A Practitioner's Guide to Instructional Design in Higher Education

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Introduction

Aims and Scope

The purpose of this book is to provide guidelines and best practices for how to lead instructional design efforts in higher education. The audience for this book are instructional designers and technologists working at 2-year and 4+ year degree institutions. This book provides instructional designers and technologists with templates, suggestions for best practices, and ways that they can leverage instructional design to support learning.

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The Competencies for Instructional Designers in Higher Education

Albert D. Ritzhaupt, Swapna Kumar, & Florence Martin

Instructional Design | Higher Education | Instructional Designers | Competencies

The purpose of this chapter is to define and describe the roles and competencies of instructional designers working in the context of higher education. Inspired by existing research, this chapter summarizes these roles and competencies of instructional designers in higher education. We first review the context and settings in which these professionals work, delineate their common roles and responsibilities within these settings, and highlight the academic backgrounds and professional experiences that align with this career role. Next, we outline the core competencies for instructional designers in higher education by describing their typical work expectations and the necessary knowledge and skills needed to perform effectively and efficiently in this environment. Finally, we discuss how to gain the necessary competencies and experiences to serve in this capacity along with some closing remarks.

Introduction

As the field of instructional design continues to mature and evolve, the professional roles and competencies of the individuals who identify as instructional designers has become increasingly important. In particular, instructional designers working in the professional context of higher education serve important roles within their organizations. A few notable professional organizations provide standards for instructional design professionals (Martin & Ritzhaupt, 2020), yet the unique case of higher education provides several opportunities and obstacles for these professionals to use their academic preparation and experiences to best serve their institutions. This chapter summarizes the roles and competencies of instructional designers working in institutions of higher education based on current research and practice.

Organizational Context and Settings

Instructional designers in higher education can be found all over the organizational charts of an institution of higher education (Anderson et. al, 2019; Kumar & Ritzhaupt, 2017; Ritzhaupt, & Kumar, 2015), including in centers for teaching excellence, online course production centers, centers of teaching and learning, human resources offices, academic libraries, information and academic technology units, and within individual colleges and academic units providing tailored services to their faculty and administration. Additionally, instructional design professionals can be found in all types of institutions of higher education ranging from research institutions to comprehensive universities to community colleges in public and private settings. While these professionals might be identified with different titles (e.g., educational technologist, learning designer) within their academic institutions (Chongwony et al., 2020; Kang & Ritzhaupt, 2015), their roles and responsibilities share many elements in common across these institutions and

configurations. Instructional designers in higher education work with faculty across academic disciplines both as their primary stakeholders and as their subject-matter experts, but also acknowledge learners as their final stakeholders (Kumar & Ritzhaupt, 2017; Ritzhaupt & Kumar, 2015).

General Roles and Responsibilities

Instructional designers in higher education provide both professional services and products to their stakeholders in the form of course design, development, and evaluation; professional development opportunities; and technical and pedagogical support for faculty, staff, and students (Anderson et. al, 2019; Kumar & Ritzhaupt, 2017; Ritzhaupt & Kumar, 2015). The courses designed, developed, and evaluated with instructional designers may be fully online, blended, or face-to-face, depending on the needs of the faculty and academic units they serve (Anderson et. al, 2019). Additionally, it is not uncommon for instructional designers to provide ongoing professional development opportunities for faculty to learn about emerging technologies for teaching and learning or instructional strategies to best engage their students through workshops, one-on-one consultations, or teaching and learning certification programs within their institutions. Providing ongoing technical and pedagogical support is also a common job requirement that involves faculty, students, and staff, such as academic advisors or tutors (Kumar & Ritzhaupt, 2017; Ritzhaupt & Kumar, 2015). This ongoing support might manifest as assisting students or faculty with the use of the institution's Learning Management System (LMS) or in the form of answering direct questions about appropriate technologies to support a specific type of instructional strategy. Additionally, instructional design work necessitates collaborations with non-academic staff, information technology units, administrators, and librarians (Anderson et. al, 2019). As the roles of these professionals appear to be constantly evolving, instructional designers in higher education are in-demand professionals that must possess a wide-range of competencies.

