had great things to say about PowerPoint presentations that helped to guide and distill class discussions, included real-world examples via links and articles, and had a balance of visual and textual information. One indicator of how important this technology is for students is the degree of displeasure or discomfort students expressed about classes where the faculty did not use PowerPoint and/or did not share the presentation with the student in textual form. In particular, many students did not feel like they had a clear sense of what was important or relevant to remember without the PowerPoint as a guide. This is particularly important because PowerPoint is the central technology that supports students as they are trying to “get the grade.” Students found it difficult to discern the important pieces of information when presented solely with either a lecture (which can potentially be full of tangents and diversions) or with readings, (which may or may not even appear on assessments). The PowerPoint is the central indicator of what faculty think are the most important points, and therefore what is most likely to appear on future assessments.

Students’ main critique of PowerPoints focused on the inclusion of either too much or too little information. When faculty include too much information, this reduces the effectiveness and efficiency of the PowerPoint as a “CliffsNotes” for the class. When faculty include too little information, perhaps emphasizing visuals over text, it is difficult
for the student to understand which ideas are key within the overall lecture. Highlighting perhaps the ideal balance between providing complete and structured information and keeping students engaged in the lecture, several students praised a faculty member’s practice of providing pre-structured lecture notes with important facts or details left blank. This structure served both to give the students confidence that they knew which facts or ideas the faculty member considered to be important and therefore would be likely to assess, but also to pique their interest in learning and paying attention during the lecture.

(Although not directly relevant to this study, two students highlighted that they had meaningful learning experiences in a hybrid online-offline class. One freshman pre-med student participated in a hybrid course in high school where students collaboratively worked through course materials from an online repository, and consulted tutors in-person when they got stuck or had a question that they could not answer by Googling. For this student, the main value of the course was the DIY-approach and the highly collaborative nature of the course work. Another senior student described her experiences in a hybrid Italian course, which also entailed a good amount of social interaction with peers. For her, the main value was the flexibility it afforded her to balance two jobs and other coursework.)

Students incorporated technology more heavily into their own study habits and practices. However, these practices were typically “on the edges,” reflecting slight enhancements to their existing learning practice rather than a significant transformation. Students found online resources, and in particular videos, to be extremely helpful for visualizing and elaborating on difficult concepts in the sciences. Additionally, the simple
tool Quizlet was a popular tool for creating digital flashcards for memorization and self-assessment. Students also leveraged basic tools like Google Drive, calendars, and to-do list apps to stay organized across their different classes.

Perhaps not surprisingly, the most interesting and innovative use of technology fell completely outside of the realm of formal learning or study habits. A few students used social media and Web 2.0 technologies as a way to explore new streams of information about the world, and to “stay relevant” about certain topics of interest through tools like email subscriptions, Instagram, and Twitter. Most interestingly of all, several students described proactively teaching themselves new things in a fairly structured way through online resources. These online learning resources let students pursue their passions through easily accessible video content by incorporating aspects of gamification, helping students with self-assessment, and integrating social interaction with both peers and experts. For students who have the passion or interest, there are efficient, effective and enjoyable pathways for them to self-teach.

**Technology as Tool for Learning: What’s NOT Working**

Although laptops are an integral part of how students do their work, they consistently identified mobile phones and laptops as a major source of disruption to their learning process both in and out of class. Students described using anti-distraction apps on both devices, but ultimately found these to be little more than a reminder to rely on their own willpower, rather than an effective mechanism for preventing distraction.

Interestingly, there seemed to be a high prevalence of students abandoning their laptops as a study tool in favor of hand-written notes, outlines, and study-guides as the best way to record and process information. This seems to be a strategy for avoiding the
distraction that laptops entail, but also a reflection of the fact that students are better able to process and store information when they write it by hand. Recent research suggests that improved attention and retention associated with handwriting is related to the process of distilling information to its “core concepts” (Mueller and Oppenheimer, 2014). Student experiences seem to bear this out, since they describe themselves as not being able to take “as many” notes or “as thorough notes,” but still seem to know more when they take notes by hand. A senior computer science major had strong criticisms of the laptop as an ineffective tool for flexibly and creatively capturing complex ideas, and ascribed his success in his classes to eschewing a laptop in favor of paper and pencil.

