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Welcome Letter

Welcome to the DETA Research Toolkit 2.0 for cross-institutional research on distance education!

The National Research Center for Distance Education and Technological Advancement (DETA) was established in 2014 with a grant from the U.S. Department of Education to conduct cross-institutional data collection across 2-year and 4-year Institutions of Higher Education (IHEs). The goal of DETA is to foster student access and success through research and advocacy of evidence-based online learning practices and technologies. The term distance education was used, in part, because of its historical significance and encompasses technology-enhanced, blended or hybrid, and online education, including instruction, teaching, and learning as well as associated functions of IHEs where relevant (e.g., institutional services, administration). The primary goals were to:

1) Understand and determine distance education outcomes;
2) Identify practices (instructional and institutional) that impact those outcomes;
3) Conduct rigorous, interdisciplinary, and standardized research to identify and evaluate influences upon outcomes for all students, and
4.) Examine underrepresented groups of the student population, including students who are minorities, low income, and first generation, and/or with a disability or impairment.

DETA Research Toolkit 1.0 was developed through the initial efforts of the DETA Summit to bring key stakeholders together to develop a research agenda for DETA.
and the nation, along with continuing the collaboration of individuals who work within distance education [researchers, faculty, instructional support, institutional support (information technology, tutoring, advising), education technology companies, graduate students, and others]. These initial efforts provided a general research model and framework of inquiry to guide our research from a systems perspective. It also included a series of outcomes incorporating various national efforts to help researchers and practitioners identify areas where we should be documenting impact and moving the needle. Disappointingly, substantial research is not being conducted to examine the efforts of practice (e.g., instruction, instructional support, including design, institutional support) in relation to these outcomes (e.g., learning, academic achievement, satisfaction). Although the original toolkit included research questions and identified dozens of variables for exploratory research that were incorporated into the framework of inquiry, DETA realized that greater specificity was needed to guide research. Therefore, the DETA Research Toolkit 2.0 provides a series of research models to establish the level of specificity needed for researchers and practitioners to conduct research at their institution and collaborate with DETA to conduct cross-institutional analysis of these efforts.

Through the years many lessons have been learned and incorporated into the planned efforts for DETA and illustrated throughout the second version of the toolkit.

With the expanded research model, DETA will advance its objective to collect data at the course, program, and institutional levels to identify key factors at multiple levels for the purpose of informing future instructional and institutional practices. DETA developed the toolkit for the national DETA community to use, including several research approaches containing experimental and survey studies along with instrumentation and codebooks to ensure the methodology for data collection is flexible and properly adapted to best reach populations of interest.

Excitingly, the DETA Research Toolkit 2.0 provides an array of new resources and tools such as emerging areas to help research move beyond the traditional paradigms of positivistic research, to bridge paradigms, and to explore innovative methodologies. DETA is enthused to provide new information to guide qualitative, design-based, and data visualization research. DETA looks to continue to engage
other interested institutions as study sites and/or support IHEs in conducting research using the new research toolkit.

If you have any questions, please do not hesitate to contact us at detaresearch@gmail.com or on Twitter or Facebook at @DETAResearch.

Warmest regards,
Tanya Joosten, Ph.D.
**Toolkit Overview**

The toolkit overview provides a brief glimpse as to the purpose and contents of the toolkit.

The toolkit presented in this document is iterative in nature and is meant to function as a living document. DETA continually seeks feedback and gathers evidence to influence the revisions of this document for the purposes of continuous improvement. As you can see, versioning of the document is available as illustrated on the cover.

The primary goal of the toolkit is to facilitate cross-institutional research and to serve as a catalyst for research across the country by providing access to research methods, instrumentation, and other tools.

This toolkit contains the following materials to assist in the research of distance education:

1. **Research model**
   Section one details the general research model for online learning from a systems perspective.

2. **Guides to research**
   Section two details several guides to research including quantitative, qualitative, and design based.

3. **Reporting**
   Section three describes consideration in reporting including data visualization.

4. **Research tools**
   Section four includes planning guidelines, student survey packer, codebooks, human subjects, and more.
(5) Research models
Section five includes specific research models to conduct and replicate research.

(6) Supplemental materials
Section six includes supplemental materials, such as publications, communications, and references.

Appendices
The final section includes appendices referenced in the toolkit.
Section 1: General Research Model

The general research model provides an overview of the development of the toolkit, including guiding factors that influence DETA research. This section contains a common language by identifying and defining desired outcomes to be influenced by research and included in research design, a framework of inquiry providing a micro and macro level phasal understanding of distance education systems to identify areas and relationships of those areas of analysis, and a general model of distance education in IHE.
Background

The background of the general research model describes the fragmentation of research in distance education and the need for common variables, research questions, areas of research, and general view of distance education as a system.

A wide array of individuals conducts distance education research within the context of higher education. There are faculty and instructors of distance education research in schools of education or related areas (e.g., professors of online pedagogy, education technology, instructional design and technology); faculty and instructors of an array of disciplines from the social sciences, humanities and arts, professions, and natural science; administrators of online programs (e.g., deans, directors of online education); academic and non-academic staff with roles within institutional support services (e.g., tutoring) or instructional support (e.g., instructional design), including academic and technology-related units; and, more. These individuals bring a diverse knowledge base, skill set, and motivation to designing and conducting research.

In the development of the proposal for DETA, several administrators, faculty, and staff from the University of Wisconsin-Milwaukee (UWM) discussed the types of research projects that would be appropriate for the proposed center’s efforts. Through these discussions, evidence of a broader issue in distance education research surfaced. Individuals who study distance education, including tech-enhanced or eLearning, blended or hybrid learning, and online learning, are heterogeneous. These individuals represent an array of disciplines, including different paradigmatic, theoretical, and methodological approaches to the study of distance education.

The opportunity afforded by this diversity in research approaches has the potential to provide our higher education communities a greater understanding of the complexity of human interaction and social systems in distance education. The opportunity identified also presented a new problem to solve - we don’t all speak the same language about research in distance education. The need for
coherence in research language, methods, and how to approach the study of phenomena to guide our knowledge of distance education became evident.

In distance education, a common language or ground has not yet been established. Although existing scholarship attempts to establish an identity for teaching and learning on the fringe or margins (see Moore, 2013), such as distance education, there is still much work to be done. It is common in other disciplines to struggle with finding this common ground as well (e.g., Corman & Poole, 2000). Yet, unlike many other disciplines that have specific models illustrative of the phenomenon of interest or research models that guide the design of research, distance education has seen little traction broadly in this area. A cohesive approach to researching distance education from a transdisciplinary lens is pertinent and needed work.

The lack of common language and work being conducted in disciplinary silos has led to a disregard or lack of acknowledgement of previous developments in the field. Furthermore, the disconnect many times between the fast-moving development of practice and redundant research of already proven practices is less than helpful to developing knowledge of the field. Several authors over the last several years have noted this dilemma. Saba (2013) discusses that “authors, editors, and reviewers are not familiar with the historical origin and conceptual growth of the field of distance education...history starts from when they become interested in the field” (p. 50). Dziuban and Picciano (2015) refer to Roberts (2007) and Diamond (1999) in describing this as a type of amnesia where “we tend to trust what we have seen for ourselves and dismiss events that have occurred in the distant past...we forget anything but what we are experiencing at the moment and assume that the present is a way it has always been” (p. 179). Moore and Kearsley (2011) have discussed this tendency as a threat to good practice and good scholarship. As practice of distance education (e.g., online learning) continues to diffuse across the globe, especially in the times of the COVID-19 pandemic, research within disciplinary silos or silos of institutional and instructional practice and service without consideration of the previous research menaces knowledge creation in our field.

The goal of the updated Toolkit aligns with the initial goal outlined in the grant: to help create a language about distance education that will have sustainability across disciplines and temporal barriers. At least in the first year, it was apparent
that there was a need for these efforts to focus on creating a language that we can all understand as well as to engage distance education stakeholders from across the country in the attempt to create an interdisciplinary lens for examining distance education. Many early individuals researching in this area are not necessarily in the professions of education, but they are from the social and information sciences studying human behavior and technology (e.g., human computer interaction, computer mediated communication, communication technology), and today, individuals in all disciplines are researching distance education (natural sciences, humanities, arts, and professions).

In creating a common interdisciplinary language, the aim is to facilitate research efforts regarding cross-institutional distance education research as a strategy for ensuring quality in teaching and learning for all students. The research fellows on the original grant team felt a desire to identify a general model to frame research and more specific models that represent current and future research in distance education, in particular, with regard to the research that would be conducted as part of the grant activities. This need and desire have continued through the decade. Moreover, the development of a framework of inquiry that included detailed representations, which illustrates the varying levels of inquiry as characterized by input-throughput-output processes facilitating an interdisciplinary approach to studying distance education, was needed as well.

Therefore, the goal of this toolkit aligns in essence with the original work in developing research models to support a coherent body of research across institutions to create a national and now international body of knowledge that creates a space for us to design, enhance, and optimize teaching and learning online. DETA research hopes to create knowledge by enhancing our understanding of the systems and its components as it relates to distance education and, more specifically, clarify how components interact with each other in order to positively influence outcomes.
Desired Outcomes

Desired outcomes were identified through a review of existing national resources and literature to guide research designs and models. The goal of research is to move the needle on these outcomes rather than other potential motivating factors for research on or development of online programs.

DETA reviewed pertinent literature and documents in identifying and developing the desired outcomes meaning the outcomes that can and should be positively influenced by changes in practice as discovered through the research. These desired outcomes or desired results allow us to backwards engineer or design our research models to ensure that we, as a community, are moving the needle on these outcomes. These desired outcomes were published, and feedback was solicited through experts who participated in the DETA Summit in 2015 at the EDUCAUSE Learning Initiative (ELI) annual meeting.

These outcomes were developed, in part, from national reports and requirements concerning quality outcomes in education and in online learning by the U.S. Department of Education and the Online Learning Consortium, including:


The desired outcomes include access, learning effectiveness, instructional effectiveness, and satisfaction. There was strong agreement to confirm the outcomes as identified. Research that advances our understanding and improves these outcomes should continue to be pursued in 2020 and beyond.

**Access**

Access is defined here as the ability for all learners who wish to learn online to be able to access learning in a wide array of programs and courses (OLC), particularly underrepresented groups of the student population, including students who are minorities, low income, and first generation, and/or with a disability or impairment (OPE). An essential component in distance education is a comprehensive infrastructure for learning that provides all individuals with the resources they need when and where they are needed, in formats that they are able to access and understand. The underlying principle is that infrastructure includes people, instructional resources, processes, learning resources, policies, broadband, hardware, and software. It enables the use of state-of-the-art technology and brings state-of-the-art technology into learning in order to enable, motivate, and inspire all students, regardless of background, languages, or disabilities, to achieve (NETP).
Data can be collected by examining administrative and technical infrastructure, which provides access to all prospective and enrolled learners. Access quality metrics are used for information dissemination, learning resource delivery, and tutoring services (OLC). Other possibilities include data gathered from student information systems, from student perception surveys, or objective accessibility ratings of online courses and programs.

Learning effectiveness
Learning effectiveness in this toolkit is defined as indicating a demonstration that learning outcomes were met or exceeded standards (OLC). This includes areas of study with research outcomes focusing on student success in achieving learning outcomes (OPE) and other potential indicators of achievement (success, failure, achievement gains, academic achievement, improvement) (WWC). Moreover, learning effectiveness could also include topics of content retention.

Typically, data are gathered through direct assessment of student learning (e.g. overall grades, exam grades, or other assessments), faculty perception surveys, faculty interviews comparing learning effectiveness in delivery modes, and student focus groups or interviews measuring learning gains (OLC). Additionally, requests for new and better ways to measure what matters include concurrent data collection. Here, focusing on diagnosing strengths and weakness during the course of learning provides the opportunity for more immediately improved student performance. Furthermore, these technology-based assessments provide the opportunity to allow data to drive decisions on the basis of what is best for each and every student based on their unique attributes and interactivity in class (NETP). Other possibilities include data gathered from student information systems or from student perception surveys.

Instructional effectiveness
Instructional effectiveness is defined as ensuring that the quality of education meets program, institutional, and national standards (OLC). The focus is on what and how we teach to match what people need to know, how they learn, where and when they will learn, and who needs to learn (NETP). The areas of study might include instructional improvement, program effectiveness, administrator effectiveness, curriculum evaluation, educational quality, outcomes of education programs, and instructional media (WWC). Additionally, instructional
effectiveness is not limited to instruction provided inside the classroom but extends itself to instructional support or supplemental instruction and guidance provided through institutional services or through staff and individuals outside of the classroom.

Traditionally, as in face-to-face delivered courses, student ratings of instructional effectiveness are collected. However, typically these standards in distance education and online learning are communicated in a course or program rubric (e.g., University of California at Chico Rubric of Online Instruction, Quality Matters) which is administered through an objective rating of a course or program in addition to traditional methods. Recent work looks to gather this data through student perceptions of instructional effectiveness through course and program rubrics converted to student surveys. Other possibilities include objective ratings of online course and program design and instructional delivery.

**Satisfaction**

Satisfaction in this toolkit measures whether faculty are pleased with teaching online, citing appreciation and happiness. It also looks at whether students are pleased with their experiences in learning online, including interaction with instructors and peers, learning outcomes that match expectations, services, and orientation (OLC). Satisfaction can also be indicated by retention in a course (sometimes called attrition) or program (degree completion).

Faculty and student surveys can indicate equal or growing satisfaction to traditional forms of learning. Other metrics can include repeat teaching of online courses by individual faculty and increase in percentage of faculty teaching online showing growing endorsement. Qualitative methods can include interviews, focus groups, testimonials with faculty, staff (including advisors and tutors), and/or students (OLC).

Distance education (tech-enhanced, blended or hybrid, and online) and associated practice in 2020 and beyond should improve these outcomes and research needs to be conducted to document the factors in practice that positively influence outcomes. These factors, once identified, should be implemented and scaled across courses, programs, and institutions. In the next section, these potential factors will be discussed in greater detail.
Framework of Inquiry

A framework of inquiry (FOI) or the structure of the system that underlies distance education was developed to guide investigations or studies of the factors that influence the desired outcomes.

Once the outcomes were identified as part of DETA efforts, the next step was to identify the factors or variables that can potentially impact these outcomes for which evidence and data could be gathered. At the DETA Summit, the participants collaboratively identified variables that could increase access, learning effectiveness, instructional effectiveness, and satisfaction. The list was quite extensive (see listing of variables).
This set of factors or variables created a structure of areas to investigate further to enhance our understanding of their impact on the outcomes. In examining the variables, a few main organizing elements appeared:

1.) The variables were representative of both activity (e.g., behaviors) or interaction and structural (e.g., design, resources, rules) elements (see Giddens, 1984; von Bertalanffy, 1968);

2.) The variables represented different levels of inquiry [individual (student, instructor), course, program, and institutional] (see Blalock, 1979; Demerath & Peterson, 1967; von Bertalanffy, 1968); and,

3.) The variables measured each phase of a system (input, throughput or process, and output) (see Katz and Kahn, 1966; von Bertalanffy, 1951, 1968).
Using these organizing elements of duality of structure, levels of analysis and phasic systems, the framework of inquiry was developed.

![Diagram of the framework of inquiry]

The framework was developed by employing a qualitative and grounded approach to developing a framework by using the variable identified at the DETA Summit as our data and examining commonalities among groups of variables. The framework provides the capacity to understand the relationship between and among the phases as well as the interrelatedness between individual behaviors and structure. The FOI includes the 3-phases levels of analysis from the individual (e.g., students) to the structural areas of inquiry, such as institutional or programmatic structures, informed by general systems theory. Importantly, the FOI can inform the design of research.

Some researchers have noted the appropriateness of using a systems approach in distance education (e.g., Moore & Kearsley, 2011). It allows a greater understanding if we think of distance education as a system, an institution of higher education as a system (e.g., University of Wisconsin - Milwaukee), or even an online program in a certain discipline (e.g., online undergraduate degree in communication) as a system. At the individual level, there are students, faculty,
and staff. At the structural levels, there are institutional- or program-level policies and resources. Courses, in of themselves, could be conceived as a system, since they have structure (rules and resources) in the course design that guides the actions and interactions of students and how they interact with the structure (e.g., content, support materials, explanations of process, course policies, required activities and participation), other human agents or students (e.g., discussions, group activities), and the instructor. Differentiating structure from activity can become a challenge and convoluted, since course structure is so closely conceptually related to human action. Moreover, structure is often measured through the memory traces of students as reported in surveys, but also structure can be captured through observation of online courses, and program and institutional artifacts (e.g., documents).

The interplay between course structure and student experiences and interactions is an important one since measuring structure is a challenge. Often researchers will focus on individual-level units of analysis, students' amount of time reading content or frequency of participating in an asynchronous (not in real-time) discussion board, and how those behaviors link to their outcomes (grades). However, as knowledge advances in distance education, it is important for researchers to understand course, program, and institutional structures, and how those influence the behaviors of students, faculty or instructors, and staff to improve the outcomes of access, learning effectiveness, instructional effectiveness, and satisfaction. Therefore, new methods and instrumentation need to capture the elements of structure and examine the relationship to these outcomes.

As structuration theory asserts (see Giddens, 1996), the structure can be understood by examining the actions of the individuals. Developing a research design to understand the course structure or the characteristics of the course (such as design, organization, support materials, and content) and its relationship to student outcomes (such as learning) can be quite difficult. Measuring structure is rarely seen in current distance education research methodologies, which leaves most research to divert from assessing course structure and instead focus on more easily measurable behaviors. However, through the measurable constructs related to the courses (or even programs) provided by students, researchers can gain a better understanding of the course structure, such as course design, and its
relationship to course outcomes. Importantly, to develop this instrumentation further qualitative research is needed to understand some of these constructs (e.g., course design) and new roles (e.g., coaching) in new educational approaches (e.g., competency-based). The FOI provides the opportunity for research to understand the interplay between the individual and structure and emphasized the importance of research, not only at the individual level, but also at the course, program, and institution levels.

The FOI has a 3-phase framework mirroring the input-throughput-output process. Often researchers will succumb to the black box phenomenon in only gathering data that is easy to obtain or measure. For example, comparing student outcomes between those who take an onsite course and those who take an online course or comparing courses between onsite and online. These research models ignore the throughput process and simply compare mode. This ignores the structural and human complexities of how a course is designed and the interactions that take place within it. To advance our knowledge and practice of distance education, researchers need to examine two or more phases through their research questioning. Students and instructors have characteristics and experiences that will influence their interactions within a course or program. The interactions by students, instructors, staff, and administrators within a course or program will influence student- and course-level outcomes. The complexity of research models to examine the complete 3-phase pathway of distance education is a requirement to advance our knowledge and improve practice. Although qualitative research designs will enhance our understanding, multivariate and multiphase research models will identify factors that move the needle on the desired outcomes so that distance education can improve and advance. Comparative studies will never do this - comparative studies will never create knowledge.

In the last several years, situated within the framework of inquiry, several research designs were created, including formulating measures, developing instrumentation, and coding to conduct cross-institutional research within the framework of inquiry. These research designs included experimental and survey study designs to address the top research questions. Experimental designs included interventions identified for testing that burgeoned from discussions at the DETA Summit although several research partners developed their own to examine interventions, such as student created videos and closed captioning.
Survey research models and instrumentation (applicable to both survey and experimental studies) were developed and conducted across institutions (see Joosten, Cusatis, & Harness, 2019; Joosten & Cusatis, 2020). Moreover, survey studies included questions to gather qualitative data for analysis to address research questions of exploratory nature and future development of instrumentation to measure important constructs that are currently difficult to capture. By examining the FOI, researchers can identify levels and phases in which to develop research questions and hypotheses to advance our knowledge. The duality and interplay between levels of analysis and phases of process are of critical importance in distance education.
General Model of Research

A description of the model developed as part of the initial goal of the grant in year one.

Model description
Moving beyond the FOI to develop a general research model of distance education, again, a structurational approach was taken - meaning there was a focus on individual- and structural-level components. A research model appropriate for interdisciplinary research and diverse methodologies was derived (see Figure X, Developing Research Model of Online Learning). The model is considered grounded because it is a reflection of data and research in the field. Data, in part, in the form of information produced at the DETA Summit, include the research questions, framework of inquiry, including variables, and research designs developed as part of the grant activities. The model is considered theoretical since social and learning science theories inform the development. However, the model is general in that it is not specific enough for testing or falsifiability. It is a process model that explains the different components of the system from a general but not yet metatheoretical level. An array of theories, existing and functional as well as grounded, can situate themselves within this general model of research.

There are four primary components that compose the research model for online learning. The four components include:

(1) inputs and outputs,
(2) process,
(3) context, and
(4) interventions.

The inputs and outputs include both agency and structural level inputs. Agency level inputs include students (learners) and instructors. Structural level inputs include the characteristics of the course, instruction, and the program that provide
structure, rules, and resources to agents to facilitate online learning process. The second component is the process, which includes in-class and out-of-class interactions that are online learning. The third component is that of the context. The context for the research of this grant is institutions of postsecondary education. Although much learning may happen in informal settings, it is not a focus of this model. The final component of the model is intervention. Interventions create variable conditions intended to result in a predetermined outcome, usually to increase student success. However, interventions as a center point also account for the model being more focused on research of conflict and change than that of function.

There are three facets of the model that describe the relationship between and among the components of the model. First, the model is cyclical in nature in that learning is conducted in cycles with each end playing the role of input and output through an interactive process representing a continuous lifecycle of online learning. Second, the model is transactional. This means that online learning is a...
simultaneous engagement of students and instructors in the learning process. Students and instructors are linked reciprocally. Third, the model can be **structurational**. Course, instructional, and program characteristics are outcomes from human action (instructors and staff) in design, development, and modification. Also, these facilitate and constrain student interactions in online learning. Furthermore, institutional properties influence individuals in their online learning interaction through instructional and professional norms, design standards, and available resources. Likewise, the interactions in online learning will influence institutional properties through reinforcing or transforming structures.

The proposed model describes a series of inputs that can have a relationship with online learning, which is a throughput or process, inside and outside the classroom within the contexts of institutions. For DETA research, the institutional context is postsecondary institutions of higher education. The cyclical elements of the model are evident in the inputs, including the characteristics of students, instructors, course as well as instruction, and programs, may influence the online learning process, which, in return, will influence future inputs of online learning process in a cyclical fashion. For instance, a course is designed by an instructor in such a way that it leads to increased rates of completion, which eventually can alter the program profile and potentially future course designs. Therefore, the inputs will influence the online learning process, which will in return influence the inputs through a feedback loop process. For example, students may become more confident and have a greater growth or mindset for achievement in future courses, instructors may learn from what works in the classroom and improve future instructional methods and course designs, and programs may have greater success. Not only is there a lifecycle of online learning, but an important interplay between the success of students in a course and the continued development of courses and programs by instructors and staff within the institution.

There are individual agents in the model, including students and instructors, that have a relationship with online learning. First, these students and instructors are agents within the context of institutions but have influences from beyond the institution, too. The cognition and experiences (from within and outside of the institution) of students and instructors will potentially affect online learning interactions within and outside a class. Second, there are also course,
instructional, and program characteristics. The design of these, in particular, will have a relationship with and potentially enhance or hinder the process of online learning. These five inputs will have relationships with the online learning process.

Interventions can be employed at any level of these input variables in order to enhance the probability that the online learning process will be positively influenced. Interventions can be at the agent level to develop students or instructors, or at the course, instructional, or program levels to potentially improve the interactions of students and instructors to enhance online learning. At the learner level, an intervention may be a workshop about taking an online course. At the instructor level, an intervention may be a faculty development program for teaching online. At the course and instructional level, an intervention may be focused on how content is designed to meet the course learning outcomes to enhance the student-content interaction. At the program level, an intervention may be a student receiving tutoring support during the course. Interventions at the agent or structural levels are intended to increase student success by enhancing the online learning provided by the institution overall.

The model represents an array of research designs, including experimental, quasi experimental, survey, and qualitative appropriate for DETA research. Input variables, such as student or course characteristics, can be mined through institutional technology systems, such as student information systems, or can be reported on surveys. This information can be used for all research designs. Experimental or quasi experimental studies would focus on comparisons of the control and experimental condition based on the intervention applied usually through the comparison of student assessments. Survey studies can examine the ability to predict student outcome variables based on the student self-report of instructional and program/institutional characteristics including reports of behaviors taking place or perceptions of in-class and out-of-class. Finally, qualitative data can be collected through surveys and other methods to better understand or develop measurement for an array of constructs (e.g., student motivation, ecosystem components).
Research Questions

In order to continue to guide research efforts, knowledge creation, and practice, DETA advances a series of research questions.

Originally, participants at the DETA Summit were asked to participate in two key sets of activities related to developing and prioritizing research questions and the process of creating a framework of inquiry to guide current and future research by identifying key variables for research model.

The research questions were voted on and arranged for prioritization. Additionally, research questions were collected through a survey that was administered in the summer of 2020 to update the information as well as incorporate relevant needs as a result of the entire world turning to remote instruction during a pandemic.

DETA has worked over the years to conduct and support research and disseminate findings. Details can be found at detaresearch.org under publications and in the DETAbase research briefs.

DETA research questions

What are the definitions of success from students' perspective?

What are the different design components (content, interactivity, assessments) that impact student learning?

What patterns of behaviors lead to increased student learning for different populations?

How can we define and measure student success beyond traditional outcomes?
What support structures are critical to providing quality access to online instruction?

What is the currency of student learning beyond the existing credit hours?

What are the key components that promote a sustainable and an effective teaching and learning ecosystem?

What variables are institutions looking at and using to define student success?

How can we develop student-driven metrics of success?

What differences are there between subgroups of online learners? (Using PIRS; post-secondary institutional rating system)

What is the currency of student learning and success? Time? Demonstration of Skills/Knowledge?

What types of faculty preparedness lead to positive student outcomes?

What are the definitions of success for programs/university/faculty?

Research agenda: Looking at bridging the pre-college and college. Students expectations of college: Do they align with institution's expectations?

What are the social and institutional support factors across student segments?

What are the variables that will impact the definition of success?
What are the small number of definable, measurable characteristics that make research rich for student success in distance education?

How can we democratize and increase access to digital higher education?

Can we benchmark at state (larger-level?) looking at systematic differences in online and in-person students?

How can open educational resources lead to affordability and accessibility?

What was good about the old academy, and what is good in this new digital environment?

What is the impact of different practices on institutional outcomes looking downstream (post-course, post-program)?

How can tech-based assessment truly assess learning and skills?

What are the institutional drivers?

How do we make online more equitable?

How do we create human-centered design?

In 2020 (and in a time of a pandemic), when are synchronous and asynchronous technologies most effective?

Some of these research questions and how to use them in research designs and studies will be discussed in the next section on designing research. DETA research previously was to focus on two primary research designs, experimental and survey. Two “guides” to conducting research, one which was experimental, and one on survey research, were included in the previous version of the toolkit. These guides were meant to assist individuals in designing studies to conduct research at their
postsecondary institutions and to facilitate the collection of cross-institutional data for analysis.

However, we found that:

1.) no research was feasible to be conducted cross-institutional except for the studies that DETA led,

2.) many who wanted to conduct research were practitioners who were not well versed in research design beyond descriptive approaches that may not be considered empirical or rigorous, and

3.) qualitative research was a must in advancing our knowledge in answering these questions, many of which are still exploratory.

Gathering data from multiple institutions is almost impossible because of reluctance to share data and reluctance to share data regarding distance education and online learning that already has a reputation problem. Practitioners, such as instructional designers, administrators of online programs, and faculty in the natural science or professions, may want to conduct research to answer specific questions or practice but lack the skills, experiences, or resources to do so. Studies on the effectiveness of distance education specifically for underrepresented students, such as students who are minorities, first generation, low income, or disabled students, are seldom undertaken. Moreover, peer reviewed journals seldom offer a place for research regarding these audiences or online and distance education in general, except for those specific to this area. National efforts to share data, to support research of practice, and disseminate effective practices in distance education are greatly hindered and need more support from institutions, foundations, technology companies, and the government.

The next section will provide greater detail.
Section 2: Philosophical Assumptions to Data Analysis

The purpose of this section was originally to provide guides or supports to designing research. In redeveloping this section, it was quickly realized that philosophical assumptions or paradigms needed to situate our guides to data analysis as the guide expanded from quantitative to a broad array of methodological approaches to distance education research. Moreover, a series of research guides are included to help introduce individual methods of research and support individuals in designing their own research to conduct in their course, program, or IHE.
The background of the previously labelled “research guides” section is described in more detail regarding the need for a brief discussion of philosophical assumptions and paradigms as well as to expand on research approaches that are pertinent to conducted better and needed empirical research.

The previous version of the toolkit contained two brief guides on conducting research that discussed some considerations in survey and experimental designs that were to be used by researchers to better understand the type of research DETA would be conducting and funding during the initial grant funding period. In this version of the toolkit, the goal was to:

1.) expand on the survey designs to help researchers better design survey research (that we feel is so important to advance our knowledge of DETA),

2.) share qualitative research designs (that we use in some of our research studies or in combination with survey designs), and

3.) introduce new and emerging research designs (to ensure that we keep the research methodologies in of themselves innovative and advancing just as distance education in of itself is).

It felt pertinent to discuss how a researcher’s view of the world can influence their research and their choice of research design. It is more than just whether one likes numbers or words, but the choices in research design and methodology can indicate a lot about the researcher themselves and about how knowledge is created in the world. Also, it felt fragmented to discuss research approaches without discussing how research in the social and learning sciences had evolved in the last century. Therefore, the goals in this section are to share an understanding of paradigms and how the paradigmatic shift in the last century has altered our way of knowing, explore the differentiation between positivist or
postpositivist and naturalistic approaches to knowing, and provide additional information on quantitative and qualitative research designs.
View of the World and Role of Research

The view of the world is discussed as the paradigmatic shift and importance of the positivist and antipositivist over the last century.

Some researchers may have a clear understanding of their paradigmatic stance and identities as researchers. Others may simply be designing and conducting research that comes naturally to them (no pun intended!). Paradigms can determine our view of the world. They influence our understanding of theory and approaches to theory development as well as the relationship between theory and research. Paradigms have historically evolved from the physical and the social sciences and have informed the emergence of new fields of study such as communication and learning sciences that often overlap the sciences of the social and physical or natural. The paradigmatic change between positivist and antipositivist or the paradigmatic shift in the social sciences is an important one as how we create knowledge and view the world is continuously evolving as a society. This shift is one of the most notable in the last century.

Here is an excerpt from Joosten (2019) where she explains the paradigmatic shift which drives the importance of us addressing both quantitative and qualitative designs in this toolkit:

Paradigmatic Change
Social science consists of various paradigms traditionally focusing on the objective and the subjective. More recently, new paradigms have arisen that are viewed as critical paradigms (e.g., critical, postmodern). Paradigms are scientists’ view of the world. These paradigms each include metatheoretical assumptions about the nature of the social sciences, nature of the social world, and how it should be investigated. Further, paradigm defines a scientist’s role and frame of reference (Burrell & Morgan, 1979/1988). For instance, young to the field or emerging social scientists discover a paradigmatic stance about the world that is in line with their view of the world in
their studies, and this position guides their inquiry throughout their career or at least some part of it. Lincoln and Guba (1985) described paradigms as “a systematic set of beliefs, together with their accompanying methods . . . [that] represent a distillation of what we think about the world. . . . Our actions in the world, including actions that we take as inquirers, cannot occur without reference to those paradigms.” So “while paradigms are thus enabling, they are also constraining” (p. 15). They referred to Patton’s (1978) definition as “a world view, a general perspective, a way of breaking down the complexity of the real world . . .deeply embedded in the socialization of adherents and practitioners . . .tell[ing] them what’s important . . . also normative, telling the practitioner what to do without the necessity of long existential or epistemological consideration” (p. 203; Lincoln & Guba, 1985, p. 15). Kuhn (1996) viewed paradigms as more of models that “spring particular coherent traditions of scientific research” from achievements and examples, including “law, theory, application, and instrumentation” (p. 10). For instance, many early efforts in science were to identify laws that influenced the behavior of organisms or humans. Not only do paradigms guide scientists’ view of the world and inquiry, the achievements of scientists can produce a revolution or new paradigms. The influence of paradigms on social science is quite evident and is an important foundation for understanding the emergence of learning science.