Academic Backgrounds and Professional Experiences

Within the United States, instructional design is most commonly offered as a graduate degree or certificate program within institutions of higher education (Ritzhaupt & Kang, 2015), and while many professionals possess this academic pedigree, this is not the only path to entering the profession. For example, a recent job announcement analysis revealed that several positions in the field only require a bachelor's degree and several years of professional experience (Kang & Ritzhaupt, 2015). Many instructional designers also have extensive prior experience as an actual educator either in K-12 settings or in higher education, which can help as a professional experience in developing a rapport with faculty. The foundational competencies of instructional designers in higher education is a moving target and though we attempt to provide these competencies in the subsequent section, it is important for readers to recognize the role is constantly evolving as the needs of higher education also evolve.

Foundational Competencies for Instructional Designers in Higher Education

In this section, we document foundational competencies of instructional design professionals working in institutions of higher education. These foundational competencies are formulated based on prior research and our interactions and practice with instructional design professionals. These general categories are not mutually exclusive and are not meant to document the only competencies for these nascent professionals. As higher education continues to evolve in the information economy, so do the roles of these professionals serving these institutions.

Strong Communication and Soft Skills

Across several studies of instructional design professionals, often the most highly rated or observed skill is strong written and verbal communication skills (Kang & Ritzhaupt, 2015; Ritzhaupt et al., 2018; Surrency et. al, 2019). These strong communication skills serve as critical to other competencies among these professionals, such as creating effective instructional resources and presentations or communicating to multiple stakeholders involved in typical instructional design projects (Chongwony et. al, 2020). Instructional designers must be able to communicate and

collaborate with subject-matter experts, graphic designers, multimedia developers, video producers, students, project managers, and more. They should be able to negotiate and communicate with diverse faculty, administrators, and students in nontechnical language (Surrency et. al, 2019). Communication skills, interpersonal skills, and soft skills are crucial for the building of effective working relationships and teamwork needed to successfully interface with various stakeholders and in a multicultural environment (Anderson et. al, 2019; Chongwony et. al, 2020; Schwier, & Wilson, 2010). In addition to communication skills, instructional designers in higher education must also possess diplomacy, problem-solving, interpersonal, and organizational skills to name a few (Kang & Ritzhaupt, 2015; Ritzhaupt et al., 2018). We place this foundational competency first in our list intentionally because it is perhaps one of the most important identified in current research and practice.

Instructional Design Models and Processes

While there are literally hundreds of instructional design models and processes defined and described in the academic research literature, instructional designers working in higher education need to be aware of these models and processes, and more importantly, know when to use a model or process that is appropriate for their current instructional design project. Prior research has shown that these professionals utilize many different instructional design models (e.g., Dick and Carey or backwards design), but often describe the phases of the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) to frame their workflow (Bond & Dirkin, 2020; Kumar & Ritzhaupt, 2017; Ritzhaupt & Kumar, 2015). Instructional designers in higher education appreciate the careful alignment among the learning objectives, instructional content, and assessments in any course design and delivery method. The instructional design models and processes they deploy help them ensure this alignment in the creation of their instructional resources, and use evaluation techniques to verify these outcomes are working in their course improvement efforts. These professionals also articulated the importance of being able to clearly explain the models and processes to their faculty stakeholders to have shared understanding of an instructional design project.