In simple terms, these two factors (distraction and inflexible idea-capture) are a strong argument for limiting or prohibiting the use of laptops during lectures. This evidence may even warrant a more radical reconsideration of the value of digitizing any activities or assignments that could just as easily be done without the use of a laptop. While this may seem somewhat extreme, a deep consideration of how technology interventions can profoundly shape a student’s ability to be reflective and mindful is essential to creating deep learning experiences. Indeed, the 2016 New Media Horizon Report suggests that helping students stay mindful and balanced in their use of technology is a “wicked problem” that will need to be addressed over the long term.

The students’ own prototypes also serve as a good indicator of the problem areas they identified in their experiences of learning and learning with technology. These themes included: preventing distraction, simplifying information search and access and tailoring it to specific subjects or disciplines, prioritizing information in readings and
lectures, and finding better tools and strategies for self-assessment. Each would be a rich pathway to explore in developing new educational technologies and tools.

**High-Impact Learning Experiences**

While students identified and described high-impact learning experiences with characteristics of student- and learning-centered practices (i.e., experiential, project-based, integrative), these experiences seem to be the exception rather than the rule. The primary mode of learning experienced in their courses is based on the age-old model of information-transfer from faculty to student. As such, their learning habits and strategies, including their use of technology, is primarily geared towards absorbing and “regurgitating” information presented to them by faculty (through note-taking, content review, memorization and self-quizzing).

Furthermore, when looking closely at what students identify to be meaningful in a formal curricular setting — faculty passion for the subject, concern for student learning, discussion-based learning, and teaching students how to think rather than remembering facts — the appropriate role or place of technology is not immediately obvious. These factors do not immediately seem to be issues ripe for technological innovation.
“Radical innovation changes lives and industries. Incremental innovation makes things better. We need both.” - Don Norman, *The Design of Everyday Things* (p. 280)

This project was structured to explore how students learn with technology, and to contextualize this within the larger question of *how students learn*: what motivates them, what skills and behaviors they have, and what are the defining characteristics of powerful learning experiences they’ve had in the past. This exploratory form of user research has led to a number of important insights on how students learn with technology, each of which raises several possible design questions. Outlined below are a few specific design questions that warrant further research and possible development, each which could act as a starting point for a more typical user-centered design process focused on a specific product, service, or technology.

Although my focus is on learning with technology, as described in the literature review, technology alone can help support incremental innovation, but radical innovations and improvements rely on larger shifts in teaching practices, institutional policies, and the culture of higher education. In light of this, the below design questions and recommendations extend beyond ideas for technological change.

Table 5: Key design problems for further research and development

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<th>Incremental Change</th>
<th>How might we improve PowerPoint as the primary vehicle of instructional content?</th>
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<td>How might we ensure a robust alignment between learning objectives, instructional materials, and assessments in individual courses?</td>
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<td>How might we address the distraction that laptops and phones pose for students, both in and out of class?</td>
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<td>How might we improve students’ information-seeking skills and behaviors?</td>
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<td>How might we create a stronger sense of community in the</td>
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| Radical Change | How might we use grades to reward and incentivize deep learning?  
|               | How might we cultivate students’ ability to self-teach through technology?  
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**Design Questions and Recommendations for Incremental Change**

**How might we improve PowerPoint as the primary vehicle of instructional content?** Although it is not the most glamorous instructional technology, it is the most universal. PowerPoint sits at the nexus of several key teaching and learning strategies. For faculty, it is a way to help structure class time, convey and organize essential content through text, images, and other media, and collectively serve as a repository of course content that is reused and remixed year after year. For students, the PowerPoint is a lens through which to interpret the sometimes messy classroom interactions between faculty and students, serving as a recurring focal point and (most importantly) as a marker of what the faculty considers important and what is likely to appear on assessments. Additionally, PowerPoints are a vehicle for students to extend the accessibility of a lecture beyond the in-class meeting, allowing students who have missed class to gain some sense of what was covered and allowing students preparing for a test to re-center their own memories and notes around an objective repository of “what is important.”

All of this makes the PowerPoint an essential instructional technology, and improved best practices around its development and implementation is an area ripe for incremental change. The first step would be to conduct an additional round of user
research into faculty goals, needs and behaviors with regards to PowerPoint to ensure that any design solution addresses the needs of both students and faculty.