People have different ways they view the world. Some individuals may be looking to tinker with and iterate upon situations to improve outcomes. For instance, some examples include questions like: What can be changed in a class or course that will improve student outcomes? What intervention or interventions can be implemented to change behavior, such as to improve student content retention or persistence at the course or degree level? Others may be driven by deeply understanding one situation or event and the webs of significance around the event. Why does one student or group of students have such a hard time comprehending certain material? What about the learning environment is hindering or helping the student? Moreover, individual educators and researchers can consider how they view the world or how they view teaching and learning. Are educators, experts, or sages on the stage who transmit knowledge to students, or do they create scaffolded experiences that assist students in creating knowledge? These questions and more can help people start to consider their paradigmatic stance regarding the study of learning.
Notably, Burrell and Morgan (1979/1988) devised what they called a tool for the analysis of social theory, an analytic scheme, or a heuristic device when they developed a model of paradigms. These paradigms of social theory allow scholars to develop their own distinctive analysis of social theories. Moreover, paradigms provide scholars a frame of reference in which to view others’ scholarship and understand others’ view of the world. There are different iterations of social science paradigms (e.g., Deetz, 1996), yet every iteration usually consists of a positivist or objective paradigm and an antipositivist or subjective paradigm. The revolution or shift from positivist to antipositivist is not only pertinent in understanding social science, but it is the crux to understanding the emergence of learning science. This revolution is often referred to as a paradigm shift. Although the dichotomy is an overly simplistic view of science, it can clarify emerging perspectives over the last half century. (Joosten, 2019, pp. 78-79)

Many researchers have developed their own frame of reference for using previous research and theory to guide their manipulation of variables in order to improve outcomes. Or, they have decided that they are more comfortable with a natural approach to knowing where they use inductive techniques through grounded theory. The domination of positivism and behaviorism in early psychological and education research is important as is the antipositivistic response to such early research. Philosophers knew long before antipositivist research started gaining steam that there was more to knowing that what we could discover from the objective (e.g., Dewey).

In the following excerpt, Joosten (2019) discusses positivism and behaviorism that today tends to fall under postpositivism where researchers still conduct studies examining the relationship between variables and attempt to manipulate and predict variables, yet these studies are often conducted in natural settings and interplay with the subjective.

**Positivism and Behaviorism**

Traditionally, the bulk of theory and research in the social sciences and the study of learning has centered in the more objective, which many felt was a narrow range of theoretical possibilities but was dominant in the field of social science. The objective
paradigm was greatly informed by theory and research relevant in the physical or natural sciences, and in return, the social sciences were immensely influenced by the objective approach to understanding the world through observations already used in the natural sciences. Traditional or objectivistic approaches search for universal laws and are viewed as scientific or “normal science” as Kuhn (1996) referred to them. This traditional approach was often described as positivist where scientists search for laws and regulation, seek to explain and predict, and search for regularities and causal relationships between elements. Positivist paradigms have dominated the natural sciences with their experimental research designs and focus on verifying and falsifying hypotheses. There were also similar approaches to science in education research through hypothesis testing and experimental design (e.g., Lindquist, 1940).

Behaviorism, pertinent because of its influence in learning sciences, is seen as objectivism in the functionalist paradigm. Functionalism falls within the positivist epistemology with the belief that knowledge can be gained through careful and objective observation of a phenomenon, and that systems are composed of variables that are causally interrelated. Burrell and Morgan (1979/1988) described behaviorism as the boundary of this paradigm due to the adhesion to the models and methods of the natural sciences where human beings are treated as machines or biological organisms, and social structures are seen as physical structures that influence human behavior. Also, they discussed Skinner’s (1953) work as a behaviorist as the “archetype of positivism” (p. 103). Behaviorism consists of causal theories of behavior where investigations focus on relationships of stimulus and response and use experimental methods as used in the natural sciences. It holds the belief that individuals’ behavior is controlled by their environment and responds to conditions to which they are subjected or that they are a product of their environment. It is positivism in the way it attempts to uncover universal laws and regulations and is deterministic.

Many scholars today still hold behaviorist values. Subsets of researchers still think of the study of learning as one that requires objective observation of learners or instructors to understand, although most understand that complete objectivism is impossible in real-life contexts such as education. For instance, some researchers consider what variables can influence student learning or other outcomes or question
how certain variables are related to or have a causal relationship with student outcomes. Or, what intervention or stimulus can be introduced to influence student outcomes. Although paradigms have shifted, there are still studies conducted from this more objective paradigmatic stance.

The focus on these approaches became an ongoing debate with new and emerging approaches. For instance, Demerath and Peterson (1967) addressed the “functionalist controversy” (p. 3) in their work. They included work from other disciplines, such as anthropology, and noted the troublesome distinction between theory and empirical analysis. Also, they posited the question whether societies could even be viewed as systems, including wondering what the logical and substantive differences were in the level of analysis from the individual to the society. Social science was evolving to question the traditional paradigm. Kuhn (1996) described emerging approaches as searching for explanation and understanding of the social world rather than searching for laws to predict. The evolution of more subjective approaches to the social sciences brought about philosophical debates and problems of ontology and epistemology, in particular when examining problems of order and conflict. Burrell and Morgan (1979/1988) went as far to call them “rival intellectual traditions” and described that positivist “has become more of a derogatory epithet than a useful descriptive concept” (p. 5). The paradigms are not only different philosophically, they are different in methodological nature. As Burrell and Morgan (1979/1988) mentioned, the differences will provide an inclination to social scientists toward different methodologies. Specifically, “how does one attempt to obtain knowledge about the social world” (p. 2). In part, this is driven by whether you are searching to provide order or to understand conflict. In practical terms, sometimes our questions are not about objective views or observations to understand relationships between variables, but our questions are simply to understand one phenomenon or to describe one event with great richness within a social context. (Joosten, 2019, pp. 80-81)

Less often today, do we see research conducted in a lab or through pure observation of human interaction. For instance, we seldom have students come to our lab, maybe even a virtual lab, where we provide them a treatment condition and then observe their reaction (i.e., stimulus and response). Moreover, we know that students and instructors are not machines and bring knowledge and
experiences with them that will influence their interactions in an online course. So as complete objectivism is rejected, researchers still try to maintain a level of objectivity to understanding how some practices (interventions or treatments) can influence students and instructors leading to more positive outcomes. A level of objectivity can be established through design as well as statistical technique. Additionally, researching within the postpositivism paradigm understands that individuals interact within a social system. Structures that exist in the course design, program design, and or institution itself can influence the behavior of individuals. Also, data can be collected directly from individuals to understand their behavior and these structures rather than observations made by scientists alone.

In the following excerpt, Joosten (2019) discusses the move to antipositivism and naturalistic inquiry by scientists that advances our knowledge of the world and distance education from the individual level to the system level.

### Antipositivism and Naturalist Inquiry

The antipositivism movement focused on the subjective influencing their perceptions and methodologies. Lincoln and Guba (1985) described this movement as a result of an old paradigm that could not deal with or explain new facts. “Normal science in the Kuhnian sense is becoming more and more difficult to sustain” (p. 7). As discussed by Burrell and Morgan (1979/1988), antipositivists believed that the social world was relative and must be understood from the view of the individuals who are directly involved in the activities that are being studied by scientists while rejecting the belief in observation, which some link back to Plato (see Demerath & Peterson, 1967). Their assumptions included that the scientists must occupy the frame of reference and participate in the action, they must understand from the inside, and that science cannot generate objective knowledge of any kind. Subjective methodological approaches tended to forgo a focus on observation through experiments, but focus more on a “phenomenological, ethnomethodological, and action frame of reference” (p. 8). Moreover, Patton (2008) stated that the “alternative to the dominant quantitative/experimental paradigm was derived from the tradition of anthropological field studies and undergirded by the philosophical tenets of phenomenology and constructivism. Using in-depth, open-ended interviewing and direct observation, the alternative paradigm relies on qualitative data, naturalistic
inquiry, and detailed description derived from close contact with people in the setting under study” (p.425). More specifically, Lincoln and Guba (1985) chronicled the role of the investigator in this research, referencing a definition from Willems and Rausch (1969) where this type of inquiry must consider the degree to which the investigator imposes units upon behavior studies and their influence upon the antecedent conditions. Mackenzie and House (1978) described these experimentally designed studies: “[m]any scientists conduct ‘experiments’ . . . such exercises often employ elaborate controls on antecedent conditions and imposition of units” (p. 11). Measurement requirements can limit behaviors that are captured because they are determined prior to the study and imposed in data collection in artificial settings, whereas “[n]aturalistic observations are often explorations into a phenomenon” (Mackenzie & House, 1978, p. 12). The inquirer should not include imposed units, but those units should develop naturally. Interestingly, grounded theory had just been introduced by Glaser and Strauss (1967). Some describe grounded theory as the “qualitative revolution” (Denzin & Lincoln, 1994, p. ix). Glaser and Strauss (1967) reported their discovery of grounded theory and shared a strategy for the discovery of this theory through qualitative methods in social research. Their efforts were in response to their questioning whether logically deduced theories would advance sociology noting the lack of confirmation of theories and creation of new theories. Many believed this to be a critical point in social science history where we moved beyond experimental and quantitative studies to create knowledge.

The interpretive paradigm, as it is generally called, was a paradigmatic shift from the positivist paradigm or “normal” science, as it was called by many. However, as Lincoln and Guba (1985) noted, this new alternative paradigm had many names, such as naturalistic, postpositivism, ethnographic, phenomenological, subjective, case study, qualitative, hermeneutic, and humanistic. The new paradigm had a different view of the world and the role of research and the researcher. Burrell and Morgan (1979/1988) described that interpretive sociology was “attempting to understand and explain the social world primarily from the point of view of the actors directly involved in the social process” (p. 227). The focus moved to understand the subjective experiences of the individuals, the ways in which social reality is meaningfully constructed and sustained, and the social context. Rather than research being conducted from observations of actions, knowledge is constructed through the
subjective experience, viewing social reality as emergent and studied through manners other than that of natural science. Burrell and Morgan referred to the parallelism in Kuhn’s (1970) view of science: “Scientific knowledge here is in essence socially constructed and socially sustained; its significance and meaning can only be understood within its immediate social context” (p. 255). Kuhn (1996) discussed the shift of paradigms: “After the discovery had been assimilated, scientists were able to account for a wider range of natural phenomena or to account with greater precision for some of those previously known. But that gain was achieved only by discarding some previously standard beliefs or procedures and, simultaneously, by replacing those components of the previous paradigm with others” (p. 66).

Today, the interpretive paradigm is a common way to examine the world, especially in the study of learning. Here, researchers may participate actively in the phenomenon being researched and hold the belief that the social world is understood from those directly involved in teaching and learning. They implement qualitative methodologies with a focus on interaction and context rather than measuring individual behavior with predetermined measurement instruments in a control condition where they attempt to control for differences of student demographics and the environment. (Joosten, 2019, pp. 81-83)

There are great methodological opportunities that are presented to us in 2020. Learning science has moved beyond experimental studies but has not deserted them as they still conduct quasi-experimental research, yet lab research is seldom conducted. Learning science has advanced new methodologies, such as qualitative methodologies and forms of natural inquiry, as social scientists have done for the last 50 years. These new methodologies have created an opportunity for us to position education and learning as happening in real-life contexts (see Sawyer, 2014). Design-based research is another area of research reported by a primary methodological approach in the learning sciences (see Somerhoff, Szameitait, Vogel, Chernikova, Loderer, & Fischer, 2018). “Design based research studies draw on the full range of social science research methods to improve design for instruction and advance the understanding of learning” (Bell, Hoadley, Linn, 2013, p. 73; Joosten, 2019, p. 91).
The following subsections will walk you through the process of designing research. The methodology will be explained to you but also you will be provided with specific step-by-step guidance to design research in the callout boxes provided.
The Objective of Quantitative Research

The primary objective of quantitative research is to “create, expand, and refine theory through systematic observation of hypothesized connections among variables” (Allen, Titsworth, & Hunt, 2009, p. 4) and “to observe, explain, predict, and perhaps control specific phenomena” (p. 7). In the previous sections, we identified variables that are of particular interest in distance education research as well as the outcomes in which it is hypothesized these variables may have a connection in order to identify factors that influence outcomes in distance education to improve the practice of tech-enhanced, blended, and online education. Whereas qualitative research is capturing observations or interactions with students, instructors, staff, or administrators to find rich “webs of significance” (Geertz, 1973), quantitative research operationalizes variables through surveys or experiments, which Allen et al. (2009) describe as “intentional manipulation.”

Researchers will make observations about behaviors and the relationship between behaviors. These observations can be made through data collected from surveys or technology systems consisting of data of students and instructors. They may examine students’ interactions within an online course and their learning or academic achievement in the course. Or, researchers may explore the behaviors of the instructor, such as their communication with students, and how that relates to students’ satisfaction in the online course. Other researchers may observe how patterns of behavior differ from one group to another still the focus is on how they relate to one another. For example, researchers could examine the online skills between represented students and underrepresented students to better understand how to support students, so they all receive an equitable experience. By identifying patterns of behavior in the sample being surveyed or tested through an experimental design, the researcher can draw generalizations about behaviors
of students and instructors or patterns in online education. These studies can happen in natural or manipulated settings and data can be collected directly from subjects of the study, which is a different approach than early positivistic and behavioristic studies of behavior and learning.

Two types of quantitative research will be discussed in more detail, survey research and experimental research, but before the researcher designs the study, they need to examine the literature and problems of the field.

**Defining a Quantitative Research Problem**

The first step in quantitative research is to “isolate a problem” (Allen et al., 2009, p. 14). Many times, a researcher will examine previous research in selecting variables to examine. Moreover, there are numerous practitioners in online education that have problems of practice that they would like to be able to explain or predict. In the previous sections, we have identified numerous variables and research questions that relate to problems that need an explanation to improve the outcomes of access, learning effectiveness, instructional effectiveness, and satisfaction. Importantly, previous research and theory should inform the researcher’s problem to ensure appropriate variables are identified and the relationship between those variables can be predicted. Once the research has isolated the problem, they can identify the research questions and hypothesis, as we previously identified. Quantitative researchers want to answer the “what questions” where qualitative researches like to answer the “how questions” (Allen et al., 2009, p. 3). For example, quantitative researchers are interested in solving problems of learning effectiveness by answer the question of what effect do certain instructor behaviors have on students learning in an online course. Once the problem and research question(s) are identified, the researchers next step is to design a study.

**Designing a Quantitative Study**

The two designs we will discuss are survey design and experimental design. We have included already developed research model designs already in order to provide you with examples of quantitative studies. In education, there is a historical preference for experimental designs, especially if the desire is to be able to make causal inferences, yet a strong argument can be made that survey design can advance causal claims as well, if certain criteria are met (see Allen et al.,
Experimental designs are difficult to conduct in IHEs in more than one course, across disciplines and programs, and across institutions. Since higher education is a living system where students are paying tuition to attend classes, it is a challenge to create the two conditions needed for a control condition and a treatment condition for a comparison study. There are logistical implications such as randomizing students, managing enrollments, scheduling of courses, and so forth. Some considerations will be discussed in the next section on experiments to support these efforts. Survey design tends to allow for gathering data from students and instructors across courses, programs, and institutions with less logistical hurdles, yet there are still challenges, such as data sharing that can be encountered by a researcher while providing greater generalizability.

Survey Research. Survey methodology is the design, collection, processing, and analysis of surveys that determine the precision and quality of the estimates derived from survey questions (Fowler Jr, 2013; Groves, Fowler Jr., Couper, Lepkowski, Singer, & Tourangeau, 2011). Good survey research is systematic, replicable, impartial, representative, and theory based. Survey research includes the incorporation of an instrument, “a mechanism for measuring phenomena” (Colton & Covert, 2007, p. 5). These instruments include items or questions that are used to collect responses from students, staff, instructors, or administrators, and
from this data, conclusions can be drawn to answer research questions and confirm (or reject) hypotheses. Surveys are developed to measure variables that are a part of research. There are usually multiple variables that are being measured and multiple items or questions per variable (or measure of the variable) to ensure the measurement is valid and reliable. Therefore, a survey given to students may actually contain multiple surveys or what is called a survey packet. The data collected from the surveys is then analyzed using various statistical methods to determine the relationship of variables or patterns of behavior. Some data collected may be qualitative and require qualitative data analysis techniques as well. Development of the survey instrumentation (including identifying variables and operationalizing them) to measure the phenomena in the study are key to designing the study, whereas in an experiment, the key is in the design of the experiment.

**Experimental Research.** This type of research involves experiments. "In an experiment, the research manipulates one variable - the independent variable - to see how that manipulation affects another variable - the dependent variable" (Allen et al., 2009, p. 11). Experimental research requires careful planning as to how the variable will be manipulated and predictions tested. Laboratory or ideal conditions for objectivity often are not generalizable to the real-world since there is much more messiness in a real-world environment. Attempts will need to be made to design the experiment to be conducted in the real-world considering what variables can be controlled or not changed before and after the independent variable is manipulated (e.g., student demographics or composition, number of students in the class, class number and name, instructor of record, pedagogy, course design, course materials and content, student-instructor interactions, student-student interactions, learning objectives, outcomes, and more). The independent and dependent variable will need to be identified as well as how the independent variable would be manipulated. DETA research identified four general outcomes - access, learning effectiveness, instructional effectiveness, and access. Most likely, the outcome identified in the previous section or a measure of them would be the dependent variable. The dependent variable is the one that is hoping to be affected in the study. Examples include: student learning or learning effectiveness (e.g., academic achievement, test scores, grades); student access (e.g., enrollment of minorities, success of minorities, persistence in the major by a particular group); student engagement (e.g., social and academic
involvement in a course or program); instructor or faculty participation (e.g., involvement in faculty development program); or, course design effectiveness (e.g., rating of quality of course design). Once the dependent variable is identified, identify the design that would allow the researcher to measure a change in the dependent variable. If the dependent variable is at the student-level (student access or learning effectiveness), the design could include one online course.

In a one course design, the study could take place in one class where for one block of time (control condition) the independent variable is not manipulated, and the dependent variable or outcome variable is measured. This is called business as usual.

This could be the face-to-face course. It could be an online course as it is already designed. It could be a pedagogical approach such as a teacher-centered pedagogy where faculty lecture and provide content and students take a standard assessment of their learning, such as a quiz or exam. Then, the independent variable is manipulated for a second block of time (treatment condition). This independent variable could be the course design that is changed or manipulated to meet the quality standards developed by Quality Matters. Or, it might be changing the pedagogical approach to be student-centered, active learning where the lecture is replaced by a student group activity accompanied with a pre-activity reading. Therefore, there is one course, one block of time that is the control condition, and one block of time where something is changed or manipulated. Outcome variables for both conditions are measured and compared.
In this model, the design could include two online courses with two different conditions (intervention and comparison conditions) or courses (the control and the treatment/experimental group) and where an attempt is made to control several contextual variables (such as student composition, number of students, instructor, course number and name, etc.). One group of students is the control group and receives no manipulation of the independent variable. One group of students is the treatment group and receives the manipulation of the independent variable or an intervention that potentially would change the dependent variable. For instance, one group of students is the control group. They take the online class as always designed it. The second group of students is the treatment group and they receive a dosage - a redesigned course that uses an adaptive learning technology (an intervention). The dependent variables or outcomes of the two groups can be compared to each other.

When conducting these experiments, current practice or business as usual should be documented. This is considered the control condition where the independent variables have not been manipulated and/or no treatment has been provided. In medical terms, the patients (think students) have not received the medicine (think good pedagogical or technological practice) but instead have received the placebo (same old course design and teaching as before).

The intervention or the treatment otherwise thought of the manipulation of the independent variable must be developed and documented as well. What is being tested? Is it a new technology? Is it a new pedagogical approach or instructional
Sometimes the intervention may have several components to it (e.g., four-prong intervention). Researchers should document everything that will change in the treatment condition.

**Sampling**

Student sampling or assignment will need to be developed and performed as part of the experiment. Student sample or assignment is to create a sense of objectivity that the manipulation of variable/s led to the impact on the dependent or outcome variable and not that it was a different student population (e.g., it was a smarter group of students that received the new technology so, of course, they received higher grades in the course). If there is one group or class of students with two different time blocks (one without the treatment or the control and one with the treatment or experiment), there is no need for random assignment. If dividing students into two groups or two classes/courses, one for the control group and one for the treatment or the experimental group, the students may be randomized into the treatment condition to create a control for differences in the student population.

True experiments, or randomized controlled trials (RCTs), are considered the gold standard methodology by some groups (e.g., U.S. Department of Education, Institute of Education Sciences). However, RCTs are relatively uncommon in postsecondary education, specifically RCTs that randomly assign students individually, rather than groups of students (classes), to intervention and comparison conditions. Both are challenging endeavors in a college or university, but random assignment of undergraduates individually is particularly challenging because it necessitates collaborative assistance of class schedulers, registrars, and campus leaders. With the advancement in statistics, there are techniques that are more feasible than designing an RCT.

In an experiment, the intervention (treatment) and comparison (control) groups should only differ in terms of the manipulated variable(s) that is likely to be the active ingredient of the intervention - one group gets the intervention and the other group does not (the control or comparison group). If the intervention and comparison groups are found to differ on a variable other than the manipulated variable(s), statistical techniques need
to be used to control for the difference associated with the variable not manipulated. If not controlled statistically, preexisting differences between the groups could undermine valid interpretation of the findings. For example, even with random assignment, which eliminates self-selection into the intervention or comparison groups, there still could be differences between groups in learner characteristics, such as academic preparedness. If the comparison group had a significantly greater proportion of students who were academically underprepared, one might see a difference in favor of the intervention, when in fact, this difference was due to the pre-existing difference in academic preparation. An examination of possible pre-existing differences between groups is always needed.

Random assignment addresses the issue of self-selection bias, accounting for the success (or failure) of a distance education intervention. Because students are randomly assigned to the intervention or comparison group(s), self-selection is eliminated as a possible explanation for the findings. Eliminating self-selection is important because of the biases that could potentially be associated with students self-selecting into a particular distance education intervention versus the comparison course without the intervention. If there is anticipation that certain student characteristics could affect the results, researchers can equally distribute students with that characteristic between the intervention and comparison groups during random assignment. This is referred to as stratified random assignment.

**Fidelity**

Fidelity is another aspect of experiment design that needs to be developed and performed. Part of ensuring fidelity of implementation of the intervention is by documenting the business as usual process described previously. Since the intervention and comparison groups should only differ in terms of the manipulated variable(s) (i.e., intervention), it is important to: document business as usual processes, determine fidelity measures, develop guide for implementation, provide professional development to support staff and instructors, gather qualitative and quantitative data, including conducting survey and focus group data collection.

The guides or manual for implementation, an implementation rubric, and professional development for support staff and instructors will ensure that
the intervention or treatment is conducted with fidelity. This will help determine whether the critical differences distinguishing the intervention and control, or comparison conditions are in place. These resources can also be used to scale the intervention across courses, a program or institution once the positive impact is identified. A researcher needs to understand what was done or how the intervention was implemented and be able to replicate it as well as other practitioners that may want to reap similar benefits.

Although fidelity of implementation is required in experimental research, it is an effective practice to use when designing any study where new pedagogical or technological practices will be examined. Implementation science in of itself can greatly help the DETA community move the needle on desired outcomes. The technology or pedagogical practice in of itself will not necessarily lead to a positive impact on outcomes. It is how the technological or pedagogical practice is implemented and within what context to which students that will lead to the most notable impact.

See supplemental information for additional guidance on random assignment, fidelity, intervention efforts, and more.

**General Quantitative Data Collection Techniques**

Once you have identified the relationships, patterns, and/or variable(s) for more manipulation have been identified, a determination on how to collect data for the variables identified as well as who will collect the data must be made. Whether collecting data using a survey or collecting data for an experiment, the data collection technique must be determined before collection can begin. Furthermore, data collection will include data from multiple sources, such as surveys, technology system databases, and observations depending on your variables and the variables that influence the objectivity of your study or ones that you want to control, even statistically or through the design of your experiment through randomized assignment.
Concepts of interest in the field are not necessarily directly observable or measurable, especially for studies that take place in real-life environments where researchers are not an active participant, such as an online course. These concepts are abstract and often referred to as constructs. Researchers need to determine ways in which to measure these constructs. In order to do this, researchers need to conceptually define the construct and determine how it can be measured. Therefore, before a researcher can collect data, they must operationalize their variables. Although numerous variables identified in the previous section, researchers will need to “find a tangible way to measure it...because we cannot observe a construct directly” (Colton & Covert, 2007). The operationalization of a variable is important since it will influence the construct validity of the variable. One should identify appropriate variables and emphasize the importance of staying focused on the selected variables through the duration of the research. For instance, the purpose may be to evaluate how online learning impacts student learning, but how can student learning be measured? How is student learning defined? Oftentimes, researchers can find valid and reliable scales that already exist and have common definitions of constructs of interest. Several are available in the instrumentation packet.

After defining the variable, the researcher can determine how to measure it. There may be multiple ways to measure one variable. Student learning is a latent construct because it is abstract and may be difficult to directly measured, while a grade on an exam or in a course can be a direct measurement and analyzed. This can also be referred to as student performance or academic achievement. Student learning could also be measured using a survey that measures student learning.
from their perspective. The argument regarding the measurement of learning is an entire book in of itself, but for this example, the researcher will need to determine how to measure student outcomes, such as their learning, that may be separate from their actual performance in the course. Therefore, it is important to determine which variables will be used keeping in mind what is measurable. No need to reinvent the wheel. Consult the literature on how constructs have been measured by people in the past and prioritize those measures that have been validated in a similar population to the one being pursued in the research. The toolkit contains a student survey packet and codebook with measures and variables, including their definitions, to help. Next, a researcher needs to generate a sample. The participants in a study should be selected at random in order to support generalizations made of the findings. Also, if the study is an experiment, the participants should be randomly assigned to a control or treatment condition, as previously discussed. Often, students or instructors from an entire program or institution can be invited to participate in a survey study to ensure the appropriate number of people from the population is sufficient, whereas the

Quantitative Research | Step 3: Who is the sample?

One strategy to identify students to participate in survey research is to identify instructors to deliver the survey to students, or the participants. Instructors who teach blended and/or online courses can be identified through institutional records (e.g., registrar’s office, institutional research). If one is not already compiled, researchers will need to gather an email list of instructors who are teaching a blended/online course. These instructors and their participation can be solicited through an email (see supplemental resources for sample instructor communication). Many times, this communication can be sent by instructional support staff, but may be received more positively if coming from administrative leaders (e.g. chair, dean, provost, or president). The instructors who identify as interested in participating in this national study can then disseminate information on the survey and a link to the online survey (which may include multiple instruments) to their students within their online classes (see supplemental information for sample student communication). Sometimes instructors can provide an incentive to students for participating in the study as well. Researchers should try to ensure that the courses which are identified by instructors or representatives of the online programming on campus are diverse (a range of disciplines, course levels, and course sizes). This will provide more generalizable results.
participants in an experiment are from one or few courses whereas students in an experiment would be limited to the enrollments in one or two courses potentially. Finally, the data collection can be conducted. Surveys can be administered through online survey administration tools, such as Qualtrics. This also allows the data set to be coded and the variables to be labelled for easier importing the data into a statistical package such as SPSS, R, or another product. Online survey applications allow for greater options in usability of surveys that can influence item completion counts.

While collecting data through surveys will be a key piece to potentially both experiment and survey designed research, additional data may need to be gathered from technology system databases and institutionally warehoused systems, such as the student information system or the learning management system. Often, these technology system databases will have important student-level data, such as demographics, grade, course completion, continued enrollment, course pathways, and more. These data sets will need to be gathered through the technology gatekeepers (e.g. information technology, institutional research) and merged with the survey data through a student-level identifier.

**Instrument development.** Surveys can gather factual information, report an observation, and measure the subjective belief (or something that originates within an individual). Specifically, standardized questions on a survey, such as behavior rating scales, can measure attitudes, opinions, and beliefs, document observations, and assess performance (Colton & Cover, 2007). They can also measure latent characteristics of a person, or things that cannot be observed, such as satisfaction in a course.

Less common in research on distance education, surveys can also serve as psychometric instruments assessing the cognitive, affective, physical function, personality traits, and more (e.g., achievement mindset). Also, surveys can be used for behavior analysis documenting before, during, and after treatment (for experimental designs), measuring the frequency or duration of targeted behavior (e.g., access or reviewing content or participation in online discussions), or documenting whether something has or has not occurred. Surveys are often used in experiential research as a form of data collection.
Surveys are a systematic method for collecting data from a sample in order to describe a population, typically through quantitative, but also qualitative description (Groves et al., 2011). The purposes of a survey are to conduct description, exploration, and explanation. There are three key components of a survey: 1.) It is a way to gather information by asking people questions, 2.) People provide their own answers to the questions, and 3.) Only a subset of the population (sample) provides data.

Surveys allow researchers to obtain data from large samples of people and allow for more robust conclusions. They also take place in naturalistic settings allowing for greater generalizability. For example, the research can occur in natural education settings such as a class or course, or it can occur within an online program. Survey data can be gathered from large samples of students across courses, programs, and institutions as well as at multiple institutions.

Survey research designs are convenient when instrumentation, or measures that have already been developed, tested, and deemed reliable and/or valid for the population being studied, are available since they can be easily administered to the identified sample. As opposed to identifying data mining for gatekeepers or creating control and variable conditions needed for experimentally designed studies, which is not always feasible in natural education setting, survey designs can help illustrate relationships between variables, but do not provide evidence for causation or cause-effect necessarily.

**Institutional Warehoused Data.** Data can be collected from existing data technology storage locations, usually called data warehouses or student information systems (SIS). Other times, data can be collected from other technology databases, such as the institutions learning management system (LMS), adaptive technology platforms, and other third-party technologies potentially with remote servers and data access.

Collecting student information system data or student demographic and grade data can be used to increase the objectivity of the study and/or expand the ability.
to identify similarities and differences between groups of students. Demographic data can be used in multivariate analysis to control for differences in student samples in survey studies. Also, it can be used to develop a randomized sample for the experiment. Grade data and course completion can be incorporated into any study as either an outcome measure or to divide higher and lower performing groups to investigate differences. Demographic and performance data can lead to the creation of groups to enhance understandings of relationships. This data allows researchers to draw conclusions using tests of variance and association (e.g., MANOVA, correlation, regression). DETA has identified specific measures that can be collected through student information systems. Many variables were derived from the DETA Summit, reports from the previous efforts of the Predictive Analytics Reporting (PAR) Framework, and the Integrated Postsecondary Education Data System (IPEDS). These data provide information on learner characteristics, course characteristics and student outcomes.

The data collected through these systems can be linked to data collected from experimental and survey studies through unique student or learner identifiers (e.g., email address) and analyzed using various univariate and multivariate analysis (e.g., T-tests, regression techniques, hierarchical linear modeling, and/or structural equation modeling). This is important since student reported information through surveys may be inaccurate or partially reported. Once data gatekeepers are identified, members at the institution that can grant access to the data, data can be easily exported from data warehouses to help better understand the relationships between variables. The importance of this activity should not be understated.

Preparing to gather student and course data housed in these storage facilities requires several important steps. Researchers should first determine if they have direct access to the data. If researchers do not have direct access to the data, they must identify the unit that oversees the data (e.g., student grades, student demographics, course information) found in the data warehouse or student information system as well as who might be the data stewards. Oftentimes, a unit on campus within Institutional Research, Information Technology (IT), Student Services, the Registrar’s Office, or Academic Affairs serves as the access point to this data. Third, consider whether a request to access the data is necessary.
including determining the length of the request (e.g., is the request 3 pages or 23 pages long?). Finally, consider whether IRB approval is needed to obtain the data.

The DETA has identified a list of variables and measures that can be extracted from these sources. Also, definitions and coding of the data are illustrated to facilitate cross-institutional analysis and findings (see the section containing Data Codebooks for further information). It is important to verify the variables and measures of the data to be collected from the data warehouse. Moreover, it is important to locate the identifiers for online and blended courses or determine how to identify which student data needs to be collected and for which courses as identified in the study sample. The terms (e.g., semester/s) in which data will be gathered will also need to be identified. Remember, do not pull the data during course drop and withdrawal windows. Pull archived data when the course has been completed.

DETA can provide assistance in the analysis and as a part of its efforts to advance cross-institutional analysis through collecting data from researchers and institutions across the globe. With that in mind, once the data is collected from the data warehouse, it may require some recoding and formatting prior to analysis and/or submission to DETA for analysis or storage. An institutional codebook that includes the values of the data collected may be useful for the data recording process. Importantly, the DETA can provide software application syntax to assist with data recording.

Once data is recorded with the appropriate values to facilitate cross-institutional research and contains the important identifiers for your institution (which can be assigned by DETA) and students, it can be exported into a comma separated value file or Excel file for submission. DETA can provide the appropriate file formatting, column headers, and import process. Technical details on recoding of institutional data, merging with survey and observational data, analysis of data, and more, can be provided by contacting DETA.

**Quantitative Types of Analysis**

Once data has been collected in Qualtrics (or your survey platform of choice) and exported, and data sets from other technology systems gathered, the data sets should be merged in order to analyze the results. Analyses will depend on research questions and hypothesis but will most likely include inferential or multivariate
statistics. Statistical analysis falls beyond the scope of this toolkit, but here is an overview of a few of the most common.

When analyzing data collected between two groups in an experimental design, independent samples t test procedure should be used to determine if those in the treatment condition scored higher than those in the control condition on exams or in the course overall.

When analyzing survey data where there is an interest in variables that predict a student outcome, multiple regression analysis or structural equation modeling should be used. These can also control for differences in the sample that are not accounted for by an experimental design or randomized assignment.

When analyzing between group differences between underrepresented groups, such as minorities, first generation, low income, or disabled, use MANOVA or Multiple Analysis of Variance statistical test.

For more information on statistical analysis, including assumptions of each test and examples relevant to studies in higher education, see Allen et al. (2009). Otherwise, contact DETA for more information to support your analysis or services provided.
Guide to Qualitative Research

The guide to qualitative research will discuss research objectives, research problems, design considerations, and methodology.