Learning Theories and Instructional Strategies

Instructional designers in higher education can express how different theoretical orientations shape their decision-making about appropriate instructional strategies for a given learner population, content domain, and delivery format (e.g., online). A traditional instructional design degree program will trace the history of learning theories from behaviorism to cognitivism to constructivism in the application of useful instructional strategies, and while some instructional designers subscribe to one of these theoretical positions, most take a pragmatic approach that blends ideas from each (Ertmer & Newby, 1993). Additionally, instructional designers are aware of different types of learning outcomes and domains, such as prescribed by the original writings of Bloom's taxonomy and domains (Bond & Dirkin, 2020; Kumar & Ritzhaupt, 2017; Ritzhaupt & Kumar, 2015). Interviews with instructional designers in higher education showed a wide array of theoretical influences, such as Malcolm Knowles's adult learning theory (Knowles, 1978), the Cognitive Theory of Multimedia Learning (CTML; Clark, & Mayer, 2016), and Merrill's first principles of instruction (Kumar & Ritzhaupt, 2017; Merrill, 2002; Ritzhaupt & Kumar, 2015). While these professionals report utilization of a wide-array of instructional strategies, instructional designers interviewed and surveyed in the research highlighted the importance of designing courses with constructivist principles, and student-centered and collaborative learning opportunities they serve (Bond, & Dirkin, 2020; Kumar & Ritzhaupt, 2017; Ritzhaupt & Kumar, 2015). Use of authentic assessments, project-based learning, and reflective learning opportunities like journaling are common student-centered instructional strategies among current practitioners of instructional design in higher education.

Technologies in Instructional Designer Practice

Instructional designers working in higher education must be knowledgeable in multiple forms of technologies, including Learning Management Systems (LMSs) (e.g., Canvas), multimedia authoring and production tools (e.g., Captivate or Photoshop), video production and editing software (e.g., Premiere) standard office productivity tools (e.g., Microsoft Word or Excel), assessment technologies (e.g., Respondus), cloud-based solutions for collaboration and document sharing (e.g., Google Drive or Dropbox), synchronous video conferencing and classroom technologies (e.g., Zoom), and even basic HTML (Hyper-text Markup Language) and CSS (Cascading Style Sheets). While most instructional designers

reported that they did not need high-end programming skills (e.g., JavaScript), they did indicate that awareness of these tools was important to their roles (Kumar & Ritzhaupt, 2017; Ritzhaupt & Kumar, 2015). Instructional designers need these technologies to support their abilities to provide communication, collaboration, management, and development of instructional resources for their stakeholders and to provide ongoing technical and pedagogical support (Kumar & Ritzhaupt, 2017; Ritzhaupt & Kumar, 2015; Schwier, & Wilson, 2010).

Project Management in Instructional Design

Although project management coursework is not consistently required across academic degree programs in the field (Van Rooij, 2010), instructional designers in higher education are often assigned to either manage or participate in multiple projects on any typical day of their work. Often instructional designers develop into project managers and need skills and knowledge in managing people, processes, and resources to achieve their objectives within diverse working environments (Chongwony, et. al, 2020; Schwier, & Wilson, 2010; Surrency et. al, 2019). These skills and knowledge include important project management competencies like schedule management, scope management, human resources management, budget management, stakeholder management, and quality management (Kline et al., 2020). Unsurprisingly, these competencies align to contemporary project management literature (e.g., Project Management Body of Knowledge or PMBOK) and certifications (e.g., Project Management Professional or PMP). While those working as project managers in instructional design in higher education have mixed emotions about these professional certifications, there is clearly alignment between the body of research in instructional design and project management (Kline et al., 2020).

Formative and Summative Evaluation

Though formative and summative evaluation is strongly rooted in contemporary instructional design models, we intentionally created a separate section to address this area because of its critical relevance to instructional designers in higher education. Instructional designers assist faculty with not only the original design and development of their courses, but they also assist with the ongoing course improvement efforts from semester-to-semester or quarter-to-quarter (Kumar & Ritzhaupt, 2017; Ritzhaupt & Kumar, 2015; Surrency et. al, 2019). Instructional designers are using a variety of data sources to inform evaluation efforts within the courses they help to create, including survey data or end-of-course evaluations, student performance data on course activities such as projects or quizzes or examinations, and increasingly, learning analytics data derived from the LMS activity logs (Kumar & Ritzhaupt, 2017; Ritzhaupt & Kumar, 2015). All of these data sources serve as evaluation evidence to ensure the learning objectives are achieved by the students within the courses and adjustments are made in a continuous process improvement effort to ensure high-quality learning experiences. These reflective cycles of course improvement are what help faculty create effective learning experiences.