There are many different ways that this technology could be improved. Below are some concrete suggestions from this research, gleaned from direct and indirect student statements about this particular educational technology:

- Redesign PowerPoints to serve double-duty as both a presentation aid and a study guide.
- Include a balance of text and visual elements that will help both visual and textual learners, and ensure that images will be interpretable to students after-the-fact.
- Share PowerPoints with students before each class, as many students like to take notes directly on the slides in order to anchor their own reflections and thoughts directly to what is presented in class. (For the faculty that fear that students will not come to class when this content is made available, there are other ways to more directly address this problem that do not impede on the learning strategies of other students — i.e., strict attendance policies, pop quizzes, etc.).
- For faculty or classes that do not use PowerPoint, explore alternative ways for students to understand what they will be assessed on, and help them understand how to organize and prioritize different course content. This could include providing a study guide to students, verbally highlighting or acknowledging what is important and/or what will be assessed versus what is an interesting tangent or side-note, or providing ungraded or low-stakes formative assessments that help
students recognize what content is important and what they may not yet fully understand.

Georgetown’s teaching and learning center, the Center for New Designs in Learning in Scholarship (CNDLS), would also do well to pay more attention to this instructional technology. Although more research is necessary to understand what would best address faculty needs and goals, this may be an avenue for CNDLS to facilitate conversations and trainings around best practices with presentation tools like PowerPoint. Furthermore, this tool may serve as a concrete starting point for discussing with faculty how they are structuring their class time, or as a scaffolding tool for helping faculty to develop online or hybrid course content.

**How might we ensure a robust alignment between learning objectives, instructional materials, and assessments in individual courses?** While making sure there is alignment between a course’s goals, content, and assessments is a well-known instructional best practice, my research drove home the importance of this alignment, given that students are well-versed in how to reverse engineer grades and will not necessarily learn unless the course structure forces them to. As described earlier, Georgetown students have an limited amount of time and usually will not spend time on things that provide no obvious “return on investment” in terms of their course grade or overall GPA. There are several key ramifications of considering that assessments are the “North Star” for students: activities or assignments that do not contribute to their grade will be ignored, if the assessment can be easily gamed by memorization rather than deep engagement with content, students will do this, and if the assessments are not *directly*
aligned with the course learning objectives, chances are very likely that students have not learned what the course was meant for them to learn.

The clearest example of this is class readings. Students did an extremely low percentage of the assigned readings because it didn’t impact their grade directly, and because the important content from the readings was often covered more clearly and efficiently in class. Keeping this in mind, faculty who want their students to do the readings should consider ways of formally or informally assessing students on the reading and strongly consider whether course readings directly further course goals.

Thinking about this as a design problem, it seems clear that the process of creating a rigorous alignment between course elements is not easy for faculty. How might faculty understand where course elements are misaligned? What might CNDLS or departments do to support faculty in this endeavor?

**How might we address the distraction that laptops and phones pose for students, both in and out of class?** Students again and again described being extremely distracted by their own devices. In order to address this problem, further user research is necessary to understand the triggers and cycles that lead to distraction, and the skills, behaviors, or contexts that already exist to allow individuals to overcome these distractions.

Of course, the issue of technological distraction is a larger societal issue that is not particular to Georgetown students, but this research suggested a few ways that it might be addressed:
- Before integrating an online tool or activity, faculty may consider the “distraction cost” that it may incur in or outside of class, and whether the same goal might be reached through non-digital means.
- Several students clearly noticed improvements in their note taking and engagement in classes where faculty had banned the use of laptops entirely — despite some initial frustration. Even for faculty who do not want to implement an outright “ban,” it may be worth strongly encouraging students to not use laptops in classes where it is not necessary, as students expressed that they often would follow the cultural norms of the faculty and other students in a class.
- This may also be a phenomenon that academic affairs staff and other student advisors can help students with. There are a number of tools and apps that block incoming notifications on both smartphones and laptops, or block a student from accessing a site after a set number of hours. Not all students are familiar with these technologies, and even sharing these basic tools may be of some help.
- Some students had developed more advanced ways of preventing distraction, including putting their phone in another room or out of immediate reach when studying, and by shifting their work entirely to paper and pencil unless strictly necessary. This seemed to be the most common and most effective strategy for avoiding distraction, both in and out of class.

**How might we improve students’ information-seeking skills and behaviors?**

My findings suggest that although current students are “digital natives,” their digital literacy skills can often be quite limited. While students did not seem to think that faculty should be responsible for teaching them new technologies or digital literacies, a
few suggested that an exception might be subject-specific research and information search, including learning how to use research databases, searching for information from other countries and in other languages, or finding ways to stay relevant on trends or current research from the field. Faculty may be uniquely equipped to help students gain advanced information seeking and research behaviors specific to that discipline. Some possible ways to do this include:

- Providing training sessions or workshops; faculty could bring in subject-specific research librarians or find a way to show students how they themselves would go about conducting research or doing a literature review in their subject area.