Included in this section are considerations relating to qualitative methodology, such as the paradigmatic underpinnings of qualitative research, common techniques for data collection and analysis, and suggestions for writing methodological findings. This guide is not intended to be an exhaustive explanation of how to conduct qualitative research. Its purpose is to provide a snapshot of qualitative research in the context of higher education, particularly as it relates to distance education.

The Objective of Qualitative Research

Qualitative research is a type of social scientific research that seeks to understand and explore phenomena within their natural setting. The objective of qualitative methodology is to interpret situations, things, and people in a way that often places the researcher in the setting they are studying. While the historical context of the qualitative methodological field is necessary to understanding its definitional meaning, qualitative research can generally be defined as an approach to understanding “things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meanings people bring to them” (Denzin & Lincoln, 2011, p. 3). In this regard, the overarching purpose is not to offer generalizable conclusions but, rather, to identify specific and localized findings for a particular phenomenon and/or setting in which the phenomenon occurs.

The paradigmatic framework of qualitative research has a long history steeped in differing perspectives (see Denzin & Lincoln, 2011). Although qualitative research is often set within an antipositivistic or interpretivist paradigm, the “global community of qualitative researchers is midway between two extremes, searching for a new middle, moving in several different directions at the same time” (Denzin & Lincoln, 2011, p. 1). The qualitative field is often fraught with debates about the
importance of “mixed methodologies and scientifically based research” and “renewed calls for social justice inquiry from the critical social science tradition” (p. 1). Yet, because there is not a methodological practice that is solely designated as the qualitative practice, this particular approach to research can sometimes seem more abstract and ambiguous than other methodologies.

Since the purpose of qualitative research is often to provide an in-depth understanding of a particularly situated phenomenon, qualitative methodologies are particularly suited to assist researchers in understanding the complexities of “human” issues that might be difficult to glean from other methodologies, such as quantitative research. For example, qualitative studies can highlight nuanced meanings of social roles, class, gender, and ethnicity for localized communities. Qualitative techniques are especially helpful for understanding opinions, beliefs, ideologies, values, and social contexts related to a culturally-specific population and/or situation.

**Defining a Qualitative Research Problem**

Any credible and valuable research study emerges because a problem is identified that warrants intentional and thoughtful study. Research problems, then, are the foundational blocks that spark the research in the first place and guide the methodological design (Creswell & Guterman, 2019). For instance, research problems that “require [a researcher] to learn about the views of individuals, assess a process over time, generate theories based on participant perspectives, [and/or] obtain detailed information about a few people or research sites” (p. 64) often will call for a qualitative methodology. Thus, unlike within a quantitative study in which the study centers on explaining and predicting connections between variables, a qualitative study focuses on exploring and understanding a research problem.

**Designing a Qualitative Study**

An effective study often begins with a research question that can best be examined through in-depth, exploratory research. While both quantitative and qualitative research includes research questions, the elements of those questions differ. As mentioned, qualitative researchers tend to answer the “how questions” (Allen, et al., 2009, p. 3). While both are driven by a problem, whether a researcher
is trying to understand the what or how is where the two diverge in research design. Therefore, there is a different purpose.

Qualitative questions will differ from the quantitative questions we discussed being developed in the previous section. Qualitative questions are often open-ended, meaning they require more explanation than a “yes” or “no.” Again, the purpose of qualitative research is to understand and to explore. Therefore, qualitative research questions encourage exploration of a primary phenomenon typically by being designed in an open-ended format.

Qualitative findings can generate similar knowledge from quantitative findings in both revealing relationships or patterns, but they start from different questions. As Creswell and Guetterman (2019) explain, “[c]omparisons and relationships may emerge as the data analysis proceeds as in grounded theory, that is, the relating of categories of information to form propositions or hypotheses, but the qualitative inquirer begins with a single idea, focus, or concept to explore before gathering data” (p. 128). For example, a researcher might want to understand what student success looks like in an online educational setting for students, so the research question would be something like:

“How do undergraduate students define student success in online courses?”

Or, it might be specific to understand something for a particular group of students:

“How do minority undergraduate student define student success in online courses?”

Given that qualitative methods are a process of discovery and often prioritize the voice of the study population, research questions are intended to home in on the focus of the study and invite narrative explanations (Farber, 2006).

In addition to identifying the research question framing the study, qualitative researchers also must make decisions about who they wish to be involved in their study. A distinguishing characteristic of qualitative researchers is that researchers attempt to “gain an in-depth, holistic perspective of groups of people, environments, programs, events, or any phenomenon one wishes to study by interacting closely with the people one is studying” (Farber, 2006, p. 398). In designing their study, qualitative researchers often seek to create an environment
or setting that enables them to be a part of the population they hope to learn from.

Qualitative researchers recognize that their own values, beliefs, and perceptions will impact the research process. That is, “the researcher hopes to minimize the distance between him- or herself [sic] and those being researched” (Creswell, 1994, p. 6). Importantly, in the discussion section of the study, qualitative researchers should acknowledge and discuss their own personal biases that may have influenced the study design and analysis. Researchers recognize that one of the primary research instruments used in the research process is themselves and, thus, they are unable to be completely objective.

A qualitative researcher will need to determine who they will be as a researcher or observer in the study and to what degree as well as who will participate in the study and in what environment will they participate. However, the position of the research as observer, participant-observer as well as the participants and environment will depend, in part, on the study design which is tightly connected to the data collection technique discussed in the next section. For instance, a researcher may want to explore how students experience an online course. They could observe an online course or courses as an observer, could interview or conduct focus groups of students, could take an online course as an observer-participant or full participant, and/or collect data through a free response survey at a distance.
Although all of these may provide an understanding of students’ experiences in an online course, each will have different implications for the researcher, the participants, and the environment. Therefore, unlike in quantitative research, there is no sample necessarily to identify unless the design includes a data collection technique that requires a sample (e.g., survey with open-ended questions; interviews with faculty who teach an online course). More likely, the researcher will need access to a group of participants or environment.

**Qualitative Data Collection Techniques**

Sometimes qualitative methodologies are considered too flexible to allow for a systematic data collection and analysis of data. This presumption is inaccurate. Without a systematic approach, important details that illuminate information specific to a phenomenon and setting is likely to be overlooked.

One of the central steps in the qualitative research design process is identifying the study’s sample population and setting. According to Creswell and Guetterman (2019), qualitative researchers “identify our participants and sites through purposeful sampling based on places and people that can best help us understand our central phenomenon” (p. 205). So, “a greater level of participation from the site” is required than when compared with quantitative methodology (p. 205). Thus, a key concern with qualitative studies is accessing the sample population and consideration of the setting’s elements and the impact of these elements on the research design.

**Free-Response Questions.** Also known as open-ended questions, free-response questions are questions that appear in a survey and are phrased in a way that invites a narrative response. Respondents are called to offer responses that are specific to their own perspectives, beliefs, values, and experiences.

Since qualitative researchers avoid overly influencing and limiting the participants' voices, free-response questions allow for more agency on the part of the participant. These questions can be integrated with survey questions that seek to gather quantitative data about perceptions, practices, and needs of those participating in higher education. The free-response technique asks participants to respond to particular questions that call for individualized narratives. For instance, a free-response question seeking to understand student practices that relate to learning success could be phrased as:
Please describe the particular learning practices you exercised in order to be successful in the course.

When using this technique, it is important that researchers carefully consider the language they are using as well as the position of the free-response questions in the survey. Open-ended questions should be concise and clear, and researchers should avoid unnecessary jargon that might confuse the participant. Additionally, given that the questions require the respondent to offer detailed information, limiting the number of free-response questions and balancing these questions with close-ended questions will assist in diminishing survey fatigue for the participant.

**Participant-Observation.** Participant-observation is a technique in which a researcher both participates within and observes the social processes they are studying. This approach provides the researcher with an “insider” view. It involves selecting, observing, and recording human behavior and phenomenon within a particular setting (Patton, 1990). The participant-observation technique is particularly helpful for observing naturally occurring phenomena in their usual contexts.

Traditionally, the participant-observation approach has centered on in-person observations. However, with the rise of Internet research, participant-observation has evolved to include virtual settings. When studying online education, this approach can be particularly helpful as it opens up possibilities for understanding how the medium (channel) impacts or is part of the phenomena being studied.
When observing computer-mediated communication, in particular, virtual participant-observation enables a researcher to understand how the technology is itself a “cultural artefact, a set of objects that have become imbued with symbolic meaning from the initial stage of the technology’s production to the outcome” (Williams, 2007, p. 7). Rather than approaching the Internet as a tool, it is viewed as an important research site and cultural phenomena to be investigated.

**Purpose of Study:** To explore how graphical virtual communities influence student engagement in online courses.

**Research Question:** In what ways does using the role-playing game, Second Life, impact student engagement in a clinical lab course?

**Data Collection:** Researcher(s) participate in and observe peer-to-peer and student-teacher interactions in the course’s Second Life community while also observing the role avatars and virtual landscapes play in the interactions.

The challenge with participant-observation is that it requires the researcher to pay careful attention to minute details that might otherwise be overlooked. For instance, researchers must pay attention to the way in which the appearance of a student’s choice about their avatar may impact peer interaction. Observations about the ways in which students’ avatars incorporate the virtual landscape into their interactions are also required.

Another challenge with participant-observation is consideration of methodological reflexivity. This particular aspect of qualitative research has a long history of debate that raises questions about the authenticity and credibility of the research. Williams (2007) outlines several “epistemological and methodological questions” that researchers should consider during the research process:

> [T]o what extent is the researcher able to write in a convincing way about the people studied when anonymity inherent in internet interactions casts doubts upon the identities of research participants? How does the participant observer manage their identity in settings mediated by text and graphics, and what impact might this have on data collection? How are
researchers to conceptualize the boundaries of online settings and the experiences of those observed? (p. 8)

As these questions make clear, researchers using the participant-observer technique must engage in reflexive assessment of the impact their presence within the research site may have on the interpretation of findings.

**Interviews.** Interviews call for extended one-on-one verbal conversations between the researcher and participants. This is a particularly effective strategy for studies that involve sensitive subject matter as it offers participants some privacy and produces rich data. In-depth interviews are also helpful in bringing to the surface specific details about personal histories, experiential knowledge, and perspectives.

Here is an example of a research question that is explored through in-depth interviews:

**Purpose of Study:** To understand the characteristics of academic success coaches in online competency-based educational (CBE) programs.

**Research Question:** Who is and what does an academic success coach do?

**Data Collection:** Five to eight 30-min in-depth interviews with academic coaches in CBE programs via Zoom (video and audio recorded).

With the permission of participants, in-depth interviews are often video or audio recorded. Doing so allows for the interviews to be transcribed and analyzed. It also enables interviewers to be present within the interview process itself rather than having the distraction of trying to take notes and/or analyze the interview in real-time. Oftentimes, video and audio recordings will reveal findings that the interviewer did not anticipate at the time of the interview.

In-depth interviews require researchers to be skilled in facilitation techniques. If an interviewer is unfamiliar with basic interviewing skills, the data collection can be challenging. For instance, sometimes interviewers are unprepared for silence from the interviewee or they do not possess the capacity to direct the conversation back to the research focus when/if the conversation goes off topic. Interviewers should strike a helpful balance between encouraging, engaging, and eliciting responses from the interviewee.
To help navigate the possible challenges that could arise with this technique, interviewers should use a loosely structured interview schedule (see the end of the qualitative toolkit for a sample interview schedule). An interview schedule is a list of questions that relates to the overarching research question guiding the study. A semi-structured interview schedule allows the conversation to flow organically while also allowing for possible unintended topics to emerge. It is often the unintended paths of a conversation in the interview that can reap the richest findings.

**Focus Groups.** Focus groups allow a researcher to interact with a group of participants at the same time to discuss a particular research area. Focus groups differ from interviews in that the concentration rests with the group responses and behaviors rather than individual perspectives and experiences. The goal of conducting research using focus groups as a data collection technique is to develop better understandings of how people feel and think about a particular topic. This is accomplished by prioritizing strategies that invite people to talk at length and with specificities (McDaniel & Gates, 2002). The objective of focus groups is to encourage and elicit participant responses that provide understanding about the emotions, thoughts, and experiences they have about and with a particular phenomenon.

Similar to in-depth interviews, focus groups require a moderator that can encourage, engage, and elicit participation from the participants. Typically, focus groups consist of eight to ten participants and a moderator who helps guide the conversation. Focus groups utilize an approach that goes beyond the question-answer format that is typical in an in-depth interview. With this technique, researchers can identify social and cultural norms by comparing and contrasting the responses of participants.

Given that participants will often “piggy-back” off one another’s responses, focus groups provide a lens in which to understand group processes within a culturally specific situation. While still providing specific information about human issues, focus groups offer a way in which researchers can identify broader views and similarities between participants that is not as easily distinguished using some of the other qualitative techniques.

The risk of a focus group technique is the potential for groupthink to occur. Participants who hold an opinion that differs from others might be hesitant to offer
the disparate perspective out of fear of being seen as an “outsider.” Another challenge is that researchers must relinquish control in the data collection process. The role of the researcher is to facilitate the conversation rather than lead it.

Researchers should prepare a discussion guide, or a “moderators guide,” that assists in starting the conversation and redirecting and assisting the flow of the conversation as needed. To encourage discussion, focus should be placed on quality interactions rather than quantity. It is recommended that in preparing the moderator’s guide, three to five topics are chosen as potential pathways of conversation. Narrowing the focus of the conversation will help produce richer findings.

**Qualitative Data Analysis Techniques**

A qualitative methodology permits a researcher to adopt a more flexible approach to analyzing findings than quantitative methodology. The form in which data is collected varies depending upon the type of data collection technique used, the restrictions imparted by the participants, and the preferences of the researcher. Typical tactics for collecting data include interview transcripts, field observation notes, audiotapes, videotapes, and survey narratives. While there are a variety of ways in which researchers can analyze their qualitative findings, the most common are thematic analysis, narrative analysis, and discourse analysis.

*Thematic Analysis* is a technique that offers a flexible approach for analyzing data. Using a thematic analysis, researchers allow “themes” or categories to emerge from the data (see the end of the qualitative toolkit for a sample thematic analysis). Using the words of the participants, the researcher recognizes similarities and differences between responses and organizes these interpretations into themes as a way of explaining a particular phenomenon.

Thematic analysis requires a researcher to be able to recognize patterns in the data (e.g., words, experiences, phrases, ideas) and identify a category that encompasses related data. Themes can be defined as, “conversation topics, vocabulary, recurring activities, meanings, feelings, or folk sayings and proverbs” (Taylor & Bogdan, 1989, p.131). Once overarching categories are established, data can also be broken down into sub-themes as a way of explaining more nuanced information within each theme. The objective of a thematic analysis is to provide a comprehensive understanding of the shared experiences and perceptions.
communicated by the population being studied. Thus, the “coherence of ideas rests with the analyst who has rigorously studied how different ideas or components fit together in a meaningful way when linked together” (Leininger, 1985, p. 60). To enhance the credibility of the research as well as to strengthen the intelligibility of the writing, a researcher should integrate related literature to make an argument or arguments as to why the particular themes were chosen.

**Narrative Analysis** is used when a researcher seeks to study the particular speech or narrative of an individual or cultural group (Reisman, 1993). This form of analysis seeks to understand the “stories” that individuals tell about a particular phenomenon. For instance, a researcher could use a narrative analysis to understand first-generation college students’ perspectives on the elements of an effective online course. In a free-response survey question, a researcher may ask students to explain a time in which they felt they were comfortable navigating the expectations of the online course or an experience in an online course that helped them succeed.

Using narrative analysis, the provided data would offer the researcher various stories that highlighted similar and different characteristics of what is considered effective online course design by first-generation college students.

**Discourse Analysis** is a linguistic approach that focuses on the process of conversation (Gee, 1992). It differs from narrative analysis in that the aim is to concentrate on the social interaction that occurs between participants rather than the individual stories communicated by individuals. Focus is placed on how participants discuss a subject and how their discussion of the subject influences their behavior. For instance, a researcher could use the transcriptions from a focus group to identify the flow of the conversation between participants and infer what is revealed about the subject in the social interaction between participants.

**Qualitative Data Coding**

One of the major tasks of researchers in the qualitative process is the coding of findings. When coding, researchers identify and categorize themes, concepts, patterns, and topics as a strategy for interpreting and presenting the data (Newman, 1997). Open-coding is a beginning step to exploring the data by identifying similarities and differences between responses, observations, and/or content (Strauss & Cobin, 1990). It is important that a researcher engages in the
coding process with a set of data several times as a way of enhancing the reliability of their interpretation and identifying themes or content that might have been overlooked in previous attempts.

For most data analysis techniques, researchers develop a coding scheme that enables them to interpret the findings. Working independently, each researcher formulates a code (or codes) that translates the thematic findings. Once the analysis is completed, researchers compare their coding schemes and adjust the coding scheme as needed to ensure intercoder-reliability.

Coding can take the form of manual coding or software-assisted coding. Manual coding involves the researchers using their coding schedule to analyze the data by manually categorizing the data into themes. Software-assisted coding involves using specially designed research software to input the data and generate common themes. Some examples of popular data analysis software programs used in qualitative studies are NVivo and MAXQDA.

Most qualitative methodologies call for an inductive approach to studying situations and processes as well as for analyzing the findings. That is to say, findings are analyzed categorically and thematically. These categories and themes emerge from the data rather than being prescribed before the methodology takes place. Depending upon the analysis used, findings are referred to as “themes” or “categories.” For example, “themes” is used when reporting findings from a thematic analysis and “categories” is used when reporting findings from a content analysis.

As with any type of communication, how a researcher presents his/her findings depends upon the audience in which the findings will be disseminated. Typically, however, qualitative findings should be written in narrative form (i.e., reporting themes or categories in a table is typically not advised). The goal of the findings section is to label and describe each theme. The label of each theme should be written such that the meaning of the label is self-evident (i.e., a reader should have a general idea of the finding after reading the label of the theme). In the course of describing themes, it is crucial that evidence, in the form of direct quotes, be used to support the presence of the theme in the data. When citing direct quotes, adequate context must be provided in order to accurately represent the meaning of what is being communicated.
Guide to UX, a Design-Based Research

The guide to UX research will discuss the objectives, research problems, design considerations, and methodology.

The Objective of UX Research

UX research is centered design-based research practices (DBR), focusing on how we understand the mental and emotional processes people use as they navigate the design of products and experiences. Anderson and Shattuck (2012) define DBR as research that “seeks to increase the impact, transfer, and translation of education research into improved practice” (p. 16). Kujala, Roto, Väänänen-Vainio et al (2011) define user experience design as a method by which the enjoyability, usability, and accessibility of a product or experience is enhanced. From a federal perspective, the U.S. Department of Health and Human Services (2020) states, “User research focuses on understanding user behaviors, needs, and motivations through observation techniques, task analysis, and other feedback methodologies“ (para 1). To put it another way, UX research looks at how people experience design and focuses on uncovering perceptions and responses to interactions with an object, product, service or system via some type of interface (Law, Roto, Hassenzahl, Vermeeren, & Kort, 2009). Conducting design-based and usability research focuses on how design influences user interaction with and within courses and technologies. The research goal is to improve practices for the students, instructors or faculty, and/or staff using those courses or technologies.

As discussed in the previous sections, there are differences between academic or scholarly research and DBR and UX research. While they need not be mutually exclusive, their aims and goals are often different. In general, scholarly research tends to seek theoretical ends over applied ones, often in a controlled environment (Anderson & Shattuck, 2012; Ford, McNally, & Ford, 2017). DBR is often subjective rather than objective in that it is intended to identify areas that need improvement rather than make scholarly declarations. It is collaborative, iterative,
and systematic (Niveen & Folmer, 2013). Further, scholarly research is generally more centered in scientific methods than applied ones, relying on controlled experiments as a means of data collection. There is not a large body of academic writing relating specifically to UX design, yet many academic publications discuss the importance of human- and student-centered design and teaching (Clewes, 2003; Soloway, Guzdial & Hay, 1994; Hannafin, & Land, 1997; Lee & Hannifin, 2016). As faculty, administrators, and practitioners in higher education, it is important to consider the student experience of the courses and learning experiences we offer. Therefore, while many of the references to user experience design and research refer to them within the context of websites or products, they are valuable and important methods for use in teaching and learning design. In educational practice, user experience research can inform faculty and practitioners about student needs and behaviors and inform teaching and design decisions in order to maximize students’ abilities to successfully process learning materials and navigate learning environments.

Defining a DBR UX Research Problem and Designing a Study

In the following, we will define selected methods of UX research in more depth, discuss ways in which researchers might get started doing UX research as a part of teaching or design practice, and go more in-depth on some selected methods, including when to use them to maximum effect. There are four predominant types of research that will inform a UX study: attitudinal, evaluative, generative, and behavioral. To begin formulating UX research plans, researchers should first figure out if they are more interested in what people say, or in what people do. Much like other forms of research, UX research begins with a testable hypothesis. In research design, the hypothesis should be a statement that is tested.

**Attitudinal research.** Attitudinal research explores people’s attitudes and feelings about products or experiences. As an example centered in the higher education...
context, consider course feedback surveys. These feedback surveys are an example of attitudinal research. In general, these ask students how they felt about a course, or how well they think they learned, but not necessarily about the specifics of what activities they did. Attitudinal research is often self-reported and should be used when one wishes to discover what students liked or did not like about a learning experience. An example of an attitudinal research question would be “On a scale of 1 (strongly disagree) to 5 (strongly agree), was it easy to find the learning materials in lesson one of this course?” In a learning design context, attitudinal research tells researchers why things are happening, or why students are doing something, rather than telling what they are doing.

For example, maybe a researcher has reason to believe that students in a course thought that the syllabus didn’t explain the assignments well, so they felt uncomfortable as they tried to complete them. This is an example of attitudinal research, in which researchers work to measure students’ attitudes about an experience. Examples of testable hypothesis questions in this attitudinal scenario include:

What do students say as to why they feel they struggle to understand the assignments as explained in the syllabus?

What do students say made them feel uncomfortable as they read the assignments as outlined in the syllabus?

How would students want to re-write the assignment descriptions in the syllabus to make more sense to them?

Evaluative research. Evaluative research uses benchmarks and performance indicators to measure whether or not a product or solution has been successful (Preskill & Torres, 1999; Hassenzahl & Tractinsky, 2006; Nunally & Farkas, 2017). In UX research design, evaluative research should be approached carefully. By its nature, it measures value which, when applied to human subjects can become emotional for research participants, potentially skewing the data collected. Evaluative research is best applied to UX research in the role of evaluating existing environments or designs, not in evaluating user activities. Evaluative research can help inform iterations to design and testing plans.

For example, perhaps a researcher wants to investigate what students click on to find the syllabus in order to evaluate whether or not there are
ways to design the course that might make the wayfinding process easier. This is an example of evaluative research, which works to evaluate the experiences students are having or have had. Examples of testable hypothesis questions in this evaluative scenario include:

On a scale of 1 to 5, with one being impossible and five being very easy, how do you rate the ease of finding the syllabus in your course?

On a scale of 1 to 5, with one being impossible and five being very easy, how easy do you find it to understand the assignment instructions as laid out in the syllabus?

**Generative research.** Generative research focuses on methods that help identify potential design or implementation iterations (Nunally & Farkas, 2017; Sanders, 2002). These methods are participatory and subjective. Generative methods are often executed in cycles, with each subsequent cycle building on the one that came before it. Generative research differs from evaluative research in that evaluative research aims to validate a solution while generative research focuses on identifying improvements and solutions. Generative and evaluative research are often used together, at different points of the design process.

For example, perhaps a researcher wants to brainstorm new ways of designing the course that allows students to participate in a series of design challenges for the purposes of lending their voices and ideas to the design process. Generative research uncovers testable hypotheses, so the examples in this section are slightly different. Examples of scenarios in this generative category include:

Using eye-tracking software, track where students look when you give them a specific task. Where do their eyes move? Is it where you expect them to go? What design iterations or additional questions can you generate from this data?

Give students a task or series of tasks (for example, find the syllabus) and ask them to screen record their actions as they do so. Ask them to narrate what they are doing and why. From this data, generate design iterations or additional questions.
**Behavioral research.** Behavioral research focuses on what people do, rather than what they think or feel. For example, behavioral research observations may find that students in a course struggle to find a syllabus because they are looking in the folder called “getting started” rather than looking in module 1 where the syllabus is uploaded. Behavioral research is often based in observation. Methods such as moderated usability studies, eye tracking, and A/B testing can be useful measurements. Or, perhaps a researcher wants to know the order in which learners click to navigate the course. Alternatively, maybe it’s more important to know what they think about how the content helped them learn once they located it. Perhaps there is a lot of survey feedback indicating that the syllabus was hard for students to find in a particular course or program, so researchers would like to put them through some test cases to see what they click on. This is an example of behavioral research, investigating what students do, or what actions they take. Examples of testable hypothesis questions in this behavioral scenario include:

- When looking for the syllabus, do students regularly look in a particular place first?
- What is the first thing students click on when you ask them to find the syllabus? What is the second thing?
- On average, how many clicks does it take for students to find the syllabus?
- On average, how long does it take students to find the syllabus?

**UX Data Collection Techniques**

There is an array of techniques that can be used to collect data to inform the study of usability or user design. These include card sorting, task analysis, observation, and interviews.

**Card sorting.** Card sorting asks students or users to sort content into groups or taxonomies that make sense to them. In a learning design context, card sorting can generate helpful suggestions for information architecture, course or website structure, and determining what information is most important to your students or audience.

**Task analysis.** Task analysis is an exercise in observation. In task analysis, scenarios are provided, and student or user behavior is tracked. Screen recording software can be a useful tool for capturing the ways people proceed through the
tasks and sub-tasks laid out in the scenario. In a learning design context, task analysis helps identify how students approach tasks, and allows researchers to see if expectations align with the reality of what students actually do.

**Moderated usability studies.** Moderated usability studies allow a designer or researcher to take participants through a series of tasks while observing and recording their actions. Often, participants are asked to narrate as they complete the tasks, to surface their thought process as they complete the objectives. Moderated usability studies are useful for those who wish to better understand students' thought processes as they navigate learning environments and objectives.

**Interviews.** Interviews are valuable tools for understanding the needs and challenges of students. Interviewing can be used on its own, or in combination with other methods, or a mixed methods approach (Portigal, 2013). Some interviews are contextual, in which the interviewers watch participants work, and ask them questions as they arise. Individual interviews are more structured and formal, while focus groups are interviews for small groups of ideally 3 - 5 individuals. In the learning design context, interviews are useful for understanding goals and attitudes, getting more detailed information on why people do or believe things, and discovering what people want in an experience.

UX research in the context of learning design can help researchers better understand students and their needs at both the course and program levels. Wayfinding is an important consideration when thinking about student success in environments where distance education is delivered and consumed (Head & Isom, 2010; Siemens, 2011; Conrad, 2013). While much of the literature is applied rather than academic, UX data and reports can have tangible impact on distance learning endeavors and should be a consideration in the design and development of student learning experiences.
Section 3: Reporting and Dissemination

The purpose of this new section is to specifically address reporting and dissemination, which we had not previously done. However, reporting and dissemination has been identified as a challenge in research. Without sharing of the findings of our research, it is difficult to replicate in other settings and scale research-based practices. We will provide information on how to develop your findings, including a new and exciting section on data visualization. Moreover, we will share some opportunities to share your findings within our DETAbase.
One challenge in research beyond the lack of general theories and models, understanding of how to design research, and standardization of instrumentation across areas of inquiry, is a lack of broad and meaningful reporting and dissemination of findings. Research is conducted in courses, programs, and institutions, applied at that local level, and never reported beyond the walls of that unit or organization, except maybe at a conference. There is research that is complete yet potentially not published due to the gatekeepers of peer reviewed publications and misconceptions of research in distance education. Moreover, research in of itself is not often comprehensible in certain forms because of the complexity of some quantitative research data analytic techniques. This section is, in part, meant to overcome some of these limitations. Furthermore, DETA offers an opportunity for any researcher to submit a DETA Research Brief for publication on the DETAbase. These briefs are short, two- to five-page summaries of research conducted that briefly describe the methods and findings for broader communication that can provide an entry point for a more meaningful conversation.

Visit the DETAbase: https://detaresearch.org/research-support/research-briefs/.
Quantitative Reporting

DETA quantitative research follows the American Psychological Association (APA) guidelines for reporting data including tables. Additionally, peer-reviewed or edited journal will provide their own guidelines, but often, they will follow the APA guidelines as well. Quantitive data, in particular, multivariate analysis is seldom received well by general practitioner conferences or reports, unless it is specific to those who do research. Therefore, if sharing to a general audience, visualizations and descriptive research are encouraged. Data visualization is discussed later in this section.

The methods section of an article should include descriptive statistics and a table to illustrate the sample that participated in the study (see Joosten, Harness, & Cusatis, 2019; Joosten & Cusatis, 2020). Also included in the methodological discussion of the article should be a discussion of reliability tests.

Online work skills: Online work skills proficiency is a measure of students’ proficiency in accessing and using with confidence technology and applications to perform course-related tasks online. Items include, “I have good word processing skills” and “I feel comfortable using a computer.” A total of 16 items are included in this measure with high internal consistency ($\alpha = .92$).

Quantitative results are organized by research questions and hypotheses. Again, one can have numerous research questions and hypotheses in one study. The methodological section should also clarify what was found with the statistical test and whether it confirmed the hypothesis or not. For example:

H1a examined the students’ perceptions of instructional characteristics of their online course and perceptions of their learning. The results of the regression that indicated that the predictors explained about 81% of the variance in perceived learning ($R^2 = .90$, $F[13, 488] = 161.12$, $p < .0001$). It was found that design and organization, content, interactivity with instructor, and learner support significantly predicted learning ($\beta = .76$, $p < .0001$, $\beta = .11$, $p < .01$, and $\beta = .23$, $p < .0001$, respectively); however, it was found that learner support negatively impacted student learning ($\beta = -.16$, $p < .05$). The other two components, interactivity with peers ($\beta = .01$, $p =$
.800) and assessment ($\beta = -0.02, p = .767$), did not contribute significantly to the model.

For the t-tests, multiple regression, structural equation modeling, and MANOVA statistical tests, there are required ways to report these numbers and what associate numbers should be reported with them (see above). Additionally, there are tables or graphics for each of these statistical tests that are usually expected to be reported (see Joosten, Harness, & Cusatis, 2019; Joosten & Cusatis, 2020).

**Qualitative Reporting**

Qualitative research is appropriate for submission to some peer-reviewed journals. Disappointingly, some research journals still favor more post-positivistic approaches to knowledge and prefer quantitative methodologies. Also, qualitative research can be prepared in a brief or reporting form. Unlike quantitative results or findings, qualitative findings are often understood by broader audiences.

The first paragraph of the findings section should include a summary statement of what analysis was conducted and a brief summary of the findings. Typically, the brief summary will simply involve listing the themes. After the introductory paragraph, the following paragraphs should report the findings in a systematic way. That is, each theme should be discussed in turn. Depending upon the density of the theme and number of subthemes (if applicable), this may take one or a few paragraphs for each theme. Always begin the discussion of each theme and subtheme (if applicable) with a broad, yet concise, description of the theme or subtheme. In the following sentences, provide a more nuanced description that includes direct quotations to support your claims.

The formatting of a qualitative findings section can be challenging and is dependent on style (e.g., APA) and journal. The publication style of the APA is the most commonly used format and as such, the conventions of this style, as it relates to quotations, will be described. Quotations that are fewer than 40 words must be enclosed within double quotation marks and be embedded in the text. For quotations longer than 40 words, no quotation marks should be used. Instead, long quotations should be in block format. That is, the quotation should start on a new line and be indented five spaces from the left margin. Each line should be indented in this way.
In general, quotations should be reported verbatim, regardless of grammatical correctness. However, it may be justifiable to alter a quotation for the sake of readability. This can occur when citing a quotation that comes after the participant explained the context. If it is necessary to add words to the quote for reliability, one must enclose the words in brackets. For example, the following quotation is in the context of a discussion about being misidentified as transgender post-mastectomy: “The last thing I would ever want [post-mastectomy] is for someone to think I was transitioning [to become male].” The meaning of the quote would be lost without the insertion of the bracketed words. Thus, adding extra words to the sentence is justifiable.

**Discussing the Limitations**

While no research approach is completely value-free, qualitative researchers are particularly aware that their values play a role in the research process. Thus, in discussing qualitative findings, many researchers will also discuss the limitations of the study. The limitations section includes the personal values that the research holds that might have influenced the participants, the interpretation of the data, and the discussing of the findings. During this discussion, researchers identify their biases and the consequences of these biases on the research process.

The limitations section also identifies opportunities for improvement in the research design. For instance, distance education researchers employing a qualitative methodology might discuss how certain implications emerged as a result of their small sample size. The purpose of the limitations or discussion is to offer the reader an opportunity to evaluate the validity of the research as well as to provide suggested direction for future studies about a similar topic.