Faculty Professional Development and Support

While not all organizational contexts and settings require instructional designers to provide professional development opportunities for faculty, depending on several factors, instructional design professionals might also be providing workshops or online courses and certification programs within their institutions to build the capacity of their faculty to teach online or use student-centered instructional strategies (Ritzhaupt & Kumar, 2015; Kumar & Ritzhaupt, 2017). The content of these professional development experiences range from technical offerings on how to use tools such as Canvas or Zoom to support teaching and learning to more pedagogical offerings on using project-based learning or effective feedback practices. These offerings are often a part of an institution's certification program for faculty to teach online or blended coursework. Additionally, some settings have instructional designers provide ongoing support to faculty, students, and staff by answering helpdesk questions or one-on-one consultations (Kumar & Ritzhaupt, 2017; Ritzhaupt & Kumar, 2015).

Change Management and Leadership

Instructional designers in higher education are uniquely positioned to facilitate educational innovations and transformations that involve changes at all levels in teaching and learning in classrooms and online, faculty

development, departments and colleges, and in an institutional level. The ability to implement, manage, and lead change is necessary to the successful performance of their role (Anderson et. al, 2019; Kline, et. al, 2020; Schwier, & Wilson, 2010). An analysis of job posts revealed that expertise in general leadership and management was among the three top desired competencies that occurred frequently among leaders of instructional design (Chongwony et. al, 2020).

Gaining the Competencies and Experiences for the Role

This section provides a brief overview of how individuals interested in the profession of instructional design in higher education can gain the necessary competencies and experiences to serve in this role. Additionally, we review the role of professional associations in supporting the professional networking, leadership, and career development needs of emerging instructional designers in higher education.

Academic Preparation

While the traditional route to become an instructional designer is the completion of a graduate degree in the field, there are other avenues to gain the academic preparation necessary to effectively serve in this capacity. As previously noted, many of the instructional designers have extensive teaching experiences in either higher education or K-12 and use these experiences to inform their approach to the craft. In addition to the typical graduate degree, many academic institutions also offer graduate certificate programs with select coursework to prepare instructional designers. These programs require fewer academic credits to earn the credential and skills and knowledge to begin in this domain. We also note that several professional associations offer certification and professional development programs and some existing educational platforms such as Coursera or LinkedIn Learning offer lower cost options.

Connecting to Professional Associations

Instructional designers in higher education have several choices for a professional association to nurture their professional networking, leadership, and career development needs (Ritzhaupt et al., 2020). These professional associations provide a wide range of services including:

1. Professional networking services

2. Growth and advocacy services

3. Professional communication services

4. Ancillary discount services

5. Leadership and mentoring services

6. Relevant literature services

7. Training and credentialing services

8. Vendor and continuing education services (Ritzhaupt et al., 2020).

Table 1 provides a list of some of the major professional associations available within the field. Emerging instructional designers are encouraged to select one or more professional associations that match their needs and career goals.

Table 1

Professional associations related to the field of instructional design

Professional Association Name

Association for Talent Development
Association for the Advancement of Computing in Education
Association for Educational Communications and Technology
EDUCAUSE
International Society for Performance Improvement
International Society for Technology in Education
Online Learning Consortium
Learning Guild
United States Distance Learning Association

Aligning Professional Experiences

A common problem across many professions is gaining the professional experiences to enter the market as a competitive job applicant. One common practice in instructional design degree programs is to encourage students to develop an e-portfolio to document their projects and experiences. Additionally, these degree programs will often provide authentic learning opportunities where students can work on real-world projects. There are also service opportunities within professional associations in which students can work on collaborative, real-world projects for service learning opportunities. The key is that emerging instructional designers must be intentional about both gaining real-world professional experiences and documenting these experiences to showcase to potential employers. As is true in many professions, an academic degree alone is often insufficient to secure employment opportunities.