- Designing assignments that requires students to apply advanced, subject-specific search skills; this may include teaching students how to do a proper literature review within that discipline, or asking students to periodically bring in recent publications or articles relevant to the field.

- Designing assignments that help students think critically about a specific article or source, including both popular sources and more expert or academic sources.

- Faculty interested in devoting particular attention to information literacy might consider assigning students to develop or contribute to a topically relevant Wikipedia article. This requires students to apply fairly advanced skills in information search and critical thinking.

At an institutional level, Georgetown’s libraries could help improve this specific set of digital literacy skills by creating open workshops focused on discipline-specific research strategies. Indeed, the Gelardin New Media Center at Georgetown’s Lauinger Library
already supports students’ development of digital literacy through one-hour workshops where Gelardin staff introduce students to tools and technologies such as Adobe Creative Suite, social media presence, and data visualization tools like Tableau. Faculty or departments could consider making these workshops mandatory, or rewarding participation with extra credit.

**How might we create a stronger sense of community in the classroom?** When describing high-impact learning experiences, students described time and again two characteristics: a sense that the professor actually cared about student learning, and being provided opportunities to discuss ideas and course content with their peers. The social aspect of learning seems to be hugely important to student, but it isn’t always something experienced in their classes.

There are a number of different ways that this social element can be addressed and incorporated. Students highlighted some of the practices that they found to be most impactful; the design problem is to understand how these experiences might be scaled up or implemented more universally within courses:

- Students described class discussions, small study groups, and collaborative group projects as the most powerful ways for them to connect with and learn from their peers. Several students cited in-class polls as another good way to connect with and hear from their peers, even in large lecture courses. Interestingly, only one student cited class discussion boards as a way to connect with their peers. Further research would be helpful to understand which tools and strategies students do or do not find effective for connecting with their peers and why.
- In the case of creating lines of communication between faculty and students, this can be done by leading Socratic-style discussions rather than lecturing, setting a tone in the course where students feel comfortable asking questions, and making sure students feel comfortable coming to office hours or reaching out to the professor outside of class. Students even suggested they were open to cold-calling as a means of starting dialogue between faculty and students who may be reluctant to speak up, as long as there is a clear culture that there are “no wrong answers” and that students will not be punished for saying something off-the-mark.

Although these are simple strategies, and well recognized as educational best practices, it seems that a sense of collaboration and community between faculty and students and between students in the class was a hallmark of students’ most memorable and life-changing courses.

**Design Questions and Recommendations for Radical Change**

**How might we use grades to reward and incentivize deep learning?** One of the current trends in higher education is towards the development of “badges” as a pathway to reward students for the skills and experiences they’ve acquired. This is a large structural change that requires collaboration between individual faculty and students, higher education institutions, and potential employers. This design question asks how we can help individual faculty incentivize learning through the current system. In this sense, a more targeted version of this question is: **how might we enable faculty to assess students on a broader range of activities and behaviors?**
Students described a number of high-impact learning experiences, each of which had more or fewer direct connections to their grade in a given course:

- Students appreciated being given a larger degree of independence in their assignments via creative “capstone” projects, assignments where they were allowed to choose the topic or direction, or independent research projects. They felt that this gave them the space to authentically direct their own learning, in a way that a more proscribed project does not. While this kind of open-endedness makes projects more difficult to assess, they are a much more engaging and authentic process for students.

- Students were also extremely motivated by the chance to apply their learning to the real world through things like client projects and community-based learning. Only a few students had had this specific kind of opportunity, but many had impactful learning experiences in applying their formal learning in an internship or extracurricular activity. Although even more challenging to assess, receiving feedback about performance in an authentic, applied learning setting is likely to be more meaningful to students in the long-run than a letter grade on a written assignment or exam.

- Finally, several students described learning and retaining more when assessments forced them to “think on their feet.” One senior pre-med student described how much he loved his physics tests because of their open-ended nature; a Spanish student described how much more she learned when speaking with someone who did not speak English because it forced her to think creatively about how to explain or describe something if she didn’t know the word; a psych
major described a high school class in which the teacher would cold-call on students to ask questions about the reading as one of the best classes she had ever taken, and the course that had made her decide to become a psych major. Each of these are assessment strategies that force students to think dynamically, to put things together on their own rather than regurgitating information, and don’t allow them to fall back on well-perfected test-taking strategies. Students readily admitted that this is a much higher bar to clear, but seemed eager to accept the challenge, knowing that it resulted in the kind of learning that would last beyond the last day of class.