**User Design Reporting**

In some cases, reporting UC research results may not be a formal written report because the research may simply serve to identify opportunities to improve navigability or design in a course. Those practitioners who work in the field of instructional design and are researching on behalf of a faculty partner may need to draft a report of their findings. The length of this report will vary, but a full report in the learning design context should contain the following segments:

1. Executive Summary/Research Highlights - What were the key takeaways from the research?
2. Introduction/Abstract - Why was the research done and who was involved in what roles?

3. Methodology and Recruitment - Who participated in the research and how were they recruited? What methods were used and how were they executed?

4. Research Findings - What data did your research uncover?

5. Recommendations/Discussion - Based on the data uncovered in your research, what recommendations do you make in regard to the learner experience? What additional data or research is needed?

6. Planning and Execution - What changes will be made, and what are the associated milestones?

7. Resources/Works Cited - What works (academic or otherwise) did you reference in the course of your research?

This report combines recommendations from Nunnally & Farkas (2017), Usability.gov, and academic research. As with everything in user experience design, the format of the report depends on the audience for which it is prepared. Ask stakeholders what is important to them and consider preparing both a written report and a slide-based (PowerPoint or otherwise) representation of findings.

Data Visualization

Many researchers are new to data visualization and do not know how to navigate various aspects of the visualization process. In the following, basic principle of data visualization will be discussed, including determining the purpose of the visualization, specific techniques will be shared, such as selecting an appropriate chart type, and considerations in critiquing and modifying your data visualization will be identified.

“The first and main goal of any graphic and visualization is to be a tool for your eyes and brain to perceive what lies beyond their natural reach” (Cairo, 2013, pp. 9-10).
Objective of Data Visualization
Data visualizations are used to convey oftentimes very complex statistical findings to an audience much more quickly than a data table or text report. The basic principles of data visualization come from a combination of fields, including psychology, design, and business. First, psychologists study how people perceive and make sense of information. Gestalt theory originated in the early 1900’s by psychologists who believed that it was human nature to perceive the whole as greater than the sum of parts. This school of thought includes a set of principles of perception that describe how humans interpret visual patterns. These principles include:

- **Similarity** - things that look similar will be visually grouped together
- **Proximity** - things that are closer together will be perceived as related
- **Continuity** - things that are situated in a line or curve will be perceived as related
- **Closure** - the tendency to fill in the gaps to closure a figure

Designers use these principles and others when creating visual graphics. Other aesthetic design choices such as color, font, and symmetry, as well as ensuring proportions are appropriate, make for the most effective data storytelling. A clean, simple design free of clutter and noise are the most effective at retaining attention and helping the reader understand the main points. Businesses leverage these ideas with the use of data analytics to compress large quantities of data into easily understandable graphics. The information presented visually is then used to analyze logistics, costs, profits, risks, and make data-driven decisions (Corporate Renaissance Group, 2017).

Visualized data has many benefits over text reports, including: 1.) Learners prefer visualized data over text (Yarbrough, 2019); 2.) The “bigger picture” is more recognizable; 3.) Connections within data are more visible; and, 4.) Many decision-makers aren’t “numbers people.”

Defining a Data Visualization Problem
The important first step to data visualization is to determine what purpose that visualization will serve. The visualization should be telling a story that will be easier to recognize and understand compared to bulleted text or a data table.
Since the data tells a story, general storytelling guidelines must be considered: What is it users and readers should understand from the visual? What specific question will the visualization answer? Who is the audience for this story?

**Designing a Data Visualization**

Once you have narrowed down your specific purpose, the next step is to prepare your data and select your application (computer-based or online service) to use for the visualization. Depending on the tool selected, this may or may not matter. If you are building a static infographic by entering data into an online application, the format you save your dataset in may not matter since it won't be uploaded. However, if you'll be uploading your data into a downloaded software application, you might be limited to the formats your selected product allows.

**Data Visualization Tools.** There are several software programs and online services to use for your data visualizations, both for interactive data dashboards and for static standalone visual reports. Some of the most common services and software include, but are not limited to: Tableau, Microsoft Power BI, Qlik, Domo, Venngage, Datawrapper, Chartbuilder, and Google Data Studio.

Many simple visualizations can be done within Microsoft products such as Word, Excel, and PowerPoint. Your product selection will depend on a variety of factors, such as the type of data you are working with, how it is stored, how you will connect it to the visualization software, and what it is being used for. The pricing and user-friendliness of the products also varies greatly. Before committing to an expensive product license, it is wise to first determine what your data visualization needs are and compare product design, capabilities, and pricing.

**Data Preparation.** Before you start uploading your data set into a visualization application, the following considerations should be made:
1. Will the systems work together if connecting directly to a server (e.g. Oracle vs. Microsoft SQL Server)?

2. Will your data file need updating, and can the process of getting the file in the same exact format be replicated? For example, if your original data contains personally identifiable information (PII) used as a unique identifier, and you create a new unique identifier and strip the PII, can that unique ID be recreated the same way each time data is refreshed?

3. Is information included in the data file that is not relevant to the specific purpose of your visualization? If so, remove it before uploading.

4. Will your visualization have filters for users to explore? If so, most visualization filters will work much the same way as Microsoft Excel filters. Is the data formatted to work as a filter? For example, if “Year” will be a filter in an interactive visualization, data should likely be formatted like Example A rather than Example B, such that all years are in one column/variable.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>50</td>
</tr>
<tr>
<td>2018</td>
<td>35</td>
</tr>
<tr>
<td>2019</td>
<td>40</td>
</tr>
</tbody>
</table>

Example A

<table>
<thead>
<tr>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>35</td>
<td>40</td>
</tr>
</tbody>
</table>

Example B

5. Are there missing data points for the relevant data that will be included in your visualization? Will your selected software recode them for you, or will you need to fill them in manually?
6. Are your variables named exactly the way you want them to appear in the visualization, and are the data points coded or labeled? For example, if you have a “sex” variable coded as Female = 1 and Male = 2, will you be able to load the data as the codes and then label it after it’s been loaded? Some products allow renaming and relabeling within the product, and other products will display the data exactly as it is in the dataset.

7. Are zero rows included in your data? For example if every month you expect 100 responses and want exactly 100 data records (rows) included in your visualization, but response 98 is nonexistent for the current month, is there a row saved in your dataset to include as missing (like Example C) or is the row nonexistent (like Example D)? Many software programs will not automatically fill in missing rows for you, and it might be easier to create the zero row in the underlying data before uploading.

Example C

<table>
<thead>
<tr>
<th>RESPONSE ID</th>
<th>ANSWER</th>
</tr>
</thead>
<tbody>
<tr>
<td>97</td>
<td>Yes</td>
</tr>
<tr>
<td>98</td>
<td></td>
</tr>
<tr>
<td>99</td>
<td>No</td>
</tr>
<tr>
<td>100</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Example D

<table>
<thead>
<tr>
<th>RESPONSE ID</th>
<th>ANSWER</th>
</tr>
</thead>
<tbody>
<tr>
<td>97</td>
<td>Yes</td>
</tr>
<tr>
<td>99</td>
<td>No</td>
</tr>
<tr>
<td>100</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Chart Style. Once the application has been identified and the data set prepared to align with the application, the characteristics of the visualization will need to be identified, including the chart style. Chart style will include several characteristics that can help the viewer understand the data and draw conclusions. The types of graphics that can assist the viewer in understanding the data include composition, comparisons and distributions, relationships, time interval, histogram, and so forth.
Once you’ve decided on the software and your data is prepped, it’s time to select the type of graphic to best illustrate your point given the type of data you’re working with. The following is a short list of commonly used data visualization chart options categorized by what function they typically serve.

Descriptions and samples are available at the end of this section.

*Imagery.* The selection of color applied to a data visualization is an important aspect that helps tell the story of the data. Some key considerations when choosing color combinations:

- If the visualization is static and printed in black and white, are the colors distinguishable from one another?

- Are the color combinations such that someone with decreased color vision would still be able to differentiate the colors?

- Are the same colors being used in different visualizations in the same area such that a reader would assume the data are somehow connected?

- Would a user make an assumption about a color choice given the topic without reading a color legend? For example, with financial data red usually has a negative or low connotation (e.g. decreased sales, a negative balance, etc.) whereas meteorologists use red to indicate data that is high (i.e. high temperatures). Avoid using colors that are counterintuitive.

- Is your visualization part of a report or website with an aesthetic branding?

- Are there so many colors that the visualization is distracting or “noisy”?

*Testing.* All data visualizations should undergo both user interface (UI) testing (for interactive online dashboards), and user experience (UX) testing. Internal testing should include team members with a variety of background and skillsets; those who are more technical might not be the greatest storytellers and could get
sidetracked with methodological details and lose the bigger picture. At the same time, those who are the best storytellers might not think though the nuanced data technicalities. The testing process is a good way to learn what can be improved about the visualization and uncover issues the original designer might not have considered.

Example questions to explore during testing:

1. Is a person with no knowledge about the underlying data able to navigate the dashboard in the ways it is intended?

2. Do your users explore the things you want them to, in the order you want them to? For example, many people will automatically look at things the same way they’d read a report - left to right, top to bottom. If your dashboard had four areas to explore like in Example E below, are your testers reading it in 1-2-3-4 order? Or are they looking at it in a different order? Sometimes the placement of items may not matter, but other times you might want your readers to explore things in a certain order, depending on the story you want the data to tell.

3. Do readers understand what is being described quickly without a lot of explanation? Generally, your users/readers should be able to look at a graphic and understand the key takeaway within about ten seconds or less. If it takes longer or if readers are searching for more information to understand the graphic, it is probably too complicated or confusing.

4. Do the graphics confuse people and leave them with more questions? For example, if using a “parts of the whole” type of graphic like a pie or donut chart, the sum should equal 100%. If it doesn’t, the chart isn’t
the appropriate choice and readers will not only not gain anything from the graphic, they will be left with more questions about the data.

5. Could the graphics be easily misinterpreted, or are they misleading? For example, including two variables on the same line graph that have different scales could be very misleading. Similarly, altering a scale or removing the 0 starting point could make two bars on a chart appear visually to have a large difference when in reality the difference could be negligible, and would leave readers with an incorrect takeaway.

6. Do the users engage with the story you are trying to tell? Are readers seeing the points you are trying to make? Good visualizations are stories driven by data, and those stories should help users engage in more efficient decision-making conversations.

Other Considerations in Data Visualization

Data Security. Security of the underlying data is an important consideration with data visualization, depending on the underlying structure and detail of the data loaded in the visualization software. For example, if all data has been aggregated before loading into the software and no personal identifying information (PII) or sensitive data points are included (e.g. public datasets already available) data security might not be a concern. However, if the dataset contains any sensitive information, PII, or is structured in such a way that a person or entity could be identified, considerations have to be made regarding how to ensure the data is kept private. Questions to consider include: Is the visualization hosted on a public server? Can a user see, copy, or download the underlying data in its original form? Are there enough details available that even without PII data, a person could be
identified? If data security is a concern, consider restructuring your data (aggregating or breaking apart into different dataset), redacting certain pieces of information, or hosting your visualization only on a secure server.

**Chart types: Compositions**

Composition charts are also referred to as “parts of a whole” charts and are used to show how data parts add up to 100%. Oftentimes pie charts are not the best choice if you want your reader to be able to tell visually which category has more proportion of the whole. For example, in the graphic below, the darker blue and medium pink look almost the same, and it is hard to distinguish which color has more proportion of the pie.

Other charts, such as a donut chart, tree map, or stacked bar graphics. These charts are basic and can be easy to create in application that already exist on your laptop or desktop (e.g., PowerPoint). Compositions are often helpful in describing the sample of your study in demographics (gender/sex, age, race or ethnicity).
Comparisons and Distributions

Comparison data graphics are used to compare the distribution of two or more data points. Examples of comparisons and distributions include histograms, bar charts or column graphs, and stacked bar or stacked columns. Remember, this is when you have two or more data points such as frequency or number of students that responded to a Likert survey item about their satisfaction (range of 0-5) in their online course or the frequency of logins to the course in the learning management systems over a period of time (daily, weekly, or monthly).

Source: Severino Ribeiro's Data Visualisation Catalogue (https://datavisualisationcatalogue.com/)
Relationships

Relationship graphics show how two or more variables are correlated. Relationship visualizations include heatmaps, radar chart, scatter plot, and Venn diagram. For instance, it could be the sum of the survey items related to course design and the correlation to a student course outcome, such as learning.

Source: Severino Ribecca's Data Visualisation Catalogue (https://datavizcatalogue.com/)
Time Interval
Time interval graphics are used to show how data change over a linear period of time (X-axis). Time interval graphics include line graphs, area graphs, and Gantt chart. For instance, the graph could show the frequency of student interaction in an online discussion forum over the weeks of the semester.
Hierarchical graphics
Hierarchy graphics show ranking and how data fit within larger groups. These include a tree map or sunburst.

Source: Severino Ribecca's Data Visualisation Catalogue (https://datavizcatalogue.com/)

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The purpose of this popular section is to provide you with research tools and resources to help you conduct research and collect data on DETA. The first resource is a list of considerations to be used in planning your research. These often come from challenges we, ourselves, have encountered when conducting research. The second resource is the most popular resource, the student survey packet. The third resource is a codebook that is helpful in coordinating and tracking coding as well as in cross-institutional research. You will also find a sample interview schedule, human subjects information requirements, sample waiver of informed consent, and sample data sharing agreement to help with your data collection needs.
Research Planning

This document is a sample of a research plan including tips to help you in planning and executing your research.

When writing research proposals, whether for individual research for courses or for overall campus research, it is important to consider and anticipate the research timeline. Oftentimes, research takes far longer than you would think. DETA offers extensive timelines including associated tables as part of their grant proposals, but for the purposes of the guides, this checklist may be helpful.

Download: Sample Research Plan [pdf].

What is the timeline for the research?
*Tip: Don’t wait for one task to be completed necessarily before starting on the next step.*

1.) **Complete IRB forms and Submit for IRB approval.** Depending on the institutional IRB can be a real hold up. However, the study may not require IRB review or may be exempt. See sample IRB materials.

2.) **Contact individuals who will be gathering and analyzing data.** It is good to know ahead of time who will be your research support or supporting the study and building a network on the campus and beyond with information technology, institutional research, statistics support, and so forth.

3.) **Identify or develop survey items.** A scan from previous research or the toolkit may easily provide what you need for the variables and measures, yet sometimes it may require contacting someone or developing new items. You must ensure that the items are valid and reliable measures.
4.) **Build the survey.** If you are not using DETA resources to disseminate the survey, the creation and design of the survey and usability in Qualtrics will take some time. If you have created it in a Google Doc or a Word document, set a timeline to build it online. You will need to consider usability and functionality. You will need to test the survey to ensure the data set that you receive will make the analysis process as efficient as possible. Developing and testing the survey may take more time than anticipated.

5.) **Gather course and program level data from contacts.** You may need to contact advisors, chairs, deans, instructors, student support services, and/or faculty support services to gain access to student and instructors of courses and programs relevant for the study. Coordinating activities with these gatekeepers can take a tremendous amount of time or can stop your study altogether.

6.) **Develop a complete list of courses and programs and date of delivery.** Delivery of surveys or coordinating data collection can often depend on the academic calendar (e.g., when they will be taught online, start and end dates of classes). This will need to be built into your plan. You don’t want to administer a survey or collect data regarding an intervention to early in the semester.

7.) **Administer data collection.** Ensure that your survey is ready to go. Each survey item has a code that corresponds with your codebook for easy analysis. Identify other data sources and collection (e.g., student information system) to ensure you will have all of the data you need to merge and begin your analysis. See survey instrument packet and codebooks.

8.) **Collect student information from other institutional data sources.** Collect the needed demographics and performance data from the student information system, learning management system, or other institutional data sources that you identified. See data codebooks.

9.) **Potentially clean up the data.** You will need to prepare your data and run diagnostics (e.g., frequencies, visualizations). Ensure that you recode variables to match the required DETA coding. See data codebooks.

10.) **Analyze data and/or submit to DETA.** Researchers should acquaint themselves with DETA data input procedures including requesting an institutional code and downloading the form with associated variable names and codes. Data submitted to DETA will be included in our cross-institutional studies.
11.) Develop written results and/or presentable form of results. The reporting section in the toolkit provides you some parameters, including graphic representations of the results (bar charts, graphs). Sample are provided.
Student Survey Instrumentation Packet

This document provides a student survey packet for key studies and variables as well as an associated codebook for surveys and student information system data to help guide quantitative data collection.

The student instrumentation packet includes student instrumentation that measures demographics, learner or student characteristics, student experience or perceptions of their course, and more. The packet was developed based on a review of instrumentation in the literature and developed by DETA research fellows. Below is a description of each section followed by the full packet.

Download a short version at: Student Survey Packet and Codebooks [pdf].

Student and/or Learner Characteristics

Demographics | The student instrumentation packet includes a pretty inclusive listing of survey items to capture student demographics. If possible, we would recommend gathering as much as possible from the student information system so not to have to add to the length of the survey to gather demographics. Moreover, place the demographics section at the end of the survey since it is most likely the least important of the variables and measures to address your research questions and/or hypotheses.

Readiness and Preparedness | The readiness and preparedness section focus on student-level data that captures data related to measures and variables of student or learner characteristics that may impact student experience within the classroom, program, or institution. These primarily are related to students' experience, attitudes, abilities, and/or opinions. Primary areas include students' technology and environment, students experience and attitudes with and about technology, students' cognitive constructs for learning and achievement, students experience and competence with communication, and others.
Course and Instructional Experience | The course experience measures student reports of information about their course, the instructional characteristics of their course, and their experience in their course (tech-enhanced, blended or online). In addition to basic course information, this survey gathers information about the student’s course, such as the course design, organization of the course, learner/student support, content and course materials, assessment, and more. It also measures the students interactions in the course with the content, their peers, and the instructor.
Student and/or Learner Characteristics

Demographics

Sex

Variables Name: SEX

What is your birth sex?

0 = Male
1 = Female
2 = Intersex
3 = Prefer not to respond
4 = Unknown

Gender

Variable Name: GEN

What is your gender?

0 = Men
1 = Women
2 = Transgender
3 = Non-binary and/or non-conforming
4 = Prefer not to respond
5 = Unknown

Note: Sex and Gender survey items will need to be merged with SIS and IPEDS data which may require the collapsing or recoding of variables.
Age
Variable Name: AGE
When is your birthday? <mm/dd/yyyy>

Ethnicity
Variable Name: ETH
Do you identify as Hispanic?
1 = Hispanic
0 = Non-Hispanic
99 = Unknown

Race
Variable Name: RACE
With which race do you identify?
1 = American Indian or Alaska Native
2 = Asian
3 = Black or African American
4 = Native Hawaiian or Other Pacific Islander
5 = White
6 = Two or more races
99 = Unknown

First Generation
Mother's Education
Variable Name: MEDUC
What was the highest school completed by your mother or parent 1?
Middle school/Jr. high
High school
College or beyond
Other/unknown

Father's Education
Variable Name: FEDUC
What was the highest school completed by your father or parent 2?
Middle school/Jr. high
High school
College or beyond
Other/unknown

Income
Family Income
Variable Name: FAMINC
What was your household or parent’s adjusted gross income upon high school graduation?

Student Income
Variable Name: STUINC
What was your (and spouse's) adjusted gross income last year?

Pell Grant Eligible
Variable Name: PGE
Are you eligible for or have you received a Pell grant?
Yes
No
Other, Don't know

Orphan
Variable Name: ORPHAN
At any time since you turned age 13, were both your parents deceased, were you in foster care, or were you a dependent or ward of the court?
Yes
No
Other, Don’t know

Marital Status
Variable Name: MARSTATUS
What is your marital status?
I am single
I am married
I am separated
I am divorced or widowed

Grade Level
Variable Name: GRDLVL
What year are you?
Freshman
Sophomore
Junior
Senior
Graduate Student
Other

**Time Commitments**

**Paid Work Hours**
Variable Name: WRKHRS
How many hours do you work per week on average?

**Employment Type**
Variable Name: EMPSTAT
What is your employment status?
Unemployed, not looking for work
Unemployed, looking for work
Part time
Full time
Other

**Student Type**
Variable Name: STUTYPE
What is your student enrollment status?
Less than part time
Part time
Full time
Overload
Don’t Know

Credit Hours
Variable Name: CDTHRS
How many credits did you take last semester? If you are a student in a competency-based program and do not have semesters, please enter how many credits have you completed in the last six months?

Prior Academic Achievement
Current Overall GPA
Variable Name: OVERGPA
What is your Current Overall GPA?

Class Rank
Variable Name: CLASSRNK
What is your current class rank?

Current Major GPA
Variable Name: MAJORGPA
What is your GPA in your major?

Degree Completion Progress
Credits Towards or Percentage of Degree Completed
Variable Name: DEGPROG1 - DEGPROG2

1. How far along in your degree completion are you?
   0-25%
   26-50%
   51-75%
   76-99%
   100%

2. How many credits have you completed towards your degree?

**Native English Speaker**
Variable Name: ENGLISH

Is English your first language?
Yes
No

**Disability and/Impairment**

*Note: Contact DETA for a demonstration of usability and functionality of these scales.*

**Physical Disability**
Variable Name: PHYDIS

Do you have a disability or require special accommodations in class?
Yes
No

**Learning Disability**
Variable Name: LRNDIS

Were you ever diagnosed by a physician or psychologist as having a learning disability?

Yes
No

Mental Illness

Variable Name: MENILL

Have you been diagnosed by a professional as having a learning disability?

Yes
No

Functional Impairment

Cognitive

Variable Names: IMPCOGN1 - IMPCOGN12

12-items; Yes/No Responses → (0) “No” (1) “Yes”

1. I have difficulty with reading.
2. I have difficulty with mathematical reasoning.
3. I have difficulty with written expression.
4. I have difficulty with spoken expression.
5. I have difficulty with receptive communication and comprehension.
6. I have difficulty with time management.
7. I have difficulty with speed of processing information.
8. I have difficulty with memory recall.
9. I have difficulty with sustained concentration.
10. I have difficulty with attentional focus.
11. I have difficulty with problem solving.
12. I have difficulty with logical reasoning.

**Sensory**

Variable Names: IMPSENS1 - IMPSENS3

3-items; Yes/No Responses → (0) “No” (1) “Yes”
1. I have difficulty with hearing.
2. I have difficulty with vision.
3. I have difficulty with visuo-spatial reasoning.

**Behavior**

Variable Names: IMPBEHV1 - IMPBEHV9

9-items; Yes/No Responses → (0) “No” (1) “Yes”
1. I have difficulty with anxiety.
2. I have difficulty with stress regulation.
3. I have difficulty with mood regulation.
4. I have difficulty with social awareness.
5. I have difficulty with appropriateness of social interaction.
6. I have difficulty with flexibility.
7. I have difficulty with adaptability.
8. I have difficulty with non-verbal communication comprehension.
9. I have difficulty with impulse control.
Motor
Variable Names: IMPMOTOR1 - IMPMOTOR4
4-items; Yes/No Responses → (0) “No” (1) “Yes”
1. I have difficulty with fine motor control.
2. I have difficulty with gross motor control.
3. I have difficulty with general body stamina.
4. I have difficulty with balance.

Assistive Technology
Communication Aid
Variable Names: ATCOMM1 - ATCOMM20
20-items; Yes/No Responses → (0) “No” (1) “Yes”
1. I use a communication board.
2. I use a speech synthesizer.
3. I use text-to-speech software.
4. I use text-to-speech hardware.
5. I use a head wand.
6. I use a light pointer.
7. I use a signal system.
8. I use telephony equipment.
9. I use a tactile device.
10. I use a Braille device.
11. I use word prediction or completion software.
12. I use an assistive listening device.
13. I use hearing aids.
14. I use an infrared or personal amplification system.
15. I use an FM amplification system.
16. I use a TDD/TTY device.
17. I use a cochlear implant.
18. I use a visual signaling or alerting system.
19. I use a speakerphone
20. I use a communication aid not previously mentioned.

Computer Access Aid
Variable Names: ATCOMP1 - ATCOMP22
22-items; Yes/No Responses → (0) “No” (1) “Yes”
1. I use an alternative or adaptive keyboard.
2. I use an expanded keyboard.
3. I use a head-operated pointing device.
4. I use an eye gaze pointing device.
5. I use a mouth or tongue pointing device.
6. I use a brain-actuated pointing device.
7. I use a Morse code input device.
8. I use a switch.
9. I use a touch screen.
10. I use a voice input system.
11. I use speech-to-text software.
12. I use dictation software.
13. I use on-screen keyboards.
14. I use a Braille display or output device.
15. I use a Braille embosser or printer.
16. I use screen reading software.
17. I use screen enlargement or magnification software.
18. I use a large print monitor.
19. I use an Optical Character Recognition (OCR) system.
20. I use a manual or electronic page turner.
21. I use audio or electronic textbooks.
22. I use a computer access aid not previously mentioned.

**Mobility Aids**
Variable Names: ATOTH1 - ATOTH5
5-items; Yes/No Responses → (0) “No” (1) “Yes”
1. I use an ambulatory aid.
2. I use a scooter or power chair.
3. I use a wheelchair.
4. I use a walker.
5. I use a mobility aid not previously mentioned.

**Other Modification**
Variable Names: ATMOBIL1 - ATMOBIL5
5-items; Yes/No Responses → (0) “No” (1) “Yes”
1. I use a personal aide.
2. I utilize an interpreter.
3. I have a personal tutor.
4. I utilize a group tutor.
5. I use a modification or accommodation not previously mentioned.
Readiness and Preparedness

*Note: these items are specific to our series of studies of student online learning readiness. Additional items are available in DETA Research Toolkit 1.0.


Technology-related

Experience in distance education

Variable Names: PREPDEEXP1 - PREPDEEXP2

2-items; continuous responses or unknown

1. How many previous online courses have you taken?
2. How many previous blended or hybrid courses have you taken?

Technology Access

Variable Names: PREPACCESS1 - PREPACCESS3

3-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

1. I have a computer or a laptop.
2. I have the Internet in my home or somewhere I can study online.
3. I have a good environment in which to study for my online course.

Online Work Skills

Variable Names: PREPWORKSKILLS1-PREPWORKSKILLS15

15-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

Adapted from Bernard et al. (2004; 2008)

1. I am able to easily access the Internet as needed for my studies.
2. I am comfortable communicating electronically.
3. I am comfortable with written communication.
4. I possess sufficient typing skills for doing online work.
5. I feel comfortable communicating online in English.
6. I know how to use an Internet search engine to locate information.
7. I know how to use a browser to locate Internet sites.
8. I know how to locate a document or a program on my computer.
9. I feel comfortable using a computer.
10. I know how to send an attachment in an email.
11. I feel confident in performing basic functions in word processing applications (e.g., MS Word, Google Docs).
12. I am able to locate additional study resources online.
13. I have a sense of self confidence in using computer applications for course tasks.
14. I am proficient in using a wider variety of computer applications.
15. I am comfortable navigating the learning management system [e.g., Desire2Learn (D2L), Blackboard, Moodle].

Social Technology Familiarity

Variable Names: PREPSOCTECH1 – PREPSOCTECH5
5-items; 5-point Likert Scale; Ranges → (1) “Never” to (5) “Very Frequently”
Adapted from Joosten (2015)
“When you use a digital device, how often do you:”
1. Chat using instant messenger (e.g., FaceTime, iMessage, Facebook Messenger, WhatsApp)
2. View videos or pictures online
3. Use social media (e.g., Instagram, SnapChat, Facebook, Twitter)
4. Take pictures
5. Take videos

**Online Learning Efficacy**

Variable Names: PREPONLINEEFF1 - PREPONLINEEFF7

7-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

Adapted from Bernard et al. (2004)

1. I am motivated by the material in online activities.
2. Learning is the same in class and at home online.
3. I feel that I can improve my listening skills the same working online as in an in-person class.
4. I believe that learning online is more motivating than a traditional in-person course.
5. I believe a complete course can be given online without difficulty.
6. I could pass a course online without any teacher assistance.
7. I believe that material in an online course is better prepared than a traditional class.

**Learning-related**

**Organization and Self-directedness**

Variable Names: PREPSDORG1 - PREPSDORG15

15-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

Adapted from Roblyer et al. (2008); Bernard et al. (2004)

1. I feel I am a very well-organized person.
2. When it comes to learning and studying, I am a self-directed, take charge kind of person.
3. In my studies, I am self-disciplined and set aside reading and homework time.
4. I am able to manage my study time effectively and complete assignments on time.
5. In my studies, I set goals and have a high degree of initiative.

6. I find it easier to study for an important test by breaking it into subparts rather than studying the whole subject matter at one time.

7. I will often set short-term goals to help me reach a long-term goal.

8. I am able to manage deadlines and when things are due in my course.

9. I am able to motivate myself to complete coursework without being reminded.

10. My desire to succeed keeps me moving forward despite challenges along the way.

11. I "give my best" without needing encouragement from others.

12. I keep moving forward even when faced with difficulties.

13. I have the determination to solve problems on my own.

14. I am capable of creating lists that prioritize certain tasks over others.

15. At the beginning of the course, I create a schedule of when assignments are due.

**Experimentation and Growth Mindset**

Variable Names: PREPMINDSET1 - PREPMINDSET14a

14-items; 5-point Likert Scale; Ranges → (1) "Strongly Disagree" to (5) "Strongly Agree"

Adapted from Roblyer et al. (2008)

1. I do not care what other people think of me if I make mistakes.

2. I am not afraid of making mistakes if I am learning to do new things.

3. I don’t mind showing my work in front of others when I am learning new things.

4. If I am given a task to perform that I know little about, I don’t mind giving it a try.

5. When I am learning something new, it is okay if I make errors.

6a. No matter who you are, you can significantly change your intelligence level.

7a. No matter how much intelligence you have, you can always change it a good deal.

8a. I like my work best when it makes me think hard.
9a. I like my work best when I can do it really well without too much trouble.
10a. I like work that I’ll learn from even if I make a lot of mistakes.
11a. I like my work best when I can do it perfectly without any mistakes.
12a. When something is hard, it just makes me want to work more on it, not less.
13a. When I work hard, it makes me feel as though I’m not very smart.
14a. I like taking chances and performing risky tasks in learning situations.

Achievement Mindset

Variable Names: PREPACH3 – PREPACH19a
17-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”
Adapted from Roblyer et al., 2008; Yee, 2007

1. I find that I try harder if I set high goals for myself.
2. I study hard for all of my classes because I enjoy acquiring new knowledge.
3. I tend to persist at tasks until they are accomplished.
4. I believe I am a high achiever.
5. I believe that I am a valuable person.
6. I feel that I am a worthy individual.
7. I try to achieve in all my classes, regardless of their level of difficulty.
8. As classes become harder, I feel that I have the ability to overcome many of the difficult obstacles that may present themselves.
9. I have a need to achieve and feel competent.
10. It is important that my teachers give me knowledge of results or feedback that I can use to further enhance my performance.
11. I take responsibility for my actions most of the time.
12. I want to become powerful.
13. I hope to accumulate items and money.
14. It is important to be well-known.
15. I like to compete with peers or family.
16. I plan to have a successful career.
17. I hope to get a well-paying job.

**Communication-related**

**Communication Competencies**

Variable Names: PREPCOMCOMP1-PREPCOMCOMP4

4-items; 5-point Likert Scale; Ranges → (1) "Strongly Disagree" to (5) "Strongly Agree"

1. I am comfortable expressing my opinion in writing to others.
2. I am comfortable responding to other people's ideas.
3. I am able to express my opinion in writing so that others understand what I mean.
4. I give constructive and proactive feedback to other even when I disagree.

**Social Competencies with Instructor**

Variable Names: PREPSOCOCOMPINST1-PREPSOCOCOMPINST5

5-items; 5-point Likert Scale; Ranges → (1) "Strongly Disagree" to (5) "Strongly Agree"

Adapted from Yu (2018)

1. I can clearly ask my instructor questions.
2. I initiate discussions with the instructor.
3. I am able to seek help from the instructor when needed.
4. I can timely inform the instructor when an unexpected situation arises.
5. I express my opinions to the instructor respectfully.
Social Competencies with Classmates.
Variable Names: PREPSOCCOMPPEER1-PREPSOCOMPPEERS5
5-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”
Adapted from Yu (2018)
1. I am able to develop friendships with my classmates.
2. I pay attention to other students’ social actions.
3. I apply different social interaction skills depending on the situations.
4. I initiate social interaction with classmates.
5. I socially interact with other students with respect.

Student Socialization (Need for)
Variable Names: PREPSOCIAL1- PREPSOCIAL5
5-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”
Adapted from Bernard et al. (2004); Yee (2007); Joosten (2015)
1. I like getting to know other students.
2. I like helping other students.
3. I often have meaningful conversations with other students.
4. I sometimes talk to other students about personal issues.
5. Other students sometimes help me with my real-life problems.

Qualitative Questions
Variables: PREPENRLQ1 - PREPENRLQ2
1. Why did you choose to take this course in the mode you did (blended or online) rather than as a completely traditional face-to-face course?
2. Which of your skills or experience were most helpful in preparing you for this course? Explain.
Course Experience

*Note: these items are specific to our series of studies of instructional characteristics and course quality. Additional items are available in DETA Research Toolkit 1.0.