Improving Competencies on the Job

Despite the academic and certificate programs that prepare instructional designers and professional networks that provide professional development opportunities, instructional designers can find it difficult to apply what they have learned when they begin a job, given the complexity of instructional design projects and the diverse stakeholders involved (Stefaniak, 2017). Research on novice and expert instructional designers illustrates ways in which instructional designers can improve and develop their competencies on the job (Hoard et al., 2019; Lowell, & Ashby, 2018). Professional development models that practice cognitive apprenticeship on the job, such as the Development of Instructional Designers Apprenticeship (DIDA) model also highlight the value of coaching and reflection for the competency development of instructional designers (Mancilla, & Frey, 2020).

Closing Remarks

Working as an instructional designer in higher education provides many growth opportunities and non-pecuniary benefits beyond just a competitive salary. For instance, a professional instructional designer would benefit from the rich-learning environment at an institution of higher education and resources (e.g., academic library) available. Listed as number 38 out of 100 in CNN Best Jobs in America in 2012 (CNN Best Jobs, 2012), instructional designers are increasingly becoming a mission-critical resource to institutions of higher education. We hope this chapter provides a

snapshot of the many competencies and roles required by these professionals to better prepare academic and professional experiences to align to the work of an instructional designer in higher education.

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Communicating Instructional Design with Faculty

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Instructional Design | Faculty Development | Educational Development | Online Education

The purpose of this chapter is to provide tools and resources for structuring effective communications between instructional designers and faculty members in different settings where faculty engage in educational development. The chapter offers scripts for suggested communications, application exercises, and links to sample tools across stages of the ADDIE (Analyze, Develop, Design, Implement, Evaluate) instructional design (ID) process. The aim is to promote constructive and creative instructional design communications with faculty members in a variety of interactions.

Introduction

Case Scenario: Jack is an instructional designer meeting with a faculty member, Dr. Stem, who is new to online teaching. Jack receives a biochemistry syllabus for an existing face-to-face course and observes that there are no learning objectives. Each week is a bulleted list of lecture topics and there is a single final exam assessment. How should Jack begin to structure the conversations with Dr. Stem regarding instructional design?

If you already work as an instructional designer, Jack's scenario may be very familiar. Communication between instructional designers (IDs) and faculty often begins with a knowledge gap about where the course is today and each person's expectations for the final course product. The instructional design process is a communication intensive process requiring continuous collaboration between IDs and faculty members who hold subject matter expertise (Intentional Futures, 2016). Communications on route to a completed course may be fruitful or possess challenges that include resistance, non-participation or a lack of follow-up, or general difficulty embracing technology (Belt & Lowenthal, 2020). However, specifics for fostering a collaborative relationship between IDs and faculty are not well-defined (Chen & Carliner, 2020).

Three common challenges that IDs face are lack of faculty buy-in, working with subject matter experts, and faculty awareness or misconceptions of an IDs role (Intentional Futures, 2016; Richardson et al., 2019). Differences in understanding educational terminology or practices, like writing learning objectives, may derail communications. Researchers suggest that interpersonal communication skills such as building trust and rapport, active listening, asking effective questions, open-mindedness, and developing a common vocabulary are essential for fostering successful positive working relationships between faculty and IDs (Chen & Carliner, 2020; Richardson et al., 2019). Experienced IDs report that interpersonal and communication skills like listening, understanding, and providing clear feedback are the most frequently applied skills for fruitful collaborations (Ferguson, 2018).

Generally, research on instructional design tends to take the viewpoint of the ID and focuses less on the faculty perspective (Chen & Carliner, 2020; Richardson et al., 2019). In this chapter, we intentionally take a faculty perspective,

describing the spaces where faculty commonly learn about teaching, in an effort to show how these spaces provide opportunities to facilitate communications between the ID and faculty. The purpose of this chapter is to provide tools and suggestions for structuring effective communications with faculty members in different settings where faculty learn and across stages of the instructional design (ID) process. In this respect, we hope that the application questions and communication tools can be useful for IDs, in order to overcome challenges of faculty buy-in, working with subject matter experts, and faculty learning about the ID role.