The relevant design question is: how to make it easier to directly tie grades and assessments to these kinds of learning experiences? They tend to be more difficult for an instructor to assess efficiently and effectively, but there may be tools and technologies that either help faculty with the assessment process, or create more controlled simulations of these kinds of learning experiences. Further research about instructor goals and needs in the assessment process would help to create a product that makes creative and flexible forms of assessment a viable practice.

How might we cultivate students’ ability to self-teach through technology? I started this project with the idea that students’ informal learning practices would provide some substantial inspiration for how to improve and rework formal learning. However, I quickly learned that most students do not have particularly advanced self-teaching methods, despite the accessibility of open learning materials and their own status as “digital natives.” Students certainly teach themselves things, but not in a widespread or deliberate way, and often not with the kind of deep subject engagement that happens in
classroom. Nonetheless, higher education seems well positioned to help students become “life long learners” by teaching them to self-teach at a much higher level.

This process would start with further research on students who already have advanced skills and practices of self-teaching through technology, in order to understand what helped them learn and develop those skills. In my own research, the student who seemed to have the most advanced practices had developed them through a hybrid summer course, in which a small group of students independently worked through online labs and materials. The students had a tutor available to them if they needed, but were strongly encouraged to find the answers on their own through online resources and tools.

This student’s experience suggests that hybrid courses designed in a similar way may facilitate self-teaching and self-regulated learning skills. A significant portion of the content students learn in classes is already available online in more and less structured formats. Faculty could create an opportunity for students to engage in rigorous self-teaching by providing them with some of these materials and then assigning projects and exercises to demonstrate understanding of this material. This would, of course, be best paired with a student scaffolding of information-seeking/research skills (as described in the previous section), and would allow students enough leeway to choose a topic relevant to their own natural curiosity and interest to motivate this more self-directed form of learning. This could also be done in a more limited fashion, by asking students to find a current research article or topic that is a bit out of their depth and to explain its contents from top-to-bottom to the class, or could be extended to an entire online course, wherein students work through open learning materials collaboratively, with the faculty member available when students are struggling.
Of course, this would require greater investigation and reflection, particularly in the context of the current assessment culture and students’ limited time to engage in this kind of messy and complex learning process, but this design would not only lead to a more authentic and active engagement with material, but would help students learn new digital literacy skills and self-regulated learning skills to serve them throughout a lifetime of learning.

This hybrid form is only one possible design solution; further research may suggest other instructional formats or tools to achieve a similar goal.

**How might we create more time for deep learning experiences?** As described, one of the main student needs is reducing the amount of time they spend in a class in order to get the grade they want. This is partially a reflection of Georgetown’s high-stress, high-commitment culture, wherein students are often involved in multiple extracurriculars, clubs, and internships simultaneously while striving to maintain an extremely high GPA. Many of the changes described above are intended to encourage students to engage more deeply with their courses and their own learning, but it is not clear that this would be possible for students who are struggling to balance many commitments. This raises the question: how might we create the *time* needed for students to engage more deeply in their learning?

Here again, two student experiences serve as a starting point for further research and development. One senior girl described struggling to balance living off-campus, holding down two jobs, and maintaining a GPA that would get her into prestigious interviews. This student appreciated a hybrid format Italian foreign language course, which met half online and half in person, since this gave her more flexibility in her
schedule. Additionally, several students had powerful learning experiences in intensive-format summer courses, when they were not also balancing a full course load.

Of course, online learning is a space under intensive exploration and development right now. Further research on what other universities and institutions are doing would help inform the next stage of research and design. A design solution would also need to take into account larger institutional policies and practices around when, where, and how students are granted credit for courses. For example, could students be granted double-credit for research-intensive, deep learning classes? Could students be granted credit for extracurricular or informal learning experiences (perhaps if additional scaffolding was added)? Ideally, some combination of these technological and institutional solutions could create space and time for meaningful student engagement in the formal learning process.

How might we cultivate a more robust practice of user-centered research and design among Georgetown faculty, staff, and administrators? The entire premise of this project is the idea that user experience research has a unique potential to help the field of ed tech to better define and achieve its goals. Particularly in the context of an elite American higher education institution like Georgetown, the details of why and how to integrate educational technologies can be quite murky. Through in-depth user research, I’ve attempted to investigate how Georgetown students learn and the role that technology plays in their learning in order to shed a bit of light on these questions.