Course Characteristics

Course Level

Variable Name: CRSLEVEL

What is the course level?
1 = undergraduate 100-200 level (general education course)
2 = undergraduate 300 level or greater (course within major)
3 = undergraduate 100-200 elective
4 = undergraduate 300 level or greater elective
5 = graduate course

Course Department

Variable Name: CRSDEPT

Which department is this course?
<dropdown list from Registrar>

Course Mode

Variable Name: CRSMODE

What is the course mode?
1 = F2F
2 = Blended/Hybrid
3 = Online
4 = Other, describe?

**Course/Program Design**
Variable Name: CRSDSIGN
What is the course or program design, if applicable?
1 = Competency-based education
2 = Self-paced (e.g., U-Paced)
3 = Traditional, not specially designed course or program
4 = Other, don’t know
*check all that apply

**Course Content/Topic**
Variable Name: CRSTOPIC
What is the topic of the course?
Text entry

**Course in Plan of Study for Major**
Variable Name: CRSMAJOR
What kind of course is this?
1 = GER, required for degree
2 = Required for major
3 = Elective, Not required for major
Instructional and Course Design Characteristics


Learner Support

Variable Names: ICLEARNS3-ICLEARNS19a

17-items; 5-point Likert Scale; Range → (1) “Strongly Disagree” to (5) “Strongly Agree”

1. The introductory explanations on how to get started in the class were clear.
2. Course description included the purpose and format of the course.
3. Instructor provided students with adequate notice and time to acquire course materials.
4. Requirements for my interaction with the instructor, content, and other students was clearly explained.
5. Academic integrity or “code of ethics” was explained or a link included.
6. Online etiquette (or “netiquette”) guidelines and expectations for how to communicate and behave online was clearly stated.
7. I understood all components of the activities.
8. The instructions for the class were clear.
9. Expected outcomes for the course and the course activities were provided at the beginning of the semester.
10. Grading expectations (i.e., grading scale) were explained or provided within the syllabus.
11. Technologies required for the course were readily available, provided in the course site, and/or easily downloadable.
12. The course materials were easy to access (available online or easily downloaded for use offline).
13. The course design took full advantage of available tools and media.
14. Technologies were convenient or easily accessible when and where I needed to use them.
15. The materials included or had links to a clear explanation of the technical support available to me.
16. The materials included links to tutorials and resources that answer basic questions related to research, writing, and technology.
17. I had adequate support in completing my activities.

Design and Organization

Variable Names: ICDESIGN1 - ICDESIGN12a

12-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

1. Each reading assignment and activity helped me succeed in meeting the expected outcome.
2. The tools and media used were relevant to my achievement of the stated learning objectives.
3. Instructions on how to meet the expected outcomes were adequate and stated clearly.
4. The instructor helped me make connections between course materials and real world experiences.
5. The course had technologies and resources that supported my learning.
6. Course activities helped me understand fundamental concepts.
7. Course activities built relevant skills that were useful outside of the course.
8. The course was well-organized.
9. Course content was organized in a logical format.
10. Topics were clearly identified, and subtopics were related to topics.
11. I understood the layout of course.
12. Navigation throughout the online components of the course was logical, consistent, and efficient.

Content Design and Delivery

Variable Names: ICCONTENT1a – ICCONTENT3a

3-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

1. Instructional materials have sufficient breadth, depth, and currency for me to learn the subject.

2. The materials included current online materials (online articles, webpages, links, and/or videos).

3. The materials included rich online materials, such as videos and images.

Interactivity with Instructor

Variable Names: ICACTIVITYINST1 – ICACTIVITYINST11a

11-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

1. The instructor facilitated learning in the course.

2. The instructor effectively communicated ideas and information.

3. The instructor showed interest in my learning.

4. The instructor helped us understand the importance of course topics and how they were related to learning outcomes.

5. The instructor actively strived to keep course participants engaged and participating in productive dialogue.

6. The instructor encouraged us to explore new concepts throughout the course.

7. The instructor helped focus online discussions on relevant issues.

8. The feedback I received from the instructor was detailed and meaningful.

9. The instructor asked questions and provided new content to facilitate discussions.
10. The instructor provided summaries particularly at the end of topic, modules, or lessons.

11. I was prompted by my instructor to expand on relevant points.

Interactivity with Peers

Variable Names: ICACTIVITYPEER1a - ICACTIVITYPEER5a

5-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

1. I had the opportunity to introduce myself to others.

2. I completed an “Ice-breaker” activity or other orientation session to get acquainted with my peers

3. At the beginning of the course, I was provided an opportunity to introduce myself to others and develop the sense of community.

4. I participated in a group activity.

5. Learning activities facilitated and supported learning that was active, encouraging frequent and ongoing engagement with other students.

Assessment and Evaluation

Variable Names: ICASSESS1 - ICASSESS16a

16-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

1. The syllabus was easily located and included objectives, our expected outcomes, and completion requirements.

2. The objectives and outcomes of the course were clearly defined.

3. Activities were clearly defined.

4. Expectations of my participation (frequency and quality) were included in the syllabus or online.

5. I received detailed instructions and tips for completing assignments.

6. The grading policy was stated clearly.
7. Expected student learning outcomes were specific, well-defined, and measurable.

8. I was provided ample opportunity to show what I learned in different ways.

9. Due dates for all assignments were provided.

10. I understood what was expected of me.

11. The assessment of my progress was effective.

12. The method of grading my performance was clear.

13. Rubrics for assignments that identify guidelines were provided.

14. Graded assignments measured the stated learning objectives or outcomes and were consistent with the course.

15. Clear standards were set for the instructor’s posting of grades, activities, and resources.

16. Graded assignments were appropriately timed within the length of the course, varied, and appropriate to the content being assessed.
Open-Ended Qualitative Questions

Variable Names: ICLEARNSQ1 - ICLEARNSQ2

Q1. Where would you recommend an institution or program invest resources to better serve you as a student taking blended or online courses? Why?

Q2. What support services would you like your campus to offer its online students?

Variable Names: ICCONTEXTQ1

Q1. What practices can an instructor implement in order to help you succeed in an online or blended course?

Variable Names: ICSTDTQ1-2

Q1. Think of a time in which you’ve taken an online or blended course. Explain an experience that influenced your success.

Q2. What are the necessary components of a successful online/blended course?

Variable Names: LRNSUPPQ1 - LEARNSUPPQ2

Q1. Where do you most often find support for your blended or online classes that is most useful? Please describe in some detail.

Q2. In what support services would you recommend an institution or program invest resources to better serve you as a student taking blended or online courses? Why?
Student Outcomes

Learning and Performance
Variable Names: LEARN1-LEARN5a; PERFORM1-PERFORM3a
8-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

LEARN
1. The course allowed me to better understand concepts.
2a. The course helped my understanding the course material.
3a. The course made it easy to connect ideas together.
4a. The course helped me think more deeply about course material.
5a. The course was beneficial to my learning.

PERFORM
1. The course activities helped my get a better grade.
2. My experience in the course helped me do better on my exams and other assignments.
3a. I got higher scores on my assignments because of my experiences in the course.

Satisfaction
Variable Names: SATIS1-SATIS7a
7-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”
1. I would take another online course.
2. I would recommend that the instructor continue teaching this course online.
3. I liked this course delivered online.
4a. Participating in this online course was a useful experience.
5a. Getting online to access the course was easy.
6a. Technical support was available when I needed it.
7a. I had little problems in the online environment.

**Original Student Outcomes**

**Learning**

Variable Names: LEARN1 - LEARN10

10-items; 5-point Likert scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

1. The class allowed me to better understand concepts.
2. The class did not help me to understand concepts better. (r)
3. The class helped me understand the course material.
4. The class made it easy to connect ideas together.
5. The class helped me think more deeply about course material.
6. The class did not help my learning. (r)
7. The class did not make it easier for me to understand the course material. (r)
8. I was not able to better understand course concepts. (r)
9. The class was beneficial to my learning.
10. The class had little impact on my learning. (r)

**Satisfaction**

Variable Names: SATIS1 - SATIS13

13-items; 5-point Likert scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

1. I would take another online course.
2. I would recommend that the instructor continue teaching this course online.
3. I liked this course delivered online.
4. I would not recommend this course to a friend. (r)
5. Participating in this online course was a useful experience.
6. It was difficult to access the online course. (r)
7. Getting online to access the course was easy.
8. Technical support was available when I needed it.
9. I needed better technical support. (r)
10. I had little problems in the online environment.
11. I sometimes had difficulty online. (r)
12. I would avoid classes that are online in the future. (r)
13. I would not recommend this course to a friend. (r)

**Open-Ended Qualitative Question**

Variable Names: PERFORMQ1

Q1. How would you classify your performance in this course (i.e., grades)?

Variable Names: SUCCESQ1 - SUCCESQ4

Q1. What strategies did you use to help yourself succeed in the online course?
Q2. What strategies would you recommend to another student taking an online course about how to be successful?
Q3. What does it mean to you to be a successful student?
Q4. Beyond grades and earning credits, what else is helpful for identifying your degree of success?
Data Codebook

List of Student Survey Variables, Measures, Definitions, Coding, and Associated Instrumentation

*Note: The codebook will be revised based on feasibility determined during data collection. Survey data will be merged with institutionally warehoused data and possibly experimental where applicable.

Demographics Survey Codebook

<table>
<thead>
<tr>
<th>Variable ID</th>
<th>Measure ID</th>
<th>Definition</th>
<th>Label</th>
<th>Coding</th>
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</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Sex</td>
<td>biological sex at birth note: IPEDS refers to as biological sex</td>
<td>SEX</td>
<td>Match to IPEDS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0=Male</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1=Female</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2= Intersex</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3=Prefer not to respond</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>99=Unknown</td>
</tr>
<tr>
<td>Gender</td>
<td>Gender</td>
<td>student gender to which they identify note: IPEDS only has biological sex</td>
<td>GEN</td>
<td>Match to IPEDS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0=Men</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1=Women</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2=Transgender</td>
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<tr>
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<td></td>
<td></td>
<td>3=Non-binary and/or non-conforming</td>
</tr>
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<td>4=Prefer not to respond</td>
</tr>
<tr>
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<td></td>
<td>99=Unknown</td>
</tr>
<tr>
<td>Age</td>
<td>Age</td>
<td>student age, numerical</td>
<td>AGE</td>
<td>Match to FAFSA</td>
</tr>
<tr>
<td>-----</td>
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<td></td>
<td></td>
<td>Numerical age (after calculating based on birthday, xx/xx/xxxx matching FAFSA)</td>
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<tr>
<th>Ethnicity</th>
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<th>student reported ethnicity</th>
<th>ETH</th>
<th>0 = Non-Hispanic</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Hispanic</td>
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<td></td>
<td></td>
<td>99 = Unknown</td>
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<tr>
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<th>RACE</th>
<th>Match to IPEDS</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = American Indian or Alaska Native</td>
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<td>2 = Asian, Asian American, Southeast Asian</td>
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<td></td>
<td></td>
<td>3 = Black or African American</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>4 = Native Hawaiian or Other Pacific Islander</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>5 = White</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 = Two or more races</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>98 = I prefer not to say</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>99 = Unknown</td>
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</tbody>
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<table>
<thead>
<tr>
<th>First Generation</th>
<th>Mother, Parent 1 Education Level</th>
<th>student report of mother's highest level of education achievement</th>
<th>MEDUC</th>
<th>1=Middle school/Jr. high</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2=High school</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3=College or beyond</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>98 = Prefer not to say</td>
</tr>
<tr>
<td>Variable</td>
<td>Description</td>
<td>Code</td>
<td>Notes</td>
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</tr>
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<td>-------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
<td>--------------------------------------------</td>
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</tr>
</tbody>
</table>
| Father, Parent 2 Education Level | student report of father's highest level of education achievement | FEDUC | 1=Middle school/Jr. high  
2=High school  
3=College or beyond  
98 = Prefer not to say  
99=Other/unknown match to FAFSA |
| Income | Family Income | household income student was raised in | FAMINC | continuous, match to FAFSA |
| Income | Student Income | student’s current income | STUINC | continuous, match to FAFSA |
| Pell Grant Eligible | | | PGE | Yes = 1  
No = 0  
Prefer not to say = 98  
Unknown = 99  
*possibly match to SIS |
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Code</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>Orphan</td>
<td>self-report of orphan status, parents deceased</td>
<td>ORPHAN</td>
<td>match to SIS, FAFSA coding</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Yes=1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No= 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unknown=99</td>
</tr>
<tr>
<td>Marital status</td>
<td>self-report of marital status</td>
<td>MARSTAT</td>
<td>match to SIS, FAFSA coding</td>
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<td></td>
<td>I am single=1</td>
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<td></td>
<td>I am married=2</td>
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<td>I am separated=3</td>
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<td></td>
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<td></td>
<td>I am divorced or widowed=4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>I prefer not to say = 98</td>
</tr>
<tr>
<td>Grade Level</td>
<td>self-report of student grade level</td>
<td>GRDLVL</td>
<td>1 = Freshman</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 = Sophomore</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 = Junior</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4 = Senior</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5 = Graduate Student</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>97 = Other</td>
</tr>
<tr>
<td>Time Commitments</td>
<td>self-reported hours worked/week</td>
<td>WRKHIRS</td>
<td>continuous (hours worked last week), don't know or none</td>
</tr>
</tbody>
</table>
| Employment Type          | self-reported employment status | EMPSTAT | 1= Unemployed, not looking for work  
                      |                                   |         | 2= Unemployed, looking for work  
                      |                                   |         | 3= Part time  
                      |                                   |         | 4= Full time  
                      |                                   |         | 99= Unknown  
                      | *possibly match to SIS            |
|-------------------------|---------------------------------|---------|----------------------------------|
| Student Type            | self-reported student status    | STUTYPE | 1= Less than part time  
                      |                                  |         | 2= Part time  
                      |                                  |         | 3= Full time  
                      |                                  |         | 4= Overload  
                      |                                  |         | 99= Unknown  
                      | *possibly match to SIS            |
| Credit Hours            | self-reported number of credits | CDTHRS  | Continuous (number of credits enrolled last semester) or don't know  
| Disability Instrument Filter | Self-reported disability (to cue disability instrument if response is yes) | DISACCOM | Yes = 1  
                      |                          |         | No = 0 (skipped out of disability instrument)  
| Functional impairment   | Cognitive                       | IMPCOGN1 - IMPCOGN12 | 12 items  
                      |                          |         | Yes/No Responses  
                      |                          |         | 0 reverse coded  

DETA Research Toolkit 2.1 | 2020.11.17
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Items</th>
<th>Type</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Sensory</td>
<td>Self-reported sensory impairment</td>
<td>IMPSENS1 - IMPSENS3</td>
<td>3 items</td>
<td>Yes/No Responses, 0 reverse coded</td>
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<tr>
<td>Behavioral</td>
<td>Self-reported behavioral impairment</td>
<td>IMPBEHV1 - IMPBEHV9</td>
<td>9 items</td>
<td>Yes/No Responses, 0 reverse coded</td>
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<td>Motor</td>
<td>Self-reported motor impairment</td>
<td>IMPMOTOR1 - IMPMOTOR4</td>
<td>4 items</td>
<td>Yes/No Responses, 0 reverse coded</td>
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<tr>
<td>Assistive technology</td>
<td>Computer Access Filter Question</td>
<td>Self-reported need for computer access aid</td>
<td>COMPACC</td>
<td>Yes = 1, No = 0 (skipped to next section)</td>
</tr>
<tr>
<td></td>
<td>Computer Access Aid</td>
<td>Self-reported use of computer access aid</td>
<td>ATCOMP1 - ATCOMP22</td>
<td>22 items, Yes/No Responses, 0 reverse coded</td>
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<tr>
<td></td>
<td>Communication Aid Filter Question</td>
<td>Self-reported need for communication aid</td>
<td>COMMAID</td>
<td>Yes = 1, No = 0 (skipped to next section)</td>
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<tr>
<td></td>
<td>Communication Aid</td>
<td>Self-reported use of communication or hearing and listening aid</td>
<td>ATCOMM1 - ATCOMM20</td>
<td>20 items, Yes/No Responses, 0 reverse coded</td>
</tr>
<tr>
<td>Filter Question</td>
<td>Self-reported need for mobility aid</td>
<td>MOBAID</td>
<td>Mobility Aid Filter Question</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-------------------------------------</td>
<td>------------</td>
<td>---------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Mobility Aid</td>
<td>self-reported use of transportation aid, prosthetics or orthotics, or mobility aid</td>
<td>ATMOBIL1 - ATMOBIL5</td>
<td>5 items Yes/No Responses 0 reverse coded</td>
<td></td>
</tr>
<tr>
<td>Other Modification Filter Question</td>
<td>Self-reported need for other modifications</td>
<td>OTHMOD</td>
<td>Yes = 1 No = 0 (skipped to next section)</td>
<td></td>
</tr>
<tr>
<td>Other Modification</td>
<td>self-reported use of personal aide, interpreter, or tutor</td>
<td>ATOTH1 - ATOTH5</td>
<td>5 items Yes/No Responses 0 reverse coded</td>
<td></td>
</tr>
<tr>
<td>Prior academic achievement</td>
<td>Current overall GPA self-reported student overall or cumulative GPA</td>
<td>OVERGPA</td>
<td>Continuous (0-4.0, recorded to 3 decimal points (e.g. 3.333)) or don't know *possibly match to SIS</td>
<td></td>
</tr>
<tr>
<td>Current major GPA</td>
<td>self-reported student GPA within their major</td>
<td>MAJORGPA</td>
<td>continuous (0-4.0, recorded to 3 decimal points (e.g. 3.333)) or don't know *possibly match to SIS</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>Code</td>
<td>Details</td>
<td></td>
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<tr>
<td>---------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------</td>
<td>-------------------------------------------------------------------------</td>
<td></td>
</tr>
</tbody>
</table>
| Degree completion progress| Credits towards or percentage of degree completed                            | DEGPROG1-2 | 2 items
1 = 0-25%
2 = 26-50%
3 = 51-75%
4 = 76-99%
5 = 100%
DEGPROG2 continuous or don’t know |
| Native English speaker    | Native English speaker self-reported as English as the student’s first language | ENGLISH | 1 = Yes
0 = No
*possibly match to SIS |
| Disability                | Physical disability self-reported physical disability                       | PHYSDIS | 1 = Yes
0 = No
*possibly match to SIS |
|                           | Learning disability self-reported learning disability                        | LRNDIS | 1 = Yes
0 = No
*possibly match to SIS |
| Mental illness            | Mental illness self-reported mental illness                                   | MENILL | 1 = Yes
0 = No
*possibly match to SIS |
| Disability indicator | Dichotomous variable indicating whether the student self-identifies as an individual with a disability or it is captured in SIS data | DISABILITY | 1 = Yes  
0 = No |
Demographics Student Information System Codebook

*Note: The codebook will be revised based on feasibility determined during data collection. Institutionally warehouse data will be merged with experimental and survey measures.

<table>
<thead>
<tr>
<th>Variable ID</th>
<th>Measure ID</th>
<th>Definition</th>
<th>Label</th>
<th>Coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Gender</td>
<td>Male/female/unknown (transgender collapsed into “unknown” due to low numbers)</td>
<td>IGEN</td>
<td>Match to IPEDS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1=Male</td>
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<tr>
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<td></td>
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<td>2=Female</td>
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<td>99=Unknown</td>
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<td>Age</td>
<td>Birthday</td>
<td>month and year of birth</td>
<td>IAGE</td>
<td>Match to FAFSA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Numerical age (after calculating based on birthday)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Numerical age (after calculating based on birthday, xx/xx/xxxx matching FAFSA)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Ethnicity</td>
<td>Hispanic/Not Hispanic/Unknown</td>
<td>IETH</td>
<td>Not Hispanic = 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hispanic = 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unknown = 99</td>
</tr>
<tr>
<td>Race based on IPEDS2 classification</td>
<td>IRACE</td>
<td>Match to IPEDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------</td>
<td>----------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = American Indian or Alaska Native</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = Asian</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = Black or African American</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 = Native Hawaiian or Other Pacific Islander</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 = White</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 = Two or more races</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>99 = Unknown</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| First Generation | Mother, Parent 1 Education Level | mother's or parent 1 highest level of education achieve | IMEDUC | 1=Middle school/Jr. high |
|                 |                                 |                                                        |       | 2=High school |
|                 |                                 |                                                        |       | 3=College or beyond |
|                 |                                 |                                                        |       | 99=Other/unknown |

| Father, Parent 2 Education Level | father's or parent 2 highest level of education achieve | IFEDUC | 1=Middle school/Jr. high |
|                                 |                                                        |       | 2=High school |
|                                 |                                                        |       | 3=College or beyond |
|                                 |                                                        |       | 99=Other/unknown |

match to FAFSA
<table>
<thead>
<tr>
<th>Income</th>
<th>Family Income</th>
<th>household income student was raised in</th>
<th>IFAMINC</th>
<th>continuous, match to FAFSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Income</td>
<td>student's current income</td>
<td>ISTUINC</td>
<td>continuous, match to FAFSA</td>
<td></td>
</tr>
</tbody>
</table>
| Pell Grant Eligible |                  | IPGE        | Yes = 1  
|                  |                  |            | No = 2     
<p>|                  |                  |            | Unknown = 99 |
|                 |                  |            | *possibly match to SIS |
| Orphan          | orphan or foster status/independent | IORPHAN | match to SIS, FAFSA coding |
| Marital status  | marital status  | IMARSTAT  | match to SIS, FAFSA coding |
| Prior academic achievement | Current overall GPA | IOVERGPA | continuous or don’t know |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Class rank</td>
<td>student class rank</td>
<td>ICLASSRNK</td>
<td>continuous or don’t know</td>
<td>*possibly match to SIS</td>
</tr>
<tr>
<td>Current major GPA</td>
<td>student GPA within their major</td>
<td>IMAJORGPA</td>
<td>continuous or don’t know</td>
<td>*possibly match to SIS</td>
</tr>
<tr>
<td>Degree completion</td>
<td>student progress toward degree</td>
<td>IDEGPROG</td>
<td>continuous</td>
<td></td>
</tr>
<tr>
<td>completion progress</td>
<td>completion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native English speaker</td>
<td>Native English speaker</td>
<td>IENGLISH</td>
<td>1 = Yes</td>
<td>*possibly match to SIS</td>
</tr>
<tr>
<td>Disability</td>
<td>Physical disability</td>
<td>IPHYSDIS</td>
<td>1 = Yes</td>
<td>*possibly match to SIS</td>
</tr>
<tr>
<td>Course Characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course level</td>
<td>Course level</td>
<td>Freshman through Graduate level course</td>
<td>ICRSLEVE</td>
<td>Freshman = 1</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
<td>---------------------------------------</td>
<td>----------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sophomore = 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Junior = 3</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Senior = 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Graduate = 5</td>
</tr>
<tr>
<td>Mode</td>
<td>Face-to-face, Blended, Online</td>
<td>F2F, blended, online</td>
<td>ICRSMODE</td>
<td>Face-to-face = 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Online = 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Blended = 2</td>
</tr>
</tbody>
</table>

**Student Outcomes**

<table>
<thead>
<tr>
<th>Final course grade</th>
<th>includes incompletes, W, pass/fail, audits. Excludes penalty fee drops</th>
<th>IGRD_FIN</th>
<th>Coding provided by individual institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Completion</td>
<td>Passing grade in a course</td>
<td>ICOMP</td>
<td>0 = no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 = yes</td>
</tr>
<tr>
<td>Success</td>
<td>Student received a C or better in the course</td>
<td>ISUCC</td>
<td>0 = no</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 = yes</td>
</tr>
</tbody>
</table>
## Readiness Survey Codebook

### Student and Learner Characteristics

### Preparedness and Readiness

<table>
<thead>
<tr>
<th>Variable ID</th>
<th>Measure ID</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparedness and Readiness</td>
<td>Technology Access</td>
<td>student's self-reported preparedness or readiness for distance education based on access to technology and study environment</td>
</tr>
<tr>
<td></td>
<td>Online Work Skills</td>
<td>student's self-reported preparedness or readiness for distance education based on one’s beliefs about their skills proficiency, comfort with technology, or experience with technology - sometimes referred to as self-efficacy using technology or technology use</td>
</tr>
<tr>
<td></td>
<td>Social Technology Familiarity</td>
<td>student’s self-reported preparedness or readiness for distance education based on one’s beliefs about their familiarity with technology in general</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Label</th>
<th>Coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREPACCESS1 - PREPACCESS3</td>
<td>3-items “Strongly Disagree” to “Strongly Agree”</td>
</tr>
<tr>
<td>PREPWORSKILLS1 - PREPWORSKILLS15</td>
<td>15-items 5-point Likert scale “Strongly Disagree” to “Strongly Agree” 0 reverse coded</td>
</tr>
<tr>
<td>PREPSOCTECH1 - PREPSOCTECH5</td>
<td>5-items 5-point Likert scale “Very Frequently” to “Never” 0 reverse coded</td>
</tr>
<tr>
<td>Measure</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| Organization and Self-Directedness | Organization and Self-Directed is a measure of students' ability to approach tasks in an organized and goal-oriented way. Additionally, the measure assesses students' ability to direct and manage their own learning | PREPSDORG1 - PREPSDORG15 | 1 reverse coded (PREPORG5) | 15-items 5-point Likert scale “Strongly Disagree” to "Strongly Agree"
| Student Online Efficacy | student's self-reported beliefs about online learning | PREPONLINEEFF1-PREPONLINEEFF7 | 0 reverse coded | 7 items 5-point Likert scale “Strongly Disagree” to "Strongly Agree"
| Communication Competencies | | PREPCOMCOMP1-PREPCOMCOMP4 | | 4 items 5-point Likert scale “Strongly Disagree” to "Strongly Agree"
| Experimentation and Growth Mindset | student's self-reported belief about their ability to experiment, take risks, or grow/change - sometimes referred to as risk-taking or growth mindset | PREPMINDSET1-PREPMINSET14a | 4 reverse coded (PREPGROW6, PREPGROW7, PREPGROW8) | 14 items 5-point Likert scale “Strongly Disagree” to "Strongly Agree"
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Scale Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement Mindset</td>
<td>student’s self-reported belief of one’s ability to achieve</td>
<td>PREPACH3-PREPACH19a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17 items</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5-point Likert scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Strongly Disagree” to “Strongly Agree”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 reverse coded (PREPACH1 &amp; PREPACH2)</td>
</tr>
<tr>
<td>Student Socialization</td>
<td>student’s self-reported desire or need to socialize and interact</td>
<td>PREPSOCIAL1-PREPSOCIAL5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 items</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5-point Likert scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Strongly Disagree” to “Strongly Agree”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 reverse coded (PRPSOC11)</td>
</tr>
<tr>
<td>Social Competencies with Instructor</td>
<td></td>
<td>PREPSOCCOMPINST1-PREPSOCCOMPINST5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 items</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5-point Likert scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Strongly Disagree” to “Strongly Agree”</td>
</tr>
<tr>
<td>Social Competencies with Classmates</td>
<td></td>
<td>PREPSOCCOMPPEER1-PREPSOCCOMPPEER5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 items</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5-point Likert scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Strongly Disagree” to “Strongly Agree”</td>
</tr>
<tr>
<td>Student Outcomes</td>
<td>Perception of performance</td>
<td>student's self-reported perceptions of performance on assessments and overall in course</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Learning and Performance</td>
<td>Perception of learning</td>
<td>student's self-reported perceptions of learning</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>Satisfaction</td>
<td>student's self-reported satisfaction with course</td>
</tr>
</tbody>
</table>
### Instructional and Course Design Survey Codebook

#### Instructional Characteristics

<table>
<thead>
<tr>
<th>Variable ID</th>
<th>Measure ID</th>
<th>Definition</th>
<th>Label</th>
<th>Coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional characteristics</td>
<td>Learner support</td>
<td>Student report of perceptions of learner support, including course materials and guides to support</td>
<td>ICLEARNS3 - ICLEARNS19a</td>
<td>17 items 5-point Likert scale “Strongly Disagree” to “Strongly Agree” 0 reverse coded</td>
</tr>
<tr>
<td></td>
<td>Design and organization</td>
<td>Student report of perceptions of course design and organization</td>
<td>ICDESIGN1 - ICDESIGN12a</td>
<td>12 items 5-point Likert scale “Strongly Disagree” to “Strongly Agree”</td>
</tr>
<tr>
<td></td>
<td>Content design and delivery</td>
<td>Student report of perceptions of the course content and how it is delivered to students (student interaction with content)</td>
<td>ICCONTENT1a - ICCONTENT3a</td>
<td>3 items 5-point Likert scale “Strongly Disagree” to “Strongly Agree” 0 reverse coded</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>Code</td>
<td>Items</td>
<td>Scale Type</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------</td>
<td>-------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Interactivity with Instructor</td>
<td>Student report of perceptions of course interactivity with other students and the instructor</td>
<td>IACTIVITYINST1 - IACTIVITYINST11a</td>
<td>11</td>
<td>5-point Likert scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>“Strongly Disagree” to “Strongly Agree”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 reverse coded</td>
</tr>
<tr>
<td>Interactivity with Peers</td>
<td></td>
<td>IACTIVITYTYPEER1a- IACTIVITYTYPEER5a</td>
<td>5</td>
<td>“Strongly Disagree” to “Strongly Agree”</td>
</tr>
<tr>
<td>Assessment and evaluation</td>
<td>Student report of perceptions of assessments and evaluation</td>
<td>ICASSESS1 - ICASSESS16a</td>
<td>16</td>
<td>5-point Likert scale</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>“Strongly Disagree” to “Strongly Agree”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 reverse coded</td>
</tr>
<tr>
<td>Student Outcomes</td>
<td>Perception of learning</td>
<td>student's self-reported perceptions of learning</td>
<td>LEARN1 - LEARN10</td>
<td>10 items</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------</td>
<td>-------------------------------------------------</td>
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<tr>
<td>Learning</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5-point Likert scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Strongly Disagree&quot; to &quot;Strongly Agree&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 reverse coded (LEARN2, LEARN6-LEARN8, LEARN10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction</td>
<td>Satisfaction</td>
<td>student's self-reported satisfaction with course</td>
<td>SATIS1 - SATIS13</td>
<td>13 items</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5-point Likert scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Strongly Disagree&quot; to &quot;Strongly Agree&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 reverse coded (SATIS4, SATIS6, SATIS9, SATIS11 - SATIS13)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Course Characteristics Codebook

| Course Characteristics | Course Characteristics | Course Characteristics | CRSLEVEL | 1 = undergraduate 100-200 level (general education course)  
|                        |                        |                        |         | 2 = undergraduate 300 level or greater (course within major)  
|                        |                        |                        |         | 3 = undergraduate 100-200 elective  
|                        |                        |                        |         | 4 = undergraduate 300 level or greater elective  
|                        |                        |                        |         | 5 = graduate course  
| Course Level           | Course Level           | Student self-report of course level | CRSLEVEL | 1 = undergraduate 100-200 level (general education course)  
| Course Department      | Course Department      | Student self-report of department course is in | CRSDEPT | <dropdown list from Registrar>  
| Course Mode            | Course Mode            | Student self-report of course mode | CRSMODE | 1 = F2F  
|                       |                       |                          |         | 2 = Blended/Hybrid  
|                       |                       |                          |         | 3 = Online  
|                       |                       |                          |         | 4 = Other, describe.  
| Course/Program Design  | Course Design          | Optional Student self-report of course design | CRSDSIGN | 1= Competency-based education  
|                       |                         |                           |         | 2 = Self-paced (e.g., U-Paced)  
|                       |                         |                           |         | 3 = Traditional, not specially designed course or program  
|                       |                         |                           |         | 99 = Unknown  

DETA Research Toolkit 2.1 | 2020.11.17
<table>
<thead>
<tr>
<th>Course Content/Topic</th>
<th>Course content or topic</th>
<th>Student self-report of course topic or content</th>
<th>CRSTOPIC</th>
<th>Text entry</th>
<th>Recode by discipline?</th>
</tr>
</thead>
</table>
| Course in plan of study for major | Course within student plan of study or major requirements | Student self-report of whether course is related to major | CRSMAJOR | 1 = GER, required for degree  
2 = Required for major  
3 = Elective, not required for major |
Sample Interview Schedule

Study Research Question: What does an academic success coach do?

1. What does an academic success coach do?
   - What are your job responsibilities?
   - Describe a typical day of work as an academic success coach.
   - What is the most important part of your job? Why?
   - How do you know when your job has been accomplished?

2. A recent survey indicated that, on average, academic success coaches spend their time on curriculum, instruction, coaching, advising, mentoring, and assessment....
   - How would you define curriculum? What does “doing curriculum” look like? What sorts of tasks do you complete?
   - How would you describe coaching or advising? What does “doing coaching, advising, and mentoring” look like? What sorts of tasks do you complete?
   - How would you describe assessment? What does “doing assessment” look like? What sorts of tasks do you complete?
   - How would you describe instruction? What does “doing instruction” look like? What sorts of tasks do you complete?