Contexts for Learning about Instructional Design

Opportunities for instructional design communications may emerge anytime faculty are learning about teaching – a dimension of educational or faculty development. Faculty development practice and research emerged in the 1970s and since then, many approaches to faculty development for instructional or teaching improvement have been implemented and studied. A national survey of directors of centers for teaching and learning revealed that preparing faculty for teaching online and distance education ranked fourth among all services offered (Beach et al., 2016). Indeed, the COVID-19 pandemic and disruption to face-to-face learning worldwide has increased the demand for faculty to understand effective instructional design as never before.

The next sections describe four common approaches used to prepare faculty for teaching online and in use by many institutions (Beach et al., 2016). Common faculty development approaches range from individual-level interactions to group-level collaborations including: 1) experience-based learning, 2) workshops, 3) faculty learning communities, and 4) peer-supported learning. To help IDs new to the field of instructional design effectively achieve the desired outcome of their interactions with faculty, we provide a brief description of the faculty development approach, an explanation of how IDs might communicate in each scenario, and a prompt for use by IDs.

The Appendix details suggest how one-one communication between IDs and faculty typically occurs in our experience with faculty members. The first column (i.e., from top-to-bottom) addresses aspects of communication (e.g., purpose, approach, frequency, prose/prompts, and intended/expected outcomes) that are pertinent for fruitful collaborations between IDs and faculty. We contend different aspects of communication will evolve as a course design project evolves from start to finish. To capture this evolution, we organize prompts by stages of the ADDIE model (Analyze, Develop, Design, Implement, Evaluate; Branch, 2009) so that given a stage of development, IDs have a useful reference for structuring conversations. An ID may find the best approach to using this matrix is by reading each column from top-to-bottom, left-to-right.

Finally, we refer to Jack's and Dr. Stem's scenario as a basis for practice application exercises throughout the chapter. The communication strategies in the Appendix at the end of the chapter are sourced from experienced instructional designers, literature, and our own practice working with faculty in a center for teaching and learning. These strategies reflect practices across disciplines and subject matter, at community colleges, traditional four-year, and graduate and professional universities.

Communicating with Individual Faculty

Communicating about instructional design may begin as a one-to-one conversation between an ID and a faculty member, who may be experienced or inexperienced with the instructional design process. In this approach, faculty learn about instructional design by engaging in the process overtime. Experiential learning focuses on how individuals learn directly by doing, reflecting on their experience, and experimenting with new learning (Kolb & Fry, 1974). Many communications between faculty and IDs occur in this experiential learning context because faculty members have unique prior experiences, educational knowledge, and comfort with teaching online.

Generally, experiential learning requires two conditions to be met for the experience to result in learning. These conditions are activation of prior knowledge and the connection of prior knowledge to the current experience (Bransford et al., 2000; Merriam & Caffarella, 1999). At this stage, communications should aim to establish rapport and surface the

faculty member's prior knowledge about instructional design. The Appendix details how one-one communication between IDs and faculty can occur and change in each phase of the ADDIE model. For example, IDs may ask the faculty member to outline the focal or primary objectives of the course. This step eases faculty into the practice of writing learning objectives or provides information about faculty skill level that the ID can use to coach the faculty member on elements of a well-written behavioral objective. Through additional conversations, the faculty member can be prompted to reflect on the completed work and revise the objectives where needed. In the case of a more experienced faculty member who has previously worked with an ID or designed an online course, rapport and a shared vocabulary may exist, so communications are more easily facilitated. By establishing a mutual understanding of the faculty member's existing knowledge with basic instructional design practices, the next stage of communication will involve helping faculty knowledge to engage in the next stage of applying instructional design to a course.

Next, IDs may move into the use of templates like a storyboard, for example, the UMB FCTL Storyboard or the Table-Style Course Design Template, which are tools for both the faculty members and the ID to begin course development work helping to organize design tasks for faculty.