However, these findings only represent one set of stakeholders among many. Further user research into the goals and behaviors of other essential stakeholders — Georgetown’s faculty and staff — would clarify exactly how these ideas would need to
be implemented in order to meet the needs of all the users, which is an essential part of the cooperative work of education.

Apart from this larger endeavor, the methods and goals of user-centered research and design have the clear potential to lead to both incremental and radical improvements in the higher education landscape. Currently, the main conduits for collecting user experience and feedback to improve student experience are end-of-semester evaluations, anecdotal evidence and feedback that faculty and staff receive, and large-scale, campus-wide surveys. At the level of an individual class, the mid-semester group feedback sessions (MSGFS) typically facilitated by CNDLS staff are strongly analogous to the kinds of user-centered methods employed in agile software development; these feedback sessions collect qualitative data about users’ experience in an informal way, and provide formative feedback that can be quickly acted upon, rather than waiting until the product is finished, so to speak. This has the benefit of improving the course experience in real time, but is also more likely to generate rich and usable data for faculty than an end-of-course survey. This model of collecting formative feedback and iterating “on the fly” based on direct student feedback could be expanded and explored as an integral part of the teaching process.

At an institutional level, departments and centers at Georgetown affiliated with technology teaching (i.e., the teaching and learning center, the library, the information technology support center, etc.) could benefit from a more formal integration of qualitative user research practices. While students certainly have a presence in these organizations, new perspectives can be gained by recruiting a small group of students totally unfamiliar with the mission and ideas of the organization and gathering open-
ended ideas and feedback from them. This enables feedback to go beyond the paradigm of “How well did X program/service/experience meet your need?” towards a paradigm of asking, “What are your needs? What would be the best use of our time and resources in supporting you?” This kind of open-ended inquiry, predicated on user experiences, goals, and behaviors rather than the organization’s needs and concerns, opens a window to more radical forms of innovation and pathways of improvement in teaching and learning practices.

**For Further Research**

This research highlights a number of different design problems and areas that would benefit from further user research. Looking ahead, a particularly generative path for improving the student learning experience seems to be finding ways to enable faculty to employ user research strategies in order to both better understand their students’ needs and revise and iterate their instructional practices. A user-centered design process could be used to develop a “toolset” for faculty user research. CNDLS currently supports MSGFs, but these are not particularly scalable or well known across the university.

This process would necessitate a series of interviews and focus groups with Georgetown faculty to understand their needs, goals, and behaviors with regards to assessment and reflection on their own instructional practices. From this, different tools, technologies, and practices could be iteratively tested to develop a toolset able to address both faculty needs and show evidence of an improved student experience. In keeping with the holistic perspective characteristic of user experience, the development process should include research into the best way to package and disseminate this toolset so that it is widely and easily accessible to faculty.
Coda

Most of the findings from this research project will come as no surprise to practitioner or researchers in the field of educational research. This project is not meant to be a piece of new scholarship, but rather a model for how user experience research methods can be applied locally to help individual faculty and institutions improve teaching and learning. While colleges and institutions always seek new ways to improve learning, these efforts too often ignore the actual goals, behaviors, and experiences of students. This is particularly true in the case of educational technology, which is often driven by a “tech-first” perspective that assumes that new technologies have an inherent capacity to improve and transform learning. User-centered research and design strategies can help instructors and institutions ground their efforts in evidence about what strategies and technologies best fit with students’ goals and capabilities and the kinds of learning experiences students find most meaningful.

While there is a well-established practice of conducting research about the impact of educational technology interventions, user research methods differ from typical research methods in three key ways:

1. The focus is on formative assessment that captures the student experience assessment *in situ* and responds in real time.

2. Following from this formative aspect, user research is better situated to look at the inputs and process of learning, not just the outcomes. This includes broad contextual factors like students’ goals, learning strategies and behaviors, and experiences across different courses and even outside the classroom.
3. The research methods it employs are flexible and scrappy, focused on enabling faculty and institutions to collect data in whatever form they can. In particular, open-ended and qualitative data is valued as a way to develop a deeper understanding of the learning experience and context. This data is not meant to be replicable or rigorously validated – it is meant to inform daily practices and behaviors.

In an era where the exact purpose and value of a liberal arts education is increasingly a debated question, user-centered perspectives and methods provide a flexible way for universities like Georgetown to explore the value that higher education provides to its students, and iteratively refine and redefine the teaching and learning practices that best meet those goals.
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