3. What are the greatest challenges of being an academic success coach?
   - How do you overcome these challenges?

4. What role, do you think, an academic success coach plays that is different from:
   - Other student support services in traditional programs (tutoring, library, writing center, advising)?
   - Other instruction services in traditional programs (e.g., faculty)

5. In what ways do academic success coaches support students and their success?
   - What are the most common barriers to student success in CBE programs?
   - What do you do to facilitate student success in the face of these barriers?
How do you respond when a student is not progressing in their program?

6. What is an example of a situation where you thought you did your job well? What did you do?

7. What characteristics do the students who need your help share?

8. If you could provide three pieces of advice for a student in a CBE program, what would they be?

9. If you were to give advice to a prospective academic success coach, what advice would you provide?

10. Who is an academic success coach?

   What sorts of experiences or educational background would best prepare an academic success coach to do their job well?

   What are the skills needed to do your job effectively?

   What types of personality traits are required to do your job well? Why?

   What experiences led you to become an academic success coach?

11. How do academic success coaches define student success?

   From your perspective, what is student success?

   How do you think your students would define success in a CBE program?

   What is the key to student success?

   What are common reasons students do not succeed in CBE programs?

   In competency-based education, what questions should we be asking about student success and satisfaction?
Human Subjects Requirements

This document provides background on the human subject review process and pertinent information to obtaining IRB approval.

A. Quick Guide to IRB

DETA exempt human subjects’ narrative and overview

Waived informed consent

Sample waiver informed consent

Sample data sharing agreement

Note: The DETA Center has IRB approval and can facilitate approval of your study. There may not be a need for additional IRB approvals at your institution depending on your proposed study. The waiver of informed consent will be administered through the DETA Center survey and survey tool to participating institutions funded through the DETA grant awards. Other individuals and institutions may be included. Therefore, these materials may be informative and not require action. Each institution will most likely require a data sharing agreement for data submitted to the DETA Center for cross-institutional analysis.

Exempt human subjects’ narrative and overview

A. Human Subjects Involvement and Characteristics

Participation may involve:

Institutional partners in data mining studies, including data mining of student information system demographic and performance data

Institutional partners in survey studies, including student response data

Institutional partners in experimental studies where students will be randomly assigned into an experimental condition experiencing an instructional intervention or a comparison condition

B. Sources of Materials

Information gathered during data mining projects specifically for research purposes include historical data mined from the student information system for courses delivered
blended or online including (student demographic information, race/ethnicity, Pell grant eligibility, first generation status, cumulative GPA, composite ACT score or SAT equivalent, overall course grade, etc.).

Information gathered during survey research projects will include student survey responses including student demographic information, student perceptions of course and instructional characteristics, and student self-report of student outcomes, such as learning, performance, and satisfaction.

Information gathered during experimental research projects may include scores on any summative and formative assessments measuring learning.

C. Recruitment and Informed Consent

For the data mining studies, data sets will be obtained through data mining and not direct interaction with human subjects. Data sharing agreements between UWM and the other institutions will be in place. The research involves the collection and study of existing data and will be recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. A waiver of consent will be obtained.

For the student survey and experimental studies, instructors and their courses will be identified through sub-grant award institutions opting to participate in the study. The students associated with these classes or courses will be participating at sub-grant awardee locations. The research conducted will be in an established and commonly accepted educational settings, involving normal educational practices. A waiver of consent will be obtained.

D. Potential Risks and Protections

Risks to Confidentiality

This risk is unlikely given that all information gathered will be treated under the Human Subjects Review Board guidelines of confidentiality of research participant records. A unique code assigned to each participating student (rather than his/her name) and will be used to link data mined, such as a particular student’s demographic information, the student’s performance variables, and the student’s assessment. Instructors will be assigned a unique code as well. Survey data from students’ data and instructors will be
anonymous and coded. Also, it will be used if he/she is randomly selected and chooses to participate in the experimental studies.

E. Importance of the Knowledge to be Gained

The project will enhance our ability to conduct cross-institutional research and advance evidence-based practice in distance education and online learning ensuring student success through quality learning experiences.

F. Collaborating Site(s)

Milwaukee Area Technical College, University of Wisconsin-Extension, and sub-grant awardees.

Waiver of Requirement for Signed Form

An IRB may waive the requirement for the investigator to obtain a signed consent form for some or all subjects, if it finds either:

1. That the only record linking the subject and the research would be the consent document, and the principal risk would be potential harm resulting from a breach of confidentiality. Each subject will be asked whether the subject wants documentation linking the subject with the research, and the subject's wishes will govern; or

2. That the research presents no more than minimal risk of harm to subjects, and involves no procedures, for which written consent is normally required outside of the research context.

Survey collections of data from students typically meet this standard and are given waiver for a written consent. In such cases, a statement should be included on the consent form indicating that by continuing the survey, the student consents to participation.

In cases in which the documentation requirement is waived, the IRB may require the investigator to provide subjects with a written statement regarding the research.
Sample Waiver of Informed Consent

This waiver should be included at the beginning of a survey prior to the student starting the survey.

University of Wisconsin - Milwaukee

Consent to Participate in Online Survey Research

Study Title: Ensuring student success and access in distance education

Person(s) Responsible for Research: Tanya Joosten, Academic Affairs, UW-Milwaukee

Study Description: The purpose of this research study is to investigate student success in blended and online courses at UW-Milwaukee. This pilot project includes approximately xx instructors and xxx students in the overall sample. If you agree to participate, you will be asked to complete an online survey that will take approximately 30 minutes to complete. The questions will ask you about your experiences in your blended or online course.

Risks / Benefits: Risks to participants are considered minimal. Collection of data and survey responses using the internet involves the same risks that a person would encounter in everyday use of the internet, such as breach of confidentiality. While the researchers have taken every reasonable step to protect your confidentiality, there is always the possibility of interception or hacking of the data by third parties that is not under the control of the research team.

There will be no costs for participating. Benefits of participating include furthering knowledge about blended and online learning.

Confidentiality: Your student ID is collected online to match data files. Data will be retained on the Qualtrics website server for two (2) years and will be deleted after this time. However, data may exist on backups or serve logs beyond the timeframe of this research project. Data transferred from the survey site will be saved in an encrypted format for up to ten (10) years. Only the Principal Investigators and project staff will have access to the data collected by this study. However, the Institutional Review Board at UW-Milwaukee or appropriate federal agencies like the Office for Human Research Protections may review this study’s records. The research team will remove any individual identifying information before analyzing the data and all study results
will be reported without identifying information so that no one viewing the results will ever be able to match you with your responses.

**Voluntary Participation:** Your participation in this study is voluntary. You may choose to not answer any of the questions or withdraw from this study at any time without penalty. Your decision will not change any present or future relationship with the University of Wisconsin Milwaukee.

Who do I contact for questions about the study: For more information about the study or study procedures, contact XX at XX.

Who do I contact for questions about my rights or complaints towards my treatment as a research subject? Contact the UWM IRB at XXX-XXX-XXXX or XXXX@XXXX.edu

**Research Subject's Consent to Participate in Research:**

By entering this survey, you are indicating that you have read the consent form, you are age 18 or older and that you voluntarily agree to participate in this research study.

Thank you!
Other informed consent samples

Consent to Participate in the DETA CBE Coaching Interview Study

Study Title: Who are academic coaches? A qualitative exploration of the professional profiles and practices of academic coaches in competency-based education.

Person Responsible for Research: Tanya Joosten (PI), Ph.D., Director of Digital Learning Research and Development, Co-Director, National Research Center for Distance Education and Technological Advancements (DETA), at the University of Wisconsin-Milwaukee.

Study Description: The purpose of the study is to better understand the backgrounds and roles of coaches in competency-based education programs as part of an effort by the U.S. Department of Education. DETA is recruiting coaches to participate in this study, as it may assist institutions and programs in enhancing student success through coaching by identifying key factors that can have a positive influence.

If you agree to be in this study, you will be asked to participate in an interview about your experience as a coach that will take approximately 45 minutes.

Your interview will be treated confidentially. Neither your name nor your institution will be identified in any information published. Data from this study may be published in professional journals. Only data will be presented or published; no identifying information will be shared.

Risks / Benefits: Risks to participants are considered minimal. Collection of data and survey responses using the Internet involves the same risks that a person would encounter in everyday use of the Internet, such as breach of confidentiality. Although the researchers have taken every reasonable step to protect your confidentiality, there is always the possibility of interception or hacking of the data by third parties that is not under the control of the research team.

By completing this screening survey, you are stating that you are at least of 18 years of age and understand that any information about you will be treated in a confidential manner and that the data collected and the results obtained will be used for research purposes only. Your personal information will never be used to report any results of the projects. You understand that the records and data files related to this research project will be maintained in the DETA Center at UWM for a period no longer than ten
years and that only personnel directly associated with this project will have access to the data.

Voluntary Participation: Your participation in this study is voluntary. You may choose to not answer any of the questions or withdraw from this study at any time without penalty. Your decision will not change any present or future relationship with the University of Wisconsin Milwaukee.

You understand that you may refuse to participate in this study or withdraw at any time without penalty. You understand that you may be withdrawn from this study by the investigators if you do not meet the screening criteria. You understand that, should you withdraw or be withdrawn from the study, any information that you have provided will be destroyed.

Who do I contact for questions about the study: For more information about the study or study procedures, contact Tanya Joosten at tjoosten[at]uwm.edu.

Who do I contact for questions about my rights or complaints towards my treatment as a research subject? Contact the UWM IRB at 414-229-3173 or irbinfo[at]uwm.edu

By choosing "yes" to this screening survey you are indicating that you have read the consent form, you are age 18 or older and that you voluntarily agree to participate in this research study.

I agree to participate in this study:

Yes

No
Consent to Participate in the Online Learning Readiness Survey Study

Distance Education and Technological Advancements (DETA)

University of Wisconsin - Milwaukee (UWM)

Consent to Participate in Online Survey Research

Study Title: Understanding Online Student Success

Person Responsible for Research: Tanya Joosten (PI), Academic Affairs.

Study Description: The purpose of this research study is to examine online learning and student success. Approximately 800 subjects will participate in this study. If you agree to participate below, you will gain access to an online survey that will take approximately 30-45 minutes to complete. The questions will ask you about yourself and your experiences in your online course.

Risks / Benefits: Risks to participants are considered minimal. Collection of data and survey responses using the Internet involves the same risks that a person would encounter in everyday use of the Internet, such as breach of confidentiality. Although the researchers have taken every reasonable step to protect your confidentiality, there is always the possibility of interception or hacking of the data by third parties that is not under the control of the research team.

There is no cost to participate. There are no benefits to you other than to further research. Data will be retained on the website server for two years and will be deleted after this time. However, data may exist on backups or server logs beyond the time frame of this research project. Data transferred from the survey site will be saved in an encrypted format for two years. Only the PI and study staff will have access to the data collected. However, the Institutional Review Board at UWM or appropriate federal agencies like the Office for Human Research Protections may review records from this study. The research team will remove your identifying information prior to analyzing the data and all study results will be reported without identifying information so that no one viewing the results will ever be able to match you with your responses.

Voluntary Participation: Your participation in this study is voluntary. You may choose to not answer any of the questions or withdraw from this study at any time without
penalty. Your decision will not change any present or future relationship with your institution.

Who do I contact for questions about the study: For more information about the study or study procedures, contact Tanya Joosten, Ph.D., at tjoosten@uwm.edu

Who do I contact for questions about my rights or complaints towards my treatment as a research subject? Contact the UWM IRB at 414-229-3173 or irbinfo@uwm.edu

By entering this survey, you are indicating that you have read the consent form, you are age 18 or older, and you voluntarily agree to participate in this research study.

Thank You!
Sample Data Sharing Agreement

Data sharing agreement
between
DETA Research Center
and
“Your Institution”

This Data Sharing Agreement is entered into by and between the DETA Research Center (DETA) and “Your Institution,” as the recognized custodians of data contained within the student information system. The purpose of the agreement is to establish the content, use, and protection of data needed by DETA to conduct cross-institutional research as supported by the U.S. Department of Education FIPSE grant.

1.0 Period of Agreement

The period of this Agreement shall be in effect from December 20xx through the termination of the research at the end of the 20XX.

2.0 Intended Use of Data

The data being supplied to DETA from “Your Institution’s” student information system is intended for use in facilitating cross-institutional scientific research to improve distance education. The data will be used solely for this purpose and only for the duration of the project.

3.0 Constraints on Use of Data

Data supplied by “Your Institution,” to DETA and the contracted agent or collected by DETA and/or the contracted agent on behalf of the students is the property of “Your Institution.” Identifiable data shall not be shared with other parties external to DETA without the written permission of “Your Institution.” Student data shall not be sold or used, internally or externally, for any purpose not directly related to the scope of work defined in this agreement without the written permission of “Your Institution.”

4.0 Data Security
DETA shall employ industry best practices, both technically and procedurally, to protect “Your Institution’s” data from unauthorized physical and electronic access. Methods employed are subject to annual review and approval by UW-Milwaukee.

4.1 Data Elements

Data shared with DETA and the contracted agent shall be limited to the data elements specifically defined and authorized. If DETA, or the contracted agent, wishes to collect additional data, a written request must be submitted. Under no circumstances shall DETA or the contracted agent collect any information classified as Sensitive or Confidential without the express written approval. Data to be shared or collected shall be limited to the following elements:

#Name (first, middle, last)

^Student ID

4.2 Data Categories

The following definitions shall be used to classify data for security purposes:

#Normal: The least restrictive class of data. Although it must be protected from unauthorized disclosure and/or modification, it is often public information or generally releasable as “Directory Information” under University procedures for processing public records requests.

^Sensitive: This class includes data for which specific protections are required by law and are not releasable as “Directory Information.”

NOTE: While data may be releasable as “Directory Information,” when these elements are provided in combination, they may be used to compromise an individual’s identity. As such, both data categories must be properly secured and may not be shared with individuals outside of UWM and the contracted agent.

4.3 Data Handling Requirements

Data handling requirements may vary depending on the classification of data shared with DETA and the contracted agent. However, it is anticipated that most data shared with DETA and the contracted agent will involve a mix of data classes including normal and sensitive information. Therefore, whenever data elements are aggregated for
collection, transmission, or storage, the aggregate data shall be handled using the protocols that apply to the most sensitive data element.

5.0 Personnel

5.1 Access to Data

DETA and the contracted agent shall limit access to normal and sensitive data to those staff members with a well-defined educational or business need.

5.2 Security Training

DETA and the contracted agent shall provide periodic training for staff on internal security policies and procedures, and on applicable state and federal legal requirements for protecting data.

5.3 Prohibition on Mobile Devices and Removable Media

DETA and the contracted agent shall have a written policy prohibiting the transfer or storage of unencrypted student information on mobile devices or removable storage media for any reason. This policy shall be made available to each staff member individually and shall be strictly enforced.

6.0 Compliance with Applicable Laws and Regulations

DETA and the contracted agent shall comply with all applicable federal laws and regulations protecting the privacy of students, including but not limited to the Family Educational Rights and Privacy Act (FERPA).

7.0 Notification of Security Breaches

Wisconsin Act 138 (Section 895.507) delineates notification requirements in the event of a breach in the security of personal information. DETA and the contracted agent agree that in the event of any breach or compromise of the security, confidentiality or integrity of computerized data where personal information of a UW-Milwaukee student was, or is reasonably believed to have been, acquired and/or accessed by an unauthorized person, DETA and/or the contracted agent shall notify “your institution” of the breach of the system containing such data within 24 hours, comply with all notification actions, and/or assist UW-Milwaukee with all notification actions required by University policy and the law.
8.0 Amendments and Alterations to this Agreement

DETA, “your institution,” or the contracted agent may amend this Agreement by mutual consent, in writing, at any time.

9.0 Termination of Services

In the event either party terminates this Agreement, or the contracted agent ceases operation, all data collected in the course of providing the service shall be returned to “your institution.” DETA and the contracted agent shall certify in writing within five business days that all copies of the data stored on the agent’s servers, backup servers, backup media, or other media including paper copies have been permanently erased* or destroyed.

*“permanently erased” means the data have been completely overwitten and are unrecoverable. File deletions or media high level formatting operations do not constitute a permanent erasure.

By the signatures of their duly authorized representative below intending to be legally bound, agree to all of the provisions of this Data Sharing Agreement.

DETA Research Center
Milwaukee, WI 53202
By: 
Title: 
Telephone: xxx-xxx-xxx
Email: xxx@xxxxx.edu
Signature: 
Date:

Your institution
Address
Telephone
Email
By: Signing authority's name (potentially the registrar)
Title: Signing authority's title
Telephone: xxx-xxx-xxx
Email: xxx@xxxxx.edu
Signature: 
Date:
Section 5: Specific Research Models

Research models provide exemplars of research that is a priority in the field of distance education to immediately inform practice through exploration and replication of studies. The following have been identified has important research studies to be undertaken.
The majority of the research models were developed by DETA and/or in conjunction with research partners which include universities and colleges across the nation. Several of the research studies once they reached a largest enough sample to show power or rich enough data in their quality were published and/or still being conducted. Several of the studies have been underway since 2015 and continue to collect and analyze data. Other research models are new but have been identified by practitioners and researchers in the field. DETA encourages researchers to conduct research based on these models to support replication of studies, improvement of instrumentation, richness of data, and generalizability of results to enhance access and success for all students enrolled in a distance education course.
Study of Course and Instructional Design

**Problem of practice:** Since online learning continues to grow in higher education, there is increasing demand and need for demonstrable effective practices to ensure quality course and instructional design in online courses and programs. While many practitioners identify practices through the gathering of instructor experiences and anecdotes, there is a general lack of systematic, evidence-based evidence for practices that can be implemented by instructors. Further, there is a need to identify practices indicative of a quality course and also demonstrate the relationship of these practices with student outcomes. This means that the link between these instructional practices and student outcomes needs to be better understood.

**Purpose:** The primary objective of this study is to examine course and instructional design characteristics to identify key components that positively influence student outcomes. Instructional and course design characteristics are characteristics of course structure that influence student and instructor behaviors and student outcomes and are many times described as quality course indicators. A secondary objective is to understand if the relationships identified between these characteristics of online courses and student outcomes (satisfaction, learning) apply to all students, focusing particularly on underrepresented students. Underrepresented students in this study are defined as first generation, racial/ethnic minority, low-income, or students with disabilities.

**Justification:** Institutionally, identifying effective, evidence-based practices to ensure the quality of courses in higher education is pertinent to meeting the needs of students, requirements of academic programs, and federal standards. How courses are structured and students’ interactions within them can impact students’ success in those courses (e.g., higher grades, greater learning, and higher rates of completion). Additionally, these structures and experiences can also lead to higher satisfaction in online courses and online programs, which can impact students’ persistence, or continued enrollment in online courses.

**Research questions and/or hypotheses:** The specific questions that the researcher would like answered or addressed in the study.

RQ: Which course and instructional design characteristics demonstrate a significantly positive relationship with student outcomes in an online course?
Hypotheses: Students’ reports of course and design instructional characteristics will increase their perceptions of:

(H1a) learning,

(H1b) satisfaction, and

(H1c) academic performance (instructor-reported final grade retrieved from student information system [SIS] data) are positively associated with instructional characteristics, specifically: (a) learner support, (b) design and organization, (c) content design and delivery, (d) interactivity with instructors, (e) interactivity with peers, and (f) assessment and evaluation.

Methods:
Sample: Students enrolled in an online course in a program or at an institution.

Data Sources: 1.) a student survey where students’ report their online course experience specific to the course and instructional design and their student outcomes in the course, and 2.) the institutions’ SIS or learning management system (if integrated with the SIS).

Instrumentation:
Outcome Variables Instrumentation - Student satisfaction, learning+performance
Key Independent Variable Instrumentation - course and instructional design characteristics in six (6) areas: (a) learner support, (b) design and organization, (c) content design and delivery, (d) interactivity with instructors, (e) interactivity with peers, and (f) assessment and evaluation.

See instruction and course design survey instrument and codebook.

Procedures:
Student data should be collected via survey and extracted from the SIS at the end of the course. The sampling frame can include all students enrolled in one or all online courses offered in the term. Recruitment can take place via email based on data from the SIS (student name, email, course enrolled) and uploaded into Qualtrics. Survey would include informed consent as required by IRB, if pertinent.

Analysis technique: Multiple linear regression, MANOVAs.
Statistical analyses can include multiple linear regression analyses to examine course and instructional design characteristics [six measures described in the instrumentation above] as predictors of student outcomes [satisfaction and learning instrumentation and SIS-derived course grade]. More specifically, hierarchical regressions can be employed to statistically establish controls for student demographics [age, gender, academic performance (overall grade point average), ability (disability or impairment), income (low income or Pell grant eligible), race (minority status), and postsecondary generation (first-generation)]. Block one of the hierarchical regressions would be the known correlates between student demographics and student success in order to assess the unique associations between readiness measures and success, removing spurious relationships. The second block of the hierarchical regression would be the six measures of student readiness.

Three hierarchical regression models are run with the following outcomes: learning, satisfaction, and final grade, respectively.

Optionally, MANOVA can be used to examine any differences between the vector of means in the four (4) underrepresented groups for the final research question. MANOVAs are run with the six characteristics measures serving as the dependent variables and demographics of interest identifying underrepresented groups status serving as the four separate independent variables, including ability (disability or impairment), income (low income as indicated by Pell grant eligibility), race (minority status), and postsecondary education generation (first-generation status). These four dichotomous characteristics conceptualize the underrepresented populations of interest.

Study of Online Learning Readiness

Problem of practice: As distance education and online learning continue to grow in precedence and popularity in institutions of higher education (IHE), understanding how students’ readiness to be successful in an online learning environment, which is often referred to as online learning readiness, is critical to student success.

Purpose: The primary objective of this study is to understand what student characteristics are empirically linked to student success and in what areas instructors and institutions can support students. A secondary objective is to understand if the relationships identified between student characteristics of online readiness and outcomes (satisfaction, learning) apply to all students.

Justification: Instructional and institutional practices are implemented at IHEs to ultimately promote student success in online courses and programs. Yet, students who enroll in online courses have varying levels of readiness and preparedness (e.g., online work skills proficiency, self-directedness) that likely influence their success (grade, course completion) (see Hung, Chou, & Chen, 2010; Yeh et al., 2019).

Institutional efforts can include providing resources to help students assess whether they are ready to take an online course and offer suggestions for preparation. Beyond institution-provided support for online students, instructional efforts by faculty to support students may include activities instructors develop to assist students in evaluating their preparedness and readiness (e.g., assessment), gaining the needed skills to learn online (e.g., orientation), and managing their expectations about learning online (e.g., course tours and tips), which can help increase students’ chances for success in an online course. However, little research has empirically assessed which student characteristics for online readiness are associated with student success in order to better tailor support resources. Even less is understood about whether certain student groups have different relationships between readiness and success. Research can better inform these efforts and overcome some of the noted challenges of past research.
Research questions and/or hypotheses:

RQ 1: Which student characteristics of online learning readiness predict student outcomes in an online course?

H1: Online students’ learning (H1a), satisfaction (H1b), and academic performance (H1c) are positively associated with their online learning readiness (technology access, online work skills, social tech skills, online learning efficacy, self-directedness and organization, communication competence with instructor, communication competence with peers, general communication competence, growth mindset, achievement mindset)

RQ2: Which student characteristics of online learning readiness predict student outcomes in an online course for underrepresented students?

H2: Online underrepresented students’ learning (H2a), satisfaction (H2b), and academic performance (H2c) are positively associated with their online learning readiness (technology access, online work skills, social tech skills, online learning efficacy, self-directedness and organization, communication competence with instructor, communication competence with peers, general communication competence, growth mindset, achievement mindset)

RQ3: Which student characteristics of online learning readiness, if any, of underrepresented student populations are significantly different than those student characteristics of represented students?

Methods:

Sample: Students enrolled in an online course in a program or at an institution.

Data Sources: 1.) a student survey where students' report their online course experience specific to their own online learning readiness and their student outcomes in the course, and 2.) the institutions' SIS or learning management system (if integrated with the SIS).

Instrumentation: See online learning readiness survey instruments and codebooks with student outcomes (satisfaction, learning+performance)

Key Independent Variable Instrumentation: student characteristics in areas of online readiness: (technology access, online work skills, social tech skills, online learning efficacy, self-directedness and organization, communication competence
with instructor, communication competence with peers, general communication competence, growth mindset, achievement mindset)

Procedures: Student data should be collected via survey and extracted from the SIS at the end of the course. The sampling frame can include all students enrolled in one or all online courses offered in the term. Recruitment can take place via email based on data from the SIS (student name, email, course enrolled) and uploaded into Qualtrics. Survey would include informed consent as required by IRB, if pertinent.

Analysis technique: Multiple linear regression, MANOVAs

Statistical analyses can include multiple linear regression analyses to examine course and instructional design characteristics [six measures described in the instrumentation above] as predictors of student outcomes [satisfaction and learning instrumentation and SIS-derived course grade]. More specifically, hierarchical regressions can be employed to statistically establish controls for student demographics [age, gender, academic performance (overall grade point average), ability (disability or impairment), income (low income or Pell grant eligible), race (minority status), and postsecondary generation (first-generation)]. Block one of the hierarchical regressions would be the known correlates between student demographics and student success in order to assess the unique associations between readiness measures and success, removing spurious relationships. The second block of the hierarchical regression would be the six measures of student readiness.

Three hierarchical regression models are run with the following outcomes: learning, satisfaction, and final grade, respectively.

Optionally, MANOVA can be used to examine any differences between the vector of means in the four (4) underrepresented groups for the final research question. MANOVAs are run with the six characteristics measures serving as the dependent variables and demographics of interest identifying underrepresented groups status serving as the four separate independent variables, including ability (disability or impairment), income (low income as indicated by Pell grant eligibility), race (minority status), and postsecondary education generation (first-generation status). These four dichotomous characteristics conceptualize the underrepresented populations of interest.
Study of Coaching in Competency-Based Education

Problem of practice: In competency-based education, academic success coaches often are the primary contact person for students, yet little is known about the job position, those who occupy it, or what is needed for those in the position to do their job effectively.

Purpose: The purpose of this study is to explore the role of academic success coaches in competency-based education, especially in terms of their shared characteristics and job responsibilities.

Justification: Competency-based education is often designed as a self-paced approach to higher education. As a result, students tend to be assigned to one academic success coach (ASC) that assists them throughout the program. While ASC’s are not necessarily subject-matter experts, they tend to be the touchpoint for students who need assistance with their courses and the program. Given this influential role, there is a need to understand what characteristics make an effective academic coach, what the job responsibilities entail, the training that is needed for an ASC position, common challenges associated with the position, and what opportunities for improvement for the CBE ASC model should be considered. In doing so, the findings will help the higher education community understand the resources ASC’s need to do their job well and to help ensure that they are able to continue their integral role in helping students, especially adult learners, finish their degrees successfully.

Research questions and/or hypotheses:

RQ1: What does an academic success coach do?

RQ 2: In what ways do academic success coaches support students and their success?

RQ3: How do academic success coaches define student success?

RQ4: Who is an academic success coach?
Methods:

Sample - Coaches from a program or institution who support students in a competency-based education program.

Data Sources - Semi-structured virtual interviews conducted via zoom, video and audio recorded, text transcripts of the recordings

Instrumentation - Interview schedule developed on public reports from CBEN as to the role of coaches

See sample interview schedule.

Procedures - Study participants can be recruited directly or through an institutional or program connect. Participants should meet study criteria and an interview scheduled. Here is an example of criteria in a pre-interview survey:

“Coaches in CBE maintain an advisory relationship with a student, typically, throughout the student’s enrollment in a competency-based education program. Coaches may also be called mentors, academic coaches, academic success coaches, or student success coaches.

Are you a coach?

Yes | No | Other

Federal regulations define a direct assessment competency-based educational program as an instructional program that, in lieu of credit hours or clock hours as a measure of student learning, uses direct assessment of student learning relying solely on the attainment of defined competencies, or recognizes the direct assessment of student learning by others. The assessment must be consistent with the accreditation of the institution or program using the results of the assessment. Accreditation status means an institution or degree program is operating within or outside of the standards set by an accrediting body. The implications for competency-based education include access to federal financial aid for students. Experimental sites is a phrase used by the U.S. Dept. of Education to recognize institutional initiatives. Title IV of the U.S. Higher Education Act covers the administration of federal financial aid, including Pell grants and federal student loans.
Are you a coach in an online, accredited or experimental site, direct assessment CBE program that is Title IV eligible?

Yes | No | Other”

Prior to the interview, participants should be sent an informed consent form to complete. Participants were also sent information pertaining to Zoom, including basic resources for Zoom tutorials. Before the interview began, participants should be reminded that the interview is to be video and audio recorded, and they should be asked to verbally consent to the interview and informed of their rights as a study participant.

The interviews should be semi-structured to allow for some consistency across interviews while not impeding the organic responses of participants. Similar questions can be asked throughout each interview (see interview schedule) but the conversation was allowed to flow as it needed.

Each interview will last approximately 45 minutes and cover a range of questions related to academic coaching, competency-based education, and student success.

The recording of the interview should be transcribed for analysis. Rev is a service that DETA has used.

Analysis technique - Thematic Analysis

Following the transcription of the interviews, a thematic analysis should be employed (Taylor & Bogdan, 1989; Leininger, 1985). Inter-coder reliability can be ensured by utilizing a coding scheme that helped guide the analysis of the data and using multiple codes. From these interviews, the original objective, to understand the role of academic coaches in competency-based education, can be met.

For existing codes and themes, contact DETA.

Online Students use of Student Support Services

Problem of Practice: Institutions provide student support services to students taking online courses. Early research shows that online students are more likely to find support in family and friends than in institutional support services. There tends to be a challenge with traditional units of student support services providing their services to students at a distance. Moreover, students at a distance may have a different skill set with different needs. Student support influences access and learning effectiveness.

Purpose: The purpose of this study is to determine the relationship between the online support services that students receive and their persistence in online courses. By understanding the practices that are common in student support services for online students and how those practices are related to student success, effective practices can be identified to inform future practices.

Justification: Institutions of higher education are making large investments in student support services in distance education. Yet, there is little empirical data indicating that these services have a significant and positive relationship on student outcomes. Moreover, there is little national descriptive data as to the common practices used to support students enrolled in online courses.

Area of Inquiry: online education, academic support, student success, case study methodology

Research Questions: The research questions focus on developing a description of support services available for online students as well as the relationship between these services and student success. Moreover, the study looks to identify effective practices to inform the improvement and future development of support services for online students.

What current support services are available?
How do student services influence student success?
What are effective practices for student services?
Do student perceptions regarding their frequency of use or the effectiveness of student services positively impact student success*

*student success measured as: course grades, course completion, persistence, retention, and degree completion, student satisfaction, and student perception of learning.

Methods:

A case study methodology will be used as representation of various stakeholders' perspectives, including students, staff, faculty, and administration.

An empirical case study methodology will be used for this study. Case studies are in-depth investigations of a single person, group, event, or community. Typically, data are gathered from a variety of sources, using several different methods (e.g. institutionally warehoused data, observations & interviews). Within case study methodology, research may continue for an extended period of time, so processes and developments can be studied as they occur.

Data Collection: Quantitative and qualitative data will be collected from multiple sources. The exact quantitative data identified as available and needed to be collected will be determined as the study progresses. Qualitative data collection may also reveal new sources of data collection required. Data collection may include:

Survey data from students who utilize support services - identifying support services, self-reporting of frequency of use of services, usefulness/effectiveness of services

Student information system data - course grade, course completion, persistence, retention, completion

Content analysis of digital archives - learning management course sites, other technology platform data, learner analytics from the LMS, staff emails, institutional website, or digital communication with students

Content analysis of course document from instructors - syllabi, assignments, support materials, job descriptions of support staff personnel, training documentation of support staff personnel, policy and procedure documentation, and analysis of mission, goal, or vision documents of support units
Interviews, focus groups, or surveys with support staff, instructors, and students

Participant observation of meetings related to student support services - staff meetings, student meetings with student support staff

Participant observations of class sessions

Data Analysis: Due to the mixed methodological approach proposed in this study, quantitative and qualitative analysis techniques will be used to address the research questions proposed above. These may include:

Content analysis of documents pertaining to relevant student services

Thematic analysis of participant observer field notes

Thematic analysis of in-depth interviews or focus groups

Thematic analysis of open-ended survey questions

Statistical Analysis relating to surveys

Analysis of Variance (ANOVA, MANOVA)

Inferential Statistics (OLS Linear Regression, Block Model Regression)
Study of Adaptive Learning Technologies

Problem of practice: Adaptive Learning Technologies studies are indicating that certain adaptive learning technologies are positively influence student outcomes at institutions such as the University of Central Florida and Arizona State University. The technologies identified that have shown promise include McGraw Hill Education, ALEKS, and RealizeIt. In order to replicate these studies and potentially scale these practices, research needs to be conducted to better understand the intervention or practice in of itself (the dosage). Moreover, common variables need to be identified, how they are defined, and how they are measured needs to be aggregated to develop a common framework for pilot testing and scaling.

Purpose: The primary objective of this study is to examine how adaptive learning technologies can be implemented at the course level and within what contexts positively influence student outcomes. The instructional and course design characteristics of these along with the functionality of the technology create and structure and facilitate interactions that influence student outcomes. A secondary objective is to understand if the relationships identified between these characteristics of online courses and student outcomes (satisfaction, learning) apply to all students, focusing particularly on underrepresented students. Underrepresented students in this study are defined as first generation, racial/ethnic minority, low-income, or students with disabilities.

Justification: Institutionally, identifying effective, evidence-based practices to ensure the quality of courses in higher education in particular for new and emerging technologies that show promise, is pertinent to meeting the needs of students, requirements of academic programs, and federal standards. How courses are structured and students’ interactions within them can impact students’ success in those courses (e.g., higher grades, greater learning, and higher rates of completion). Additionally, these structures and experiences can also lead to higher satisfaction in online courses and online programs, which can impact students’ persistence, or continued enrollment in online courses.

Research questions and/or hypotheses: The specific questions that the researcher would like answered or addressed in the study
RQ1: Systematically reviewing the published literature on adaptive learning, which adaptive learning technologies when implemented into a blended or online course lead to increase in student outcomes? What are the features and functionality of these adaptive learning technologies? What student outcomes were identified and how were they measured?

RQ2: What course and instructional design characteristics [such as (a) learner support, (b) design and organization, (c) content design and delivery, (d) interactivity with instructors, (e) interactivity with peers, and (f) assessment and feedback] are common across the courses that have shown an increase in student outcomes?

RQ3: What institutional support was provided to these faculty or instructors to prepare their courses and themselves for using adaptive learning technologies?

**Methods:**

Systematic Protocol (to be published, January 2021)

Interviews

Procedures:

1.) Perform protocol.

2.) Develop interview schedule, identify experiences adaptive learning professionals, designers, researchers, and vendors to interview, schedule and conduct interviews. Analyze data.

3.) Informed on previous research and interview findings, design pilot study of adaptive learning technologies with the intervention clearly defined, steps in place to ensure fidelity of implementation, instrumentation to collect data on the course and instructional design and student outcomes.

4.) Design and replicate pilot study at 2+ institutions.

Study of Open Education Resources

Problem of practice: Open education resource (OER) studies are indicating that certain types or OER and/or practices and technologies surrounding or situating OER are positively influence student outcome. In order to replicate these studies showing promise and scale effective practices, research needs to be conducted to better understand the intervention or practice in of itself (the dosage). Moreover, common variables need to be identified, how they are defined, and how they are measured needs to be aggregated to develop a common framework for pilot testing and scaling.

Purpose: The primary objective of this study is to examine what type of OER can be used and how it can be implemented at the course level and within what contexts to positively influence student outcomes. The instructional and course design characteristics of these cases along with the functionality of the technology create and structure and facilitate interactions that influence student outcomes. A secondary objective is to understand if the relationships identified between these characteristics of online courses and student outcomes (satisfaction, learning) apply to all students, focusing particularly on underrepresented students. Underrepresented students in this study are defined as first generation, racial/ethnic minority, low-income, or students with disabilities.

Justification: Institutionally, identifying effective, evidence-based practices to ensure the quality of courses in higher education in particular for new and emerging practices and technologies (e.g., Pressbooks) that show promise, is pertinent to meeting the needs of students, requirements of academic programs, and federal standards. How courses are structured and students’ interactions within them and with the intervention can impact students’ success in those courses (e.g., higher grades, greater learning, and higher rates of completion). Additionally, these structures and experiences can also lead to higher satisfaction in online courses and online programs, which can impact students’ persistence, or continued enrollment in online courses.

Research questions and/or hypotheses: The specific questions that the researcher would like answered or addressed in the study

RQ1: Systematically reviewing the published literature on OER, which OER interventions when implemented into a blended or online course lead to increase
in student outcomes? What are the features and functionality of these OER technologies and practices? What student outcomes were identified and how were they measured?

RQ2: What course and instructional design characteristics [such as (a) learner support, (b) design and organization, (c) content design and delivery, (d) interactivity with instructors, (e) interactivity with peers, and (f) assessment and feedback] are common across the courses that have shown an increase in student outcomes?

RQ3: What institutional support was provided to these faculty or instructors to prepare their courses and themselves for using OER, if any?

Methods:

Systematic Protocol (to be published, January 2021)

Interviews

Procedures:

1.) Perform protocol.

2.) Develop interview schedule, identify experiences OER professionals, designers, researchers, and vendors to interview, schedule and conduct interviews. Analyze data.

3.) Informed on previous research and interview findings, design pilot study of an OER intervention clearly defined, steps in place to ensure fidelity of implementation, instrumentation to collect data on the course and instructional design and student outcomes.

4.) Design and replicate pilot study at 2+ institutions.


Study of Learning in Response to COVID-19

Problem of practice: Since COVID-19, a pandemic, results in the nation moving postsecondary education to a remote instruction model, faculty and administrators have been requesting information to evaluate remote instruction courses. Importantly, Hodges, Moore, Lockee, Trust, and Bond (2020, March 27th) made a clear argument as to why the difference between remote instruction and online learning is so important as “‘Online learning’ will become a politicized term that can take on any number of meanings depending on the argument someone wants to advance” (para 3). They continue by discussing how the inadequacies of remote instruction could be confused as online learning creating negative perceptions of online learning in an area that already is battling a stigma and discuss evaluating remote teaching. It is not the time to conduct comparative studies. It is time to follow recent data (see “Time for Class: COVID-19 Edition”) to identify how course design of any class, despite mode (remote, f2f, blended, or online) can influence student outcomes. As indicated in the “Delivering High-Quality Instruction Online in Response to COVID-19: A Playbook for Faculty” by the Online Learning Consortium and the Every Learner Everywhere Network, design is the first step providing foundation for developing an online course in emergent situations. There is a need to identify practices indicative of a quality course and also demonstrate the relationship of these practices with student outcomes. This means that the link between these course and instructional design practices and student outcomes needs to be better understood.

Purpose: The primary objective of this study is to examine course and instructional design characteristics to identify key components that positively influence student outcomes despite the mode of delivery. Instructional and course design characteristics are characteristics of course structure that influence student and instructor behaviors and student outcomes and are many times described as quality course indicators. A secondary objective is to understand if the relationships identified between these characteristics of online courses and student outcomes (satisfaction, learning) apply to all students, focusing particularly on underrepresented students. Underrepresented students in this study are defined as first generation, racial/ethnic minority, low-income, or students with disabilities.
**Justification:** Institutionally, identifying effective, evidence-based practices to ensure the quality of courses in higher education is pertinent to meeting the needs of students, requirements of academic programs, and federal standards. How courses are structured and students’ interactions within them can impact students’ success in those courses (e.g., higher grades, greater learning, and higher rates of completion). Additionally, these structures and experiences can also lead to higher satisfaction in online courses and online programs, which can impact students’ persistence, or continued enrollment in online courses.

**Research questions and/or hypotheses:** The specific questions that the researcher would like answered or addressed in the study

RQ: Which course and instructional design characteristics demonstrate a significantly positive relationship with student outcomes in an online course?

Hypotheses: Students’ reports of course and design instructional characteristics will increase their perceptions of:

(H1a) learning,

(H1b) satisfaction, and

(H1c) academic performance (instructor-reported final grade retrieved from student information system [SIS] data) are positively associated with instructional characteristics, specifically: (a) learner support, (b) design and organization, (c) content design and delivery, (d) interactivity with instructors, (e) interactivity with peers, and (f) assessment and evaluation.

**Methods:**

Sample: Students enrolled in ANY f2f, blended, hybrid, or online course in a program or at an institution.

Data Sources: 1.) a student survey where students’ report their online course experience specific to the course and instructional design and their student outcomes in the course, and 2.) the institutions' SIS or learning management system (if integrated with the SIS).

Instrumentation:

Outcome Variables Instrumentation - Student satisfaction, learning
Key Independent Variable Instrumentation – course and instructional design characteristics in six (6) areas: (a) learner support, (b) design and organization, (c) content design and delivery, (d) interactivity with instructors, (e) interactivity with peers, and (f) assessment and evaluation.

See instructional and course design survey and codebook.

Procedures: Student data should be collected via survey and extracted from the SIS at the end of the course. The sampling frame can include all students enrolled in one or all online courses offered in the term. Recruitment can take place via email based on data from the SIS (student name, email, course enrolled) and uploaded into Qualtrics. Survey would include informed consent as required by IRB, if pertinent.

Analysis technique: Multiple linear regression, MANOVAs

Statistical analyses can include multiple linear regression analyses to examine course and instructional design characteristics [six measures described in the instrumentation above] as predictors of student outcomes [satisfaction and learning instrumentation and SIS-derived course grade]. More specifically, hierarchical regressions can be employed to statistically establish controls for student demographics [age, gender, academic performance (overall grade point average), ability (disability or impairment), income (low income or Pell grant eligible), race (minority status), and postsecondary generation (first-generation)]. Block one of the hierarchical regressions would be the known correlates between student demographics and student success in order to assess the unique associations between readiness measures and success, removing spurious relationships. The second block of the hierarchical regression would be the six measures of student readiness.

Three hierarchical regression models are run with the following outcomes: learning, satisfaction, and final grade, respectively.

Optionally, MANOVA can be used to examine any differences between the vector of means in the four (4) underrepresented groups for the final research question. MANOVAs are run with the six characteristics measures serving as the dependent variables and demographics of interest identifying underrepresented groups status serving as the four separate independent variables, including ability (disability or impairment), income (low income as indicated by Pell grant eligibility),
race (minority status), and postsecondary education generation (first-generation status). These four dichotomous characteristics conceptualize the underrepresented populations of interest.


Section 6: Supplemental Information

DETA Publications and Media

As a result of DETA research and efforts:


Media and Blog Posts


Thompson, K., & Cavanagh, T. (July 5th, 2016). It is more about the social than the media.


TOPcast: Teaching Online Podcast, University of Central Florida. Retrieved from https://cdl.ucf.edu/topcast-s02e15/ [audio interview]


References


CSU Chico Rubric for Online Instruction. Retrieved from: [http://www.csuchico.edu/eoi/the_rubric.shtml](http://www.csuchico.edu/eoi/the_rubric.shtml)


Additional Experimental Design Resources

Fidelity

Because the intervention and comparison groups should only differ in terms of the manipulated variable (i.e., the intervention), it is important to:

1. Train the instructors to carry out the conditions with fidelity
2. Create a detailed manual to guide fidelity throughout the study
   [This is particularly important if you have the same instructor(s) teaching both the intervention and comparison students.]
3. Develop an implementation rubric
   [This will help you determine whether the critical differences distinguishing the intervention and comparison conditions are in place.]
4. Check fidelity throughout the study
   [It is incumbent upon the researcher to ensure the intervention and comparison conditions don’t drift and quality is maintained in both the conditions during the study.]

It is far better to detect fidelity problems during the study when corrections can be made than after the study. Approaches to checking fidelity in both the intervention and comparison groups might include:

- observing the intervention course sites and the comparison course sites/classes on specified days, scoring whether the features distinguishing the intervention from the comparison conditions are in place.

- observing the intervention course sites and the comparison course sites/classes on specified days, scoring whether the features that are intended to be held constant (e.g., equivalent content) across the intervention and comparison groups remain constant.

- rating digitally recorded interviews with the instructors on questions related to fidelity in both the intervention and comparison conditions at specified points in the semester.
surveying students in both the intervention and comparison groups during the semester to ascertain their course experiences relevant to fidelity.

monitoring email correspondence between the instructors and students for fidelity in both the intervention and comparison groups.

**Intervention Effects**

The final size of the sample (number of participants left after student drops/withdrawals) is critical to detecting intervention effects. The probability of detecting an effect (statistical power) is largely determined by the size of the effect you wish to detect and the size of the sample. The figures below explore the relationship between the effect size and sample size needed to achieve sufficient power (.80).

If we wish to detect a 2-point difference (4%) on a 50-item exam taken by both the intervention and comparison students and we expect a standard deviation in each course of about 2.0, then our effect size for the difference is 1.0.

<table>
<thead>
<tr>
<th></th>
<th>Intervention Course</th>
<th>Comparison Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Exam Score</td>
<td>36</td>
<td>38</td>
</tr>
<tr>
<td>Standard Deviation (SD)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Effect Size</td>
<td>1.0</td>
<td></td>
</tr>
</tbody>
</table>

\[
\text{Effect Size (d) = } \frac{M_1 - M_2}{SD}
\]

You can use the calculator provided below to determine effect size:
Now that we know our effect size for the anticipated difference is 1.0, the calculator below will determine the sample size needed for each course (n=17 in each group) to be 80% sure of detecting an effect if it exists.

Source: http://www.psychometrica.de/effect_size.html

Source: https://www.ai-therapy.com/psychology-statistics/sample-size-calculator
Q: What happens to the sample size needed if we hold our mean difference (M1 - M2 = 2), our significance level ($\alpha = .05$), and our power (.80) constant, but change our standard deviation to 3 for each course?

A: Our effect size drops to $d = .667$ and we now require 37 participants in each course to have an 80% chance of detecting a difference in performance between the courses if one exists.
Here's two that you can try:

(answers are in very small print - change the font size to check your answer).

Q: What happens to the sample size needed if we hold our mean difference \( (M_1 - M_2 = 2) \), our significance level \( (\alpha = .05) \), and our power (.80) constant, but change our standard deviation to 4 for each course? (Answer: Our effect size drops to .5 and our sample size needed per group becomes sixty-four.)

Q: What happens to the sample size needed if we change our mean difference to \( (M_1 - M_2 = 4) \), our significance level \( (\alpha = .05) \), and our power (.80) constant, and change our standard deviation to 4 for each course? (Answer: Our effect size rises to 1 and our sample size needed per group becomes seventeen.)

**Attrition**

In determining your total sample size it is important to realistically gauge likely attrition (participant loss) from your study, because high attrition may affect the ability to detect intervention effects. Historical data from the campuses that will be involved in your study or perhaps attrition rates reported in relevant studies could be valuable in projecting attrition. Consider the historical data below showing that in three of the four semesters, the intervention course had a significantly higher drop/withdrawal rate than the comparison course. Based on this information, the researcher projected that the drop/withdrawal rate would be higher in the intervention course than in the comparison course in the planned project. The drop/withdrawal differential in Spring 2014 was the lowest (9.4% - 6.5% = 2.9%), while the largest differential was between the intervention course in Spring 2014 and the comparison course in Fall 2015 (9.4% - 2.5% = 6.9%). Thus, using the drop/withdrawal rates from the historical data, a differential loss of approximately 3% to 7% between the intervention and comparison courses was projected. Projected drop/withdrawal rates less than 10% in both the intervention and comparison courses is good news because Shadish, Cook, and Campbell (2002) indicate that when effect size is high and attrition rates are below 10% there is likely little, if any, change in study conclusions due to attrition.
Historical Student Drop/Withdrawal Rates Used by Researcher to Project Attrition for the Planned Study

<table>
<thead>
<tr>
<th>Semester</th>
<th>Intervention</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring 2014</td>
<td>9.4%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Summer 2014</td>
<td>4.0%</td>
<td>7.3%</td>
</tr>
<tr>
<td>Fall 2015</td>
<td>8.4%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Spring 2015</td>
<td>8.8%</td>
<td>2.6%</td>
</tr>
</tbody>
</table>

If high overall attrition occurs in your study, the assistance of a statistical consultant may be necessary to determine how best to handle this problem. High overall attrition is problematic because it raises the prospect that the students who dropped or withdrew from the study/courses might differ from those who remained. The possibility that differences exist between students who dropped/withdraw and those who did not drop/withdraw needs to be examined whenever overall attrition is over 10%. In addition to overall attrition, differential attrition between the intervention and comparison groups must also be examined and, if found to be high, addressed statistically to avoid weakening the validity of conclusions.

Student drops and withdrawals should be considered failures when evaluating the effectiveness of the intervention relative to the comparison. Participant outcomes (e.g., the percentage of final grades denoting success) should be based on all students, regardless of whether they dropped or withdrew from the study.

Given that your final sample size is critical to the ability to detect intervention effects, you should incorporate procedures to maximize survey response rates. Typically, high response rates are achieved only through diligent effort. Repeated well-crafted reminders to complete study surveys are an absolute must. Attention should be paid to the visual design, content, and writing style used in reminders and in the survey. A personalized request sent to each participant to help by completing the survey may be necessary. Conveying the
reasons for and importance of completing the surveys may increase response rates. The response rate can also be maximized through the use of different approaches (e-mail messages, course news, telephone calls, postcards, letters, Tweets, other social media). It is important to be mindful of students’ privacy since some forms of communication are public beyond the course. Modest monetary incentives may also increase response rates.

Example Email Reminder for Entire Class

Dear Students,

This is a friendly reminder to complete Survey 3. The last day to complete the survey is **Sunday, December 22nd**. Please complete it as soon as possible -- it only takes 5 to 10 minutes!

Link for Survey 3: [INSERT LINK]

Remember, you will get extra credit for completing the survey - so don’t miss out! I really appreciate your participation as it is important to the research.

Example Email Reminder for Subgroup Who Did Not Complete Survey Yet – Use BCC

Hi Students,

You are receiving this email because you have not yet completed Survey 3 to count toward extra credit in your final grade. Please complete Survey 3 as soon as possible.

**Deadline:** Sunday, Dec. 22 by 11:59 p.m.

**Here’s the link for Survey 3:** [INSERT LINK]

It is important for our research and understanding of student learning.
Example Email Reminder for Individual Students

Hi Douglas,

I have a favor to ask. Could you take the third survey that is part of the study in your course? It would only take 5 to 10 minutes of your time, depending on how fast you complete it. You would help me, contribute to our understanding of X, and get extra credit toward your course grade. Here’s the link:

5 to 10 minutes of your time gets you the extra credit, and I would be so appreciative!

Only group responses are being looked at. No one will know your responses. You only gain and can’t lose anything by completing the survey. Could you please help me by taking the survey by 11:59pm on Sunday, Dec. 22?

Thank you!

Ethical Protection of Learners

Some research projects must secure Institutional Review Board (IRB) approval. This is a requirement, regardless of whether your study involves participants or not, because the DETA grant awards are made through our federally funded grant. It is always good to make sure ethical protections are in place, and the longer-term goal for all DETA funded projects is for you to disseminate the knowledge gained from your project. If you publish your study outcomes, you are supposed to have obtained IRB approval. If your institution does not have an IRB, we will facilitate preparation and submission of the required materials to UWM’s IRB. An example informed consent document is included in resources and tools.

Incorporating tailored versions of the following points, if applicable, into your IRB protocol and informed consent document, will assist you in obtaining IRB approval in a timely fashion. Clearly explain that students will be able to:

- decline to participate in the research and still enroll in the course(s).
- drop or withdraw from the course(s) in accordance with university drop/withdrawal deadlines and policies on tuition, without forfeiting any incentive offered. [The goal is to reduce/eliminate fear about losing
incentives that may deter learners from dropping either the comparison or intervention course when it may be in their best interest to do so.

withdraw from the research at any time without penalty (students may remain in the course even if they are no longer a study participant).

expect their information will be treated confidentially. [Unique codes rather than student names or other identifying information will be used to link students’ survey responses, final course grades, and other outcome measures.]

earn equivalent course credit (if extra credit is offered as an incentive for participation in your research) through an alternative option. [Offering an alternative way to earn course credit addresses the concern that students may feel coerced to participate in the research, particularly if you are studying your own students.]

For detailed information about protection of human subjects access: http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.html

Instructors

If possible, both the intervention and comparison conditions should be taught by the same instructors. Having different instructors teach each condition makes it impossible to distinguish the effects of the intervention from the effects of the instructors.

Equivalence of Grades

If final course grades are included as an outcome of your study, it is important to carefully examine whether the contributors to the final grades in the intervention and comparison groups are equivalent. For example, if the grading scheme in the intervention course includes extra credit and the grading scheme in the comparison course does not include extra credit, this might inflate the final course grades in the intervention course. One way to try to equate the grades might be to remove the extra credit and recalculate the final grades accordingly. You may also have to devise ways to try to equate grades, when there are subjectively graded components (e.g., participation, discussion posts, papers) contributing to the final grade in one course and not in the others, particularly if these components were graded without the benefit of a rubric. Because
subjectively graded contributors to final course grades typically have a narrower range of grades skewed toward the higher end of the grade distribution than objectively graded contributors (e.g., exams), they tend to increase final course grades. If you are in the planning stages of your study, you may be able to control the grading components so they are equivalent. If this is not possible, or if you are using pre-existing final grade data, a possible way to try to equate the grades would be to remove the subjective grading components and recalculate the final grades accordingly.

**Measure Perceptions at More than One Time Point**

Measuring perceptions at two or more points in time (e.g., beginning and end of the semester) for both the intervention and comparison groups in your study is advantageous. With two or more measurements separated by time, meditational analyses can be performed that could potentially reveal the underlying mechanism/mediator of the intervention effects. Understanding not only that an intervention works, but why it works is critically important as this knowledge can help to meaningfully shape new distance education and technological innovations.

Besides allowing statistical analysis of mediators/mechanisms underlying an intervention’s effectiveness, a fuller understanding may emerge from measuring learner perceptions at two or more points in time. A one-shot measurement may reveal a difference between the intervention and comparison groups. However, with at least two measurement time points there is the possibility of detecting change due to the intervention. Clearly, demonstrated change in perception is a more valid measure (of change) than learners’ retrospective report that change occurred. Whenever possible, measure change in perception rather than perception of change.

Figures Illustrating the Importance of Measuring Perceptions at More than One Time Point
Figure A below shows a difference in students' sense of control, with students in the Intervention course reporting more perceived control than students in the Comparison course. At first glance, one may be tempted to prematurely conclude the Intervention led to this difference between the groups. But, without knowing students’ ratings of perceived control in the beginning of the semester, we do not know whether this assertion is correct as will become clear in Figures B-E.

Figures B-E depict ratings of perceived control at the beginning (Time 1) and end of the course (Time 3) for the intervention and comparison students. [Note that the data that created the difference displayed in Figure A was used to create the data for Time 3 in Figures B-E. With the same difference at Time 3, you would come to four different conclusions from the figures below depending upon the data from Time 1]. These figures show that knowing a difference exists between the groups at Time 3 in perceived control is not enough to fully understand the meaning of the difference. Figure B indicates the difference between the Intervention and Comparison students existed from the start. The intervention did not change students' perception of control. While in Figure C, improvement from Time 1 to Time 3 was shown for students in both the Intervention and Comparison courses. In Figure D, the data indicate that only the Intervention students improved in perception of control, while in Figure E, only the Comparison students decreased in perception of control.
Testing a Mediator of an Intervention Requires Measurement at More than One Point in Time

Although you may read published journal articles with one measurement time point that purport to have identified the mediator of an intervention, a true test of mediation requires more than one time point. Maxwell, Cole, and Mitchell’s figure below shows the importance of using multiple time points. The possible indirect effects of X on Y are depicted over time. All cross-lagged paths occur over one unit of time (t₁, t₂, t₃). Maxwell et al. argue that to the extent that the pink path from manipulated intervention variable (X₁) at time t₁ and the possible mediator of the intervention effect (M₂) at time t₂ is nonzero and the path from M₂ to Y₃ at time t₃ is also nonzero, M₂ mediates the effect of the intervention (X₁) on the outcome (Y₃), reducing or eliminating the direct effect of X₁ on Y₃. When we look at the variables X₁, M₁, and Y₁ (all measured at time t₁ – highlighted in blue), we can readily see that the indirect path, even if significant, does not allow time for the intervention to have its effect on the mediator, and for the mediator
to have its effect on the outcome. Analyses done in this manner typically depict the relationships between X, M, and Y at the end of the intervention study, making it impossible to determine what variable may have caused what. Therefore, it may be optimal to measure all three variables at least at two points in time, and preferably at three points in time, to reveal a fuller picture of any possible mediation of the intervention effect.

What Works Clearinghouse Standards
What study design meets WWC Standards?

Meets WWC group design standards without reservation: randomized controlled trials in which participants are assigned randomly to two or more groups that are differentiated by whether they receive the intervention (preferred).

Meets WWC group design standards with reservation: quasi-experimental design studies in which groups are compared after the establishment of a baseline from the analytic group (the sample who remained at the end of the study). Equivalence must be demonstrated separately for each outcome domain.

- If the difference between groups on an observable characteristic is greater than .25 standard deviations in absolute value, the groups are not deemed equivalent.

- If the difference is between .05 and .25 standard deviations, statistical adjustment needs to be made in order for the groups to be deemed equivalent, including regression adjustment and ANCOVA.

- If the difference is less than .05 standard deviations, baseline equivalence is satisfactory.

Testing for Reliability
What is the minimum accepted reliability?

- Cronbach’s alpha (inter-item consistency): > .5
- Test-retest: > .4
- Inter-rater (kappa, ICC, etc.): > .5

Missingness
- Imputed baseline variables not acceptable. Dropping the missing is acceptable

Effect sizes (translated to “improvement index”)
For continuous outcomes, WWC prefers Hedges’ g
For dichotomous outcomes, the Cox index is the preferred measure

.25 standard deviations is considered “substantively important”
Collapsing categorical levels is acceptable for effect size purposes

Characterization of Findings of an Effect based on a Single Outcome

“statistically significant positive effect” - the estimated effect is positive and statistically significant (correcting for clustering when not properly aligned)

“substantively important positive effect” - the estimated effect is positive and not statistically significant but is substantively important

“indeterminate effect” - the estimated effect is neither statistically significant nor substantively important

“substantively important negative effect” - the estimated effect is negative and not statistically significant but is substantively important

“statistically significant negative effect” - the estimated effect is negative and statistically significant (correcting for clustering when not properly aligned)

Significance

p < .05

ICC default is .2 for achievement outcomes and .1 for behavior and attitudinal outcomes

Sample Size for “Evidence for an Intervention”

Medium to Large = More than one study, more than one setting, and 350 students (25 students in 14 classrooms across studies)

Small = Only one study, OR only one setting, OR fewer than 350 students

- (350 based upon power analysis for 80% probability)
Additional Design and Dissemination Resources


Contributions

Thank you to all that have helped through the years. There are so many of you that have helped to contribute to this toolkit. We appreciate your contributions and continued support.

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Sample Research Plan
This document is a sample of a research plan including tips to help you in planning and executing your research.

When writing research proposals, whether for individual research for courses or for overall campus research, it is important to consider and anticipate the research timeline. Oftentimes, research takes far longer than one might think. DETA offers extensive timelines including associated tables as part of their grant proposals, but for the purposes of the guides, this checklist may be helpful.

BEFORE YOU BEGIN

What is the timeline for the research?

Tip: Don’t necessarily wait for one task to be completed before starting on the next step.

1. Complete IRB forms and submit for IRB approval
   (see sample IRB materials). Depending on the institution, IRB can be a real holdup. However, the study may not require IRB review or may be exempt.

2. Contact individuals that will be gathering and analyzing data (research support). It is good to know ahead of time who will be supporting the study and to build a network on the campus and beyond with IT, institutional research, statistics support, and so forth.

3. Identify or develop survey items. A scan from previous research or the toolkit may easily provide what you need for the variables and measures, yet sometimes it may require contacting someone or developing new items (valid).

4. Build the survey (if you are not using DETA resources to disseminate the survey). The creation and design of the survey and usability in Qualtrics will take some time. If you have created it in a Google Doc or Word document, set a timeline to build it online. It may take more time than anticipated.

5. Gather course and program level data from contacts
   (advisors, chairs, deans, instructors, student support services, faculty support services) to gain access to students and instructors of courses and programs relevant for the study.

Continued on next page...
6. **Develop a complete list of courses and programs** and date of delivery (e.g., when they will be taught online, start and end dates of classes).

7. **Administer data collection (survey).**  
   See Section 2: Guide to Quantitative Research.

8. **Collect student information** from other institutional data sources (demographics and performance data).  
   See Section 2: Guide to Quantitative Research.

9. **Potentially clean up the data, recode variables to match the required DETA coding** (see the Data Codebook).

10. **Analyze data and/or submit to DETA.** Researchers should acquaint themselves with DETA data input procedures including requesting and institutional code and downloading the form with associated variable names and codes.

11. **Develop written results and/or presentable form of results**, including graphic representations of the results (bar charts, graphs). A sample will be provided.

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**TOOLKIT**  
This resource is part of the [DETA Research Toolkit v2.0](https://everylearnereverywhere.org) on the Every Learner Everywhere Network’s library of digital resources.

Find more resources at [everylearner everywhere.org](https://everylearnereverywhere.org)  
For questions, contact [resources@everylearner.org](mailto:resources@everylearner.org)
Online Learning Readiness: Survey Instrument and Codebook

Learner Characteristics

Preparedness and Readiness

Technology Access
VARIABLE NAMES: PREPACCESS1 – PREPACCESS3
3-items; 5-point Likert Scale; Ranges → (1) "Strongly Disagree" to (5) "Strongly Agree"
1. I have a computer or a laptop.
2. I have the Internet in my home or somewhere I can study online.
3. I have a good environment in which to study for my online course.

Online Work Skills
VARIABLE NAMES: PREPWORKSKILLS1 – PREPWORKSKILLS15
15-items; 5-point Likert Scale; Ranges → (1) "Strongly Disagree" to (5) "Strongly Agree"
Adapted from Bernard et al (2004)
1. I am able to easily access the Internet as needed for my studies.
2. I am comfortable communicating electronically.
3. I am comfortable with written communication.
4. I possess sufficient typing skills for doing online work.
5. I feel comfortable communicating online in English.

Adapted from Roblyer et al (2008)
6. I know how to use an Internet search engine to locate information.
7. I know how to use a browser to locate Internet sites.
8. I know how to locate a document or a program on my computer.
9. I feel comfortable using a computer.
10. I know how to send an attachment in an email.
11. I feel confident in performing basic functions in word processing applications (e.g., MS Word, Google Docs).

12. I am able to locate additional study resources online.

13. I have a sense of self confidence in using computer applications for course tasks.

14. I am proficient in using a wider variety of computer applications.

15. I am comfortable navigating the learning management system [e.g., Desire2Learn (D2L), Blackboard, Moodle].

**Social Technology Familiarity**

VARIABLE NAMES: PREPSOCTECH1 – PREPSOCTECH5

5-items; 5-point Likert Scale; Ranges \( \dagger \) (1) “Never” to (5) “Very Frequently”

Adapted from Joosten (2015)

“When you use a digital device, how often do you:”

1. Chat using instant messenger (e.g., FaceTime, iMessage, Facebook Messenger, WhatsApp)
2. View videos or pictures online
3. Use social media (e.g., Instagram, SnapChat, Facebook, Twitter)
4. Take pictures
5. Take videos

**Organization and Self-directedness**

VARIABLE NAMES: PREPSDORG1 – PREPSDORG15

15-items; 5-point Likert Scale; Ranges \( \dagger \) (1) “Strongly Disagree” to (5) “Strongly Agree”

Adapted from Roblyar et al (2008), Bernard et al. (2004)

1. I feel I am a very well-organized person.
2. When it comes to learning and studying, I am a self-directed, take charge kind of person.
3. In my studies, I am self-disciplined and set aside reading and homework time.
4. I am able to manage my study time effectively and complete assignments on time.
5. In my studies, I set goals and have a high degree of initiative.
6. I find it easier to study for an important test by breaking it into subparts rather than studying the whole subject matter at one time.
7. I will often set short-term goals to help me reach a long-term goal.
8. I am able to manage deadlines and when things are due in my course.
9. I am able to motivate myself to complete coursework without being reminded.
10. My desire to succeed keeps me moving forward despite challenges along the way.
11. I “give my best” without needing encouragement from others.
12. I keep moving forward even when faced with difficulties.
13. I have the determination to solve problems on my own.
14. I am capable of creating lists that prioritize certain tasks over others.
15. At the beginning of the course, I create a schedule of when assignments are due.

**Student Online Efficacy**

**VARIABLE NAMES:** PREPONLINEEFF1 – PREPONLINEEFF7

7-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

Adapted from Bernard et al (2004)

1. I am motivated by the material in online activities.
2. Learning is the same in class and at home online.
3. I feel that I can improve my listening skills the same working online as in an in-person class.
4. I believe that learning online is more motivating than a traditional in-person course.
5. I believe a complete course can be given online without difficulty.
6. I could pass a course online without any teacher assistance.
7. I believe that material in an online course is better prepared than a traditional class.

**Communication Competencies**

**VARIABLE NAMES:** PREPCOMCOMP1 – PREPCOMCOMP4

4-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

1. I am comfortable expressing my opinion in writing to others.
2. I am comfortable responding to other people’s ideas.
3. I am able to express my opinion in writing so that others understand what I mean.
4. I give constructive and proactive feedback to other even when I disagree.

**Experimentation and Growth Mindset**

**VARIABLE NAMES:** PREPMINDSET1 – PREPMINDSET14A

14-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

Adapted from Roblyer et al. (2008)

1. I do not care what other people think of me if I make mistakes.
2. I am not afraid of making mistakes if I am learning to do new things.
3. I don’t mind showing my work in front of others when I am learning new things.
4. If I am given a task to perform that I know little about, I don’t mind giving it a try.
5. When I am learning something new, it is okay if I make errors.
6. No matter who you are, you can significantly change your intelligence level.
7. No matter how much intelligence you have, you can always change it a good deal.
8. I like my work best when it makes me think hard.
9. I like my work best when I can do it really well without too much trouble.
10. I like work that I’ll learn from even if I make a lot of mistakes.
11. I like my work best when I can do it perfectly without any mistakes.
12. When something is hard, it just makes me want to work more on it, not less.
13. When I work hard, it makes me feel as though I’m not very smart.

Achievement Mindset
VARIABLE NAMES: PREPACH3 – PREPACH19A
17-items; 5-point Likert Scale; Ranges → (1) "Strongly Disagree" to (5) "Strongly Agree"
Roblyer et al 2008; Yee (2007)
1. I find that I try harder if I set high goals for myself.
2. I study hard for all of my classes because I enjoy acquiring new knowledge.
3. I tend to persist at tasks until they are accomplished.
4. I believe I am a high achiever.
5. I believe that I am a valuable person.
6. I feel that I am a worthy individual.
7. I try to achieve in all my classes, regardless of their level of difficulty.
8. As classes become harder, I feel that I have the ability to overcome many of the difficult obstacles that may present themselves.
9. I have a need to achieve and feel competent.
10. It is important that my teachers give me knowledge of results or feedback that I can use to further enhance my performance.
11. I take responsibility for my actions most of the time.
12. I want to become powerful.
13. I hope to accumulate items and money.
14. It is important to be well-known.
15. I like to compete with peers or family.
16. I plan to have a successful career.

17. I hope to get a well paying job.

**Student Socialization**

VARIABLE NAMES: PREPSOCIAL1 – PREPSOCIAL5

5-items; 5-point Likert Scale; Ranges \( \star \) (1) “Strongly Disagree” to (5) “Strongly Agree”

Adapted from Bernard et al (2004); Yee (2007); Joosten (2015)

1. I like getting to know other students.
2. I like helping other students.
3. I often have meaningful conversations with other students.
4. I sometimes talk to other students about personal issues.
5. Other students sometimes help me with my real life problems.

**Social Competencies with Instructor**

VARIABLE NAMES: PREPSOCCOMPINST1 – PREPSOCCOMPINST5

5-items; 5-point Likert Scale; Ranges \( \star \) (1) “Strongly Disagree” to (5) “Strongly Agree”

Adapted from Yu (2018)

1. I can clearly ask my instructor questions.
2. I initiate discussions with the instructor.
3. I am able to seek help from the instructor when needed.
4. I can timely inform the instructor when an unexpected situation arises.
5. I express my opinions to the instructor respectfully.

**Social Competencies with Classmates.**

VARIABLE NAMES: PREPSOCCOMPPEER1 – PREPSOCCOMPPEER5

5-items; 5-point Likert Scale; Ranges \( \star \) (1) “Strongly Disagree” to (5) “Strongly Agree”

Adapted from Yu (2018)

1. I am able to develop friendships with my classmates.
2. I pay attention to other students’ social actions.
3. I apply different social interaction skills depending on the situations.
4. I initiate social interaction with classmates.
5. I socially interact with other students with respect.
Student Outcomes

Learning and Performance
VARIABLE NAMES: LEARN1 – LEARN5A; PERFORM1 – PERFORM3A
8-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

LEARN
1. The course allowed me to better understand concepts.
2. The course helped my understand the course material.
3. The course made it easy to connect ideas together.
4. The course helped me think more deeply about course material.
5. The course was beneficial to my learning.

PERFORM
6. The course activities helped my get a better grade.
7. My experience in the course helped me do better on my exams and other assignments.
8. I got higher scores on my assignments because of my experiences in the course.

Satisfaction
VARIABLE NAMES: SATIS1 – SATIS7A
7-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

1. I would take another online course.
2. I would recommend that the instructor continue teaching this course online.
3. I liked this course delivered online.
4. Participating in this online course was a useful experience.
5. Getting online to access the course was easy.
6. Technical support was available when I needed it.
## Preparedness and Readiness

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<tr>
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<td>Demographics</td>
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| Preparedness and Readiness | Technology Access | Student's self-reported preparedness or readiness for distance education based on access to technology and study environment | PREPACCESS1 – PREPACCESS3 | • 3-items  
• “Strongly Disagree” to “Strongly Agree” |
| Online Work Skills | | Student's self-reported preparedness or readiness for distance education based on one's beliefs about their skills proficiency, comfort with technology, or experience with technology - sometimes referred to as self-efficacy using technology or technology use | PREPWORKSKILLS1 – PREPWORKSKILLS15 | • 15-items  
• 5-point Likert scale  
• “Strongly Disagree” to “Strongly Agree”  
• 0 reverse coded |
| Social Technology Familiarity | | Student's self-reported preparedness or readiness for distance education based on one's beliefs about their familiarity with technology in general | PREPSOCTECH1 – PREPSOCTECH5 | • 5-items  
• 5-point Likert scale  
• “Very Frequently” to “Never”  
• 0 reverse coded |
| Organization and Self-directedness | | Organization and Self-Directed is a measure of students' ability to approach tasks in an organized and goal-oriented way. Additionally, the measure assesses students' ability to direct and manage their own learning | PREPSDORG1 – PREPSDORG15 | • 15-items  
• 5-point Likert scale  
• “Strongly Disagree” to “Strongly Agree”  
• 1 reverse coded (PREPORG5) |

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<tr>
<td>Student Online Efficacy</td>
<td>Student's self-reported beliefs about online learning</td>
<td>PREPONLINEEFF1 – PREPONLINEEFF7</td>
<td>• 7 items&lt;br&gt;• 5-point Likert scale&lt;br&gt;• &quot;Strongly Disagree&quot; to &quot;Strongly Agree&quot;&lt;br&gt;• 0 reverse coded</td>
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<tr>
<td>Communication Competencies</td>
<td>PREPCOMCOMP1 – PREPCOMCOMP4</td>
<td>• 4 items&lt;br&gt;• 5-point Likert scale&lt;br&gt;• &quot;Strongly Disagree&quot; to &quot;Strongly Agree&quot;</td>
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<tr>
<td>Experimentation and Growth Mindset</td>
<td>Student's self-reported belief about their ability to experiment, take risks, or grow/change - sometimes referred to as risk-taking or growth mindset</td>
<td>PREPMINDSET1 – PREPMINDSET14a</td>
<td>• 14 items&lt;br&gt;• 5-point Likert scale&lt;br&gt;• &quot;Strongly Disagree&quot; to &quot;Strongly Agree&quot;&lt;br&gt;• 4 reverse coded (PREPGROW6, PREPGROW7, PREPGROW9, PREPGROW11)</td>
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<tr>
<td>Achievement Mindset</td>
<td>Student’s self-reported belief of one’s ability to achieve</td>
<td>PREPACH3 – PREPACH19a</td>
<td>• 17 items&lt;br&gt;• 5-point Likert scale&lt;br&gt;• &quot;Strongly Disagree&quot; to &quot;Strongly Agree&quot;&lt;br&gt;• 2 reverse coded (PREPACH1 &amp; PREPACH2)</td>
<td></td>
</tr>
<tr>
<td>Student Socialization</td>
<td>Student’s self-reported desire or need to socialize and interact</td>
<td>PREPSOCIAL1 – PREPSOCIAL5</td>
<td>• 5 items&lt;br&gt;• 5-point Likert scale&lt;br&gt;• &quot;Strongly Disagree&quot; to &quot;Strongly Agree&quot;&lt;br&gt;• 1 reverse coded (PRPSOC11)</td>
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<tr>
<td>Social Competencies with Instructor</td>
<td></td>
<td>PREPSOCOMPINST1 – PREPSOCOMPINST5</td>
<td>• 5 items&lt;br&gt;• 5-point Likert scale&lt;br&gt;• &quot;Strongly Disagree&quot; to &quot;Strongly Agree&quot;</td>
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<tr>
<td>Social Competencies with Classmates</td>
<td></td>
<td>PREPSOCOMPPEER1 – PREPSOCOMPPEERS5</td>
<td>• 5 items&lt;br&gt;• 5-point Likert scale&lt;br&gt;• &quot;Strongly Disagree&quot; to &quot;Strongly Agree&quot;</td>
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</table>
## Student Outcomes

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<tr>
<th>VariableID</th>
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</thead>
<tbody>
<tr>
<td>Learning and Performance</td>
<td>Perception of performance</td>
<td>Student’s self-reported perceptions of performance on assessments and overall in course</td>
<td>PERFORM1 – PERFORM3a</td>
<td>3 items, 5-point Likert scale, “Strongly Disagree” to “Strongly Agree”</td>
</tr>
<tr>
<td>Perception of learning</td>
<td></td>
<td>Student’s self-reported perceptions of learning</td>
<td>LEARN1 – LEARN5a</td>
<td>5 items, 5-point Likert scale, “Strongly Disagree” to “Strongly Agree”, 5 reverse coded (LEARN2, LEARN6 – LEARN8, LEARN10)</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>Satisfaction</td>
<td>Student’s self-reported satisfaction with course</td>
<td>SATIS1 – SATIS7a</td>
<td>7 items, 5-point Likert scale, “Strongly Disagree” to “Strongly Agree”, 6 reverse coded (SATIS4, SATIS6, SATIS9, SATIS11 – SATIS13)</td>
</tr>
</tbody>
</table>
Instructional Characteristics


### Learner Support

**VARIABLE NAMES:** ICLEARNS3 – ICLEARNS19A

17-items; 5-point Likert Scale; Range → (1) “Strongly Disagree” to (5) “Strongly Agree”

1. The introductory explanations on how to get started in the class were clear.
2. Course description included the purpose and format of the course.
3. Instructor provided students with adequate notice and time to acquire course materials.
4. Requirements for my interaction with the instructor, content, and other students was clearly explained.
5. Academic integrity or “code of ethics” was explained or a link included.
6. Online etiquette (or “netiquette”) guidelines and expectations for how to communicate and behave online was clearly stated.
7. I understood all components of the activities.
8. The instructions for the class were clear.
9. Expected outcomes for the course and the course activities were provided at the beginning of the semester.
10. Grading expectations (i.e., grading scale) were explained or provided within the syllabus.
11. Technologies required for the course were readily available, provided in the course site, and/or easily downloadable.
12. The course materials were easy to access (available online or easily downloaded for use offline).
13. The course design took full advantage of available tools and media.
14. Technologies were convenient or easily accessible when and where I needed to use them.
15. The materials included or had links to a clear explanation of the technical support available to me.
16. The materials included links to tutorials and resources that answer basic questions related to research, writing, and technology.

17. I had adequate support in completing my activities.

**Design and Organization**

**VARIABLE NAMES:** ICDESIGN1 – ICDESIGN12A  
12-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

1. Each reading assignment and activity helped me succeed in meeting the expected outcome.
2. The tools and media used were relevant to my achievement of the stated learning objectives.
3. Instructions on how to meet the expected outcomes were adequate and stated clearly.
4. The instructor helped me make connections between course materials and real-world experiences.
5. The course had technologies and resources that supported my learning.
6. Course activities helped me understand fundamental concepts.
7. Course activities built relevant skills that were useful outside of the course.
8. The course was well-organized.
9. Course content was organized in a logical format.
10. Topics were clearly identified and subtopics were related to topics.
11. I understood the layout of course.
12. Navigation throughout the online components of the course was logical, consistent, and efficient.

**Content Design and Delivery**

**VARIABLE NAMES:** ICCONTENT1A – ICCONTENT3A  
3-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

1. Instructional materials have sufficient breadth, depth, and currency for me to learn the subject.
2. The materials included current online materials (online articles, webpages, links, and/or videos).
3. The materials included rich online materials, such as videos and images.

**Interactivity with Instructor**

**VARIABLE NAMES:** ICACTIVITYINST1 – ICACTIVITYINST11A  
11-items; 5-point Likert Scale; Ranges → (1) “Strongly Disagree” to (5) “Strongly Agree”

1. The instructor facilitated learning in the course.
2. The instructor effectively communicated ideas and information.
3. The instructor showed interest in my learning.
4. The instructor helped us understand the importance of course topics and how they were related to learning outcomes.
5. The instructor actively strived to keep course participants engaged and participating in productive dialogue.

6. The instructor encouraged us to explore new concepts throughout the course.

7. The instructor helped focus online discussions on relevant issues.

8. The feedback I received from the instructor was detailed and meaningful.

9. The instructor asked questions and provided new content to facilitate discussions.

10. The instructor provided summaries particularly at the end of topic, modules, or lessons.

11. I was prompted by my instructor to expand on relevant points.

Interactivity with Peers

VARIABLE NAMES: ICACTIVITYPEER1A – ICACTIVITYPEER5A

5-items; 5-point Likert Scale; Ranges → (1) "Strongly Disagree" to (5) "Strongly Agree"

1. I had the opportunity to introduce myself to others.

2. I completed an “Ice-breaker” activity or other orientation session to get acquainted with my peers.

3. At the beginning of the course, I was provided an opportunity to introduce myself to others and develop the sense of community.

4. I participated in a group activity.

5. Learning activities facilitated and supported learning that was active, encouraging frequent and ongoing engagement with other students.

Assessment and Evaluation

VARIABLE NAMES: ICASSESS1 – ICASSESS16A

16-items; 5-point Likert Scale; Ranges → (1) "Strongly Disagree" to (5) "Strongly Agree"

1. The syllabus was easily located and included objectives, our expected outcomes, and completion requirements.

2. The objectives and outcomes of the course were clearly defined.

3. Activities were clearly defined.

4. Expectations of my participation (frequency and quality) were included in the syllabus or online.

5. I received detailed instructions and tips for completing assignments.

6. The grading policy was stated clearly.

7. Expected student learning outcomes were specific, well-defined, and measurable.

8. I was provided ample opportunity to show what I learned in different ways.

9. Due dates for all assignments were provided.

10. I understood what was expected of me.
11. The assessment of my progress was effective.
12. The method of grading my performance was clear.
13. Rubrics for assignments that identify guidelines were provided.
14. Graded assignments measured the stated learning objectives or outcomes and were consistent with the course.
15. Clear standards were set for the instructor's posting of grades, activities, and resources.
16. Graded assignments were appropriately timed within the length of the course, varied, and appropriate to the content being assessed.
Student Outcomes

Learning
VARIABLE NAMES: LEARN1 – LEARN10
10-items; 5-point Likert scale; Ranges -> (1) “Strongly Disagree” to (5) “Strongly Agree”
1. The class allowed me to better understand concepts.
2. The class did not help me to understand concepts better. (r)
3. The class helped me understand the course material.
4. The class made it easy to connect ideas together.
5. The class helped me think more deeply about course material.
6. The class did not help my learning. (r)
7. The class did not make it easier for me to understand the course material. (r)
8. I was not able to better understand course concepts. (r)
9. The class was beneficial to my learning.
10. The class had little impact on my learning. (r)

Satisfaction
VARIABLE NAMES: SATIS1 – SATIS13
13-items; 5-point Likert scale; Ranges -> (1) “Strongly Disagree” to (5) “Strongly Agree”
1. I would take another online course.
2. I would recommend that the instructor continue teaching this course online.
3. I liked this course delivered online.
4. I would not recommend this course to a friend. (r)
5. Participating in this online course was a useful experience.
6. It was difficult to access the online course. (r)
7. Getting online to access the course was easy.
8. Technical support was available when I needed it.
9. I needed better technical support. (r)
10. I had little problems in the online environment.
11. I sometimes had difficulty online. (r)
12. I would avoid classes that are online in the future. (r)
13. I would not recommend this course to a friend. (r)
## Instructional Characteristics

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<thead>
<tr>
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</table>
| Instructional characteristics | Learner support | Student report of perceptions of learner support, including course materials and guides to support | ICLEARNS3 – ICLEARNS19a | • 17 items  
• 5-point Likert scale  
• "Strongly Disagree" to "Strongly Agree"  
• 0 reverse coded |
|       | Design and organization | Student report of perceptions of course design and organization | ICD DESIGN1 – ICD DESIGN12a | • 12 items  
• 5-point Likert scale  
• "Strongly Disagree" to "Strongly Agree" |
|       | Content design and delivery | Student report of perceptions of the course content and how it is delivered to students (student interaction with content) | ICC CONTENT1a – ICC CONTENT3a | • 3 items  
• 5-point Likert scale  
• "Strongly Disagree" to "Strongly Agree"  
• 0 reverse coded |
|       | Interactivity with Instructor | Student report of perceptions of course interactivity with other students and the instructor | ICACTIVITYINST1 – ICACTIVITYINST11a | • 11 items  
• 5-point Likert scale  
• "Strongly Disagree" to "Strongly Agree"  
• 0 reverse coded |
|       | Interactivity with Peers | | ICACTIVITYPEER1a-ICACTIVITYPEER5a | • 5 items  
• "Strongly Disagree" to "Strongly Agree" |
|       | Assessment and evaluation | Student report of perceptions of assessments and evaluation | ICASSESS1 – ICASSESS16a | • 16 items  
• 5-point Likert scale  
• "Strongly Disagree" to "Strongly Agree"  
• 0 reverse coded |
## Student Outcomes

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<td>Student's self-reported perceptions of learning</td>
<td>LEARN1 – LEARN10</td>
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- **Learning**
  - MeasureID: Perception of learning
  - Definition: Student's self-reported perceptions of learning
  - Label: LEARN1 – LEARN10
  - Coding:
    - 10 items
    - 5-point Likert scale
    - "Strongly Disagree" to "Strongly Agree"
    - 5 reverse coded (LEARN2, LEARN6 – LEARN8, LEARN10)

- **Satisfaction**
  - MeasureID: Satisfaction
  - Definition: Student's self-reported satisfaction with course
  - Label: SATIS1 – SATIS13
  - Coding:
    - 13 items
    - 5-point Likert scale
    - "Strongly Disagree" to "Strongly Agree"
    - 6 reverse coded (SATIS4, SATIS6, SATIS9, SATIS11 – SATIS13)
Sample Interview Schedule

This is a sample interview schedule from a DETA study that can be used for qualitative studies and collecting data in interviews or focus groups.

Study research question:
What does an academic success coach do?

1. What does an academic success coach do?
   - What are your job responsibilities?
   - Describe a typical day of work as an academic success coach.
   - What is the most important part of your job? Why?
   - How do you know when your job has been accomplished?

2. A recent survey indicated that, on average, academic success coaches spend their time on curriculum, instruction, coaching, advising, mentoring, and assessment. 
   - How would you define curriculum? What does “doing curriculum” look like? What sorts of tasks do you complete?
   - How would you describe coaching or advising? What does “doing coaching, advising, and mentoring” look like? What sorts of tasks do you complete?
   - How would you describe assessment? What does “doing assessment” look like? What sorts of tasks do you complete?
   - How would you describe instruction? What does “doing instruction” look like? What sorts of tasks do you complete?

3. What are the greatest challenges of being an academic success coach?
   - How do you overcome these challenges?

4. What role, do you think, an academic success coach plays that is different from:
   - Other student support services in traditional programs (tutoring, library, writing center, advising)?
   - Other instruction services in traditional programs (e.g., faculty)
5. In what ways do academic success coaches support students and their success?
   - What are the most common barriers to student success in CBE programs?
   - What do you do to facilitate student success in the face of these barriers?
   - How do you respond when a student is not progressing in their program?

6. What is an example of a situation where you thought you did your job well? What did you do?

7. What characteristics do the students who need your help share?

8. If you could provide three pieces of advice for a student in a CBE program, what would they be?

9. If you were to give advice to a prospective academic success coach, what advice would you provide?

10. Who is an academic success coach?
    - What sorts of experiences or educational background would best prepare an academic success coach to do their job well?
    - What are the skills needed to do your job effectively?
    - What types of personality traits are required to do your job well? Why?
    - What experiences led you to become an academic success coach?

11. How do academic success coaches define student success?
    - From your perspective, what is student success?
    - How do you think your students would define success in a CBE program?
    - What is the key to student success?
    - What are common reasons students do not succeed in CBE programs?
    - In competency-based education, what questions should we be asking about student success and satisfaction?
Human Subjects Requirements

This document provides background on the human subject review process and pertinent information to obtaining IRB approval.

Quick Guide to IRB:

1. DETA exempt human subjects’ narrative and overview
2. Waived informed consent
3. Sample waiver of informed consent

Note: The DETA Center has IRB approval and can facilitate approval of your study. There may not be a need for additional IRB approvals at your institution depending on your proposed study. The waiver of informed consent will be administered through the DETA Center survey and survey tool to participating institutions funded through the DETA grant awards. Other individuals and institutions may be included. Therefore, these materials may be informative and not require action. Each institution will most likely require a data sharing agreement for data submitted to the DETA Center for cross-institutional analysis.
Exempt human subjects’ narrative and overview

A. Human Subjects Involvement and Characteristics

Participation may involve:

1. Institutional partners in data mining studies, including data mining of student information system demographic and performance data
2. Institutional partners in survey studies, including student response data
3. Institutional partners in experimental studies where students will be randomly assigned into an experimental condition experiencing an instructional intervention or a comparison condition

B. Sources of Materials

Information gathered during data mining projects specifically for research purposes include historical data mined from the student information system for courses delivered blended or online including (student demographic information, race/ethnicity, Pell grant eligibility, first generation status, cumulative GPA, composite ACT score or SAT equivalent, overall course grade, etc.).

Information gathered during survey research projects will include student survey responses including student demographic information, student perceptions of course and instructional characteristics, and student self-report of student outcomes, such as learning, performance, and satisfaction.

Information gathered during experimental research projects may include scores on any summative and formative assessments measuring learning.

C. Recruitment and Informed Consent

For the data mining studies, data sets will be obtained through data mining and not direct interaction with human subjects. Data sharing agreements between UWM and the other institutions will be in place. The research involves the collection and study of existing data and will be recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. A waiver of consent will be obtained.

For the student survey and experimental studies, instructors and their courses will be identified through sub-grant award institutions opting to participate in the study. The students associated with these classes or courses will be participating at sub-grant awardee locations. The research conducted will be in an established and commonly accepted educational settings, involving normal educational practices. A waiver of consent will be obtained.

Continued on next page...
D. Potential Risks and Protections

Risks to Confidentiality
This risk is unlikely given that all information gathered will be treated under the Human Subjects Review Board guidelines of confidentiality of research participant records. A unique code assigned to each participating student (rather than his/her name) will be used to link data mined, such as a particular student's demographic information, the student’s performance variables, and the student's assessment data. Instructors will be assigned a unique code as well. Survey data from students and instructors will be anonymous and coded. Also, it will be used if he/she is randomly selected and chooses to participate in the experimental studies.

E. Importance of the Knowledge to be Gained
The project will enhance our ability to conduct cross-institutional research and advance evidence-based practice in distance education and online learning ensuring student success through quality learning experiences.

F. Collaborating Site(s)
Milwaukee Area Technical College, University of Wisconsin-Extension, and sub-grant awardees.
Waiver of Requirement for Signed Form

An IRB may waive the requirement for the investigator to obtain a signed consent form for some or all subjects, if it finds either:

1. That the only record linking the subject and the research would be the consent document, and the principal risk would be potential harm resulting from a breach of confidentiality. Each subject will be asked whether the subject wants documentation linking the subject with the research, and the subject’s wishes will govern; or

2. That the research presents no more than minimal risk of harm to subjects, and involves no procedures, for which written consent is normally required outside of the research context.

Survey collections of data from students typically meet this standard and are given waiver for a written consent. In such cases, a statement should be included on the consent form indicating that by continuing the survey, the student consents to participation.

In cases in which the documentation requirement is waived, the IRB may require the investigator to provide subjects with a written statement regarding the research.
Sample Waiver of Informed Consent

This waiver should be included at the beginning of a survey prior to the student starting the survey.

University of Wisconsin – Milwaukee

Consent to Participate in Online Survey Research

Study Title: Ensuring student success and access in distance education

Person(s) Responsible for Research: Tanya Joosten, Academic Affairs, UW-Milwaukee

Study Description:
The purpose of this research study is to investigate student success in blended and online courses at UW-Milwaukee. This pilot project includes approximately xx instructors and xxx students in the overall sample. If you agree to participate, you will be asked to complete an online survey that will take approximately 30 minutes to complete. The questions will ask you about your experiences in your blended or online course.

Risks/Benefits:
Risks to participants are considered minimal. Collection of data and survey responses using the internet involves the same risks that a person would encounter in everyday use of the internet, such as breach of confidentiality. While the researchers have taken every reasonable step to protect your confidentiality, there is always the possibility of interception or hacking of the data by third parties that is not under the control of the research team.

There will be no costs for participating. Benefits of participating include furthering knowledge about blended and online learning.

Confidentiality:
Your student ID is collected online to match data files. Data will be retained on the Qualtrics website server for two (2) years and will be deleted after this time. However, data may exist on backups or server logs beyond the timeframe of this research project. Data transferred from the survey site will be saved in an encrypted format for up to ten (10) years. Only the Principal Investigators and project staff will have access to the data collected by this study. However, the Institutional Review Board at UW-Milwaukee or appropriate federal agencies like the Office for Human Research Protections may review this study's records. The research team will remove any individual identifying information before analyzing the data and all study results will be reported without identifying information so that no one viewing the results will ever be able to match you with your responses.

Continued on next page...
Voluntary Participation:
Your participation in this study is voluntary. You may choose to not answer any of the questions or withdraw from this study at any time without penalty. Your decision will not change any present or future relationship with the University of Wisconsin Milwaukee.

Who do I contact for questions about the study?
For more information about the study or study procedures, contact XX at XX.

Who do I contact for questions about my rights or complaints towards my treatment as a research subject? Contact the UWM IRB at XXX-XXX-XXXX or XXXX@XXXX.edu

Research Subject’s Consent to Participate in Research:
By entering this survey, you are indicating that you have read the consent form, you are age 18 or older, and that you voluntarily agree to participate in this research study.

Thank you!
Sample Data Sharing Agreement

This document is a sample data sharing agreement between your institution and DETA.

This Data Sharing Agreement is entered into by and between the UW-Milwaukee DETA Research Center (DETA) and “Your Institution,” as the recognized custodians of data contained within the student information system. The purpose of the agreement is to establish the content, use, and protection of data needed by DETA to conduct cross-institutional research as supported by the U.S. Department of Education FIPSE grant.

1.0 Period of Agreement
The period of this Agreement shall be in effect from December 20XX through the termination of the research at the end of the 20XX.

2.0 Intended Use of Data
The data being supplied to DETA from “Your Institution's” student information system is intended for use in facilitating cross-institutional scientific research to improve distance education. The data will be used solely for this purpose and only for the duration of the project.

3.0 Constraints on Use of Data
Data supplied by “Your Institution,” to DETA and the contracted agent or collected by DETA and/or the contracted agent on behalf of the students is the property of “Your Institution.” Identifiable data shall not be shared with other parties external to DETA without the written permission of “Your Institution.” Student data shall not be sold or used, internally or externally, for any purpose not directly related to the scope of work defined in this agreement without the written permission of “Your Institution.”

4.0 Data Security
DETA shall employ industry best practices, both technically and procedurally, to protect “Your Institution's” data from unauthorized physical and electronic access. Methods employed are subject to annual review and approval by UW-Milwaukee.

4.1 Data Elements
Data shared with DETA and the contracted agent shall be limited to the data elements specifically defined and authorized. If DETA, or the contracted agent, wishes to collect additional data, a written request must be submitted. Under no circumstances shall DETA or the contracted agent collect any information classified as Sensitive or Confidential without the express written approval. Data to be shared or collected shall be limited to the following elements:

#Name (first, middle, last)
^Student ID
4.2 Data Categories
The following definitions shall be used to classify data for security purposes:

**Normal**: The least restrictive class of data. Although it must be protected from unauthorized disclosure and/or modification, it is often public information or generally releasable as “Directory Information” under University procedures for processing public records requests.

**Sensitive**: This class includes data for which specific protections are required by law and are not releasable as “Directory Information.”

NOTE: While data may be releasable as “Directory Information,” when these elements are provided in combination, they may be used to compromise an individual’s identity. As such, both data categories must be properly secured and may not be shared with individuals outside of UWM and the contracted agent.

4.3 Data Handling Requirements
Data handling requirements may vary depending on the classification of data shared with DETA and the contracted agent. However, it is anticipated that most data shared with DETA and the contracted agent will involve a mix of data classes including normal and sensitive information. Therefore, whenever data elements are aggregated for collection, transmission, or storage, the aggregate data shall be handled using the protocols that apply to the most sensitive data element.

6.0 Personnel

6.1 Access to Data
DETA and the contracted agent shall limit access to normal and sensitive data to those staff members with a well-defined educational or business need.

6.2 Security Training
DETA and the contracted agent shall provide periodic training for staff on internal security policies and procedures, and on applicable state and federal legal requirements for protecting data.

6.3 Prohibition on Mobile Devices and Removable Media
DETA and the contracted agent shall have a written policy prohibiting the transfer or storage of unencrypted student information on mobile devices or removable storage media for any reason. This policy shall be made available to each staff member individually and shall be strictly enforced.

7.0 Compliance with Applicable Laws and Regulations
DETA and the contracted agent shall comply with all applicable federal laws and regulations protecting the privacy of students, including but not limited to the Family Educational Rights and Privacy Act (FERPA).

8.0 Notification of Security Breaches
Wisconsin Act 138 (Section 895.507) delineates notification requirements in the event of a breach in the security of personal information. DETA and the contracted agent agree that in the event of any breach or compromise of the security, confidentiality or integrity of computerized data where personal information
of a UW-Milwaukee student was, or is reasonably believed to have been, acquired and/or accessed by an unauthorized person, DETA and/or the contracted agent shall notify “Your Institution” of the breach of the system containing such data within 24 hours, comply with all notification actions, and/or assist UW-Milwaukee with all notification actions required by University policy and the law.

9.0 Amendments and Alterations to this Agreement
DETA, “Your Institution,” or the contracted agent may amend this Agreement by mutual consent, in writing, at any time.

10.0 Termination of Services
In the event either party terminates this Agreement, or the contracted agent ceases operation, all data collected in the course of providing the service shall be returned to “Your Institution.” DETA and the contracted agent shall certify in writing within five business days that all copies of the data stored on the agent’s servers, backup servers, backup media, or other media including paper copies have been permanently erased* or destroyed.

*“permanently erased” means the data have been completely overwritten and are unrecoverable. File deletions or media high-level formatting operations do not constitute a permanent erasure.

By the signatures of their duly authorized representative below intending to be legally bound, agree to all of the provisions of this Data Sharing Agreement.

UW-Milwaukee
DETA Research Center
3213 E Kenwood Ave
Milwaukee, WI 53201

By:
Title:
Telephone:
Email:
Signature: ________________ Date: ________________

Your institution
Address
Telephone
Email

By: Signing authority’s name (potentially the registrar)
Title: Signing authority’s title
Telephone: xxx-xxx-xxx
Email: xxx@xxxxx.edu

Signature: ________________ Date: ________________
What Works Clearinghouse Standards

What study design meets WWC Standards?

Meets WWC group design standards without reservation:
Randomized controlled trials in which participants are assigned randomly to two or more groups that are differentiated by whether they receive the intervention (preferred).

Meets WWC group design standards with reservation:
Quasi-experimental design studies in which groups are compared after the establishment of a baseline from the analytic group (the sample who remained at the end of the study). Equivalence must be demonstrated separately for each outcome domain.

- If the difference between groups on an observable characteristic is greater than .25 standard deviations in absolute value, the groups are not deemed equivalent.
- If the difference is between .05 and .25 standard deviations, statistical adjustment needs to be made in order for the groups to be deemed equivalent, including regression adjustment and ANCOVA.
- If the difference is less than .05 standard deviations, baseline equivalence is satisfactory.

Testing for Reliability

What is the minimum accepted reliability?

- Cronbach’s alpha (inter-item consistency): >.5
- Test-retest: >.4
- Inter-rater (kappa, ICC, etc.): >.5

Missingness

- Imputed baseline variables not acceptable. Dropping the missing is acceptable.

Effect sizes (translated to “improvement index”)

For continuous outcomes, WWC prefers Hedges’ $g$

For dichotomous outcomes, the Cox index is the preferred measure

.25 standard deviations is considered “substantively important”

Collapsing categorical levels is acceptable for effect size purposes
Characterization of Findings of an Effect based on a Single Outcome

“statistically significant positive effect” — the estimated effect is positive and statistically significant (correcting for clustering when not properly aligned)

“substantively important positive effect” — the estimated effect is positive and not statistically significant but is substantively important

“indeterminate effect” — the estimated effect is neither statistically significant nor substantively important

“substantively important negative effect” — the estimated effect is negative and not statistically significant but is substantively important

“statistically significant negative effect” — the estimated effect is negative and statistically significant (correcting for clustering when not properly aligned)

Significance

\( p<.05 \)

ICC default is .2 for achievement outcomes and .1 for behavior and attitudinal outcomes

Sample Size for “Evidence for an Intervention”

Medium to Large
More than one study, more than one setting, and 350 students (25 students in 14 classrooms across studies)

Small
Only one study, OR only one setting, OR fewer than 350 students
  • (350 based upon power analysis for 80% probability)

TOOLKIT
This resource is part of the DETA Research Toolkit v2.0 on the Every Learner Everywhere Network’s library of digital resources.

Find more resources at everylearnereverywhere.org

For questions, contact resources@everylearner.org