Application Exercise 1

Given the status of the biochemistry syllabus that Jack received, what questions could Jack ask Dr. Stem to establish rapport and evaluate the faculty member's prior knowledge about course design? Jot down a few questions you would want to ask Dr. Stem to get started with building rapport. After you write your questions, refer to the prompts in the first column in the Appendix) to check your ideas. Also, refer to the linked web tools for practice developing a set of course objectives with a faculty member.

Faculty Peer-Supported Learning

Peer learning is a broad term that encompasses those experiences where peers help one another to learn new knowledge or skills (O'Donnell, 2006). Faculty peers play a significant role in faculty learning and should not be overlooked in communications about instructional design. A highly structured process like ADDIE does not fit with peer learning, but peer learning is included because of its significance to faculty learning. Peers are an excellent source to create comfort with and knowledge about instructional design.

In a recent survey of health professions on our graduate campus, almost half of faculty respondents (n=476) reported learning about educational technology or virtual teaching from a peer. Peer learning occurs in a faculty member's workplace, classroom, or clinical teaching environment. Peer learning may be structured, as in the case of peer observations of teaching, to follow a cycle of observation, feedback, and reflection (Chism, 2007; Martin & Double, 1998; Webb & McEnerney, 1995); however, peer learning via teaching observation is less common in online settings. So how might IDs communicate through peer learning networks about instructional design?

We propose two ways IDs can communicate with faculty and their network of peers: 1) collect data on faculty instructional design experiences through periodic evaluations, and 2) making direct requests for referrals to other faculty. At many colleges and universities, evaluation of instructional design projects occurs via evaluation surveys, semi-structured feedback, or focus groups. The results of these evaluations can be shared on a website or within the institution. IDs may choose to share data directly with new faculty members, especially if data pertains to services the ID provided.

IDs can also build networks of faculty with anyone they have engaged with in a constructive instructional design process. IDs may ask faculty members directly if they may be used as a reference or referral. When establishing work relationships with new faculty members, IDs can connect new instructional design clients to established instructional design clients – who may represent their experiences to peers. Faculty members experiencing the instructional design process serve as champions for the ID by sharing experiences and challenges to break down barriers to the process of engagement. The challenge for IDs is determining the best ways to network and communicate their expertise with faculty in this informal learning approach.

Communicating in Groups

An extension of both experiential learning and peer learning is faculty learning communities (FLCs). FLCs are small groups of faculty members that may be cohort-based (i.e. same rank or hiring date) or interest-based (e.g. online teaching or assessment)and meet regularly to advance their knowledge on educational topics (Cox, 2004). FLCs typically meet during an academic year and may be peer-led or facilitated by teaching and learning staff (see https://edtechbooks.org/-ufsZ or https://edtechbooks.org/-qUFa .

FLCs focused on online teaching offer a platform for the ID to communicate with faculty either formally or informally. For example, an ID may educate faculty on the instructional design process or facilitate educational technology demonstrations. Informally, the ID may attend as a subject-matter expert to answer questions about the design of assessments in a learning management system.

IDs may also collaborate with faculty on specific scholarly projects involving online educational tools. IDs have expertise using features of polling tools or audio/ video recording and annotation tools like Screencast-O-Matic (see https://screencast-o-matic.com/) or VoiceThread (see https://voicethread.com/). This specific knowledge is valuable in the design, conduct, and analysis of the impact of projects involving educational technology interventions. Depending on the topical focus of the FLC and the purpose of an ID's participation, as consultant, subject-matter expert, or scholarly partner, the communications approach of the ID will vary.

Application Exercise 2

Jack incorporates a game-based tool in Dr. Stem's biochemistry course to engage the students. Dr. Stem reports he is not technologically savvy. Jack invites Dr. Stem to join an FLC where online teaching faculty share their experiences with similar tools. Brainstorm a few approaches to working with Dr. Stem on learning to use the game-based tool. After writing some ideas, refer to the prompts in the Appendix for the Development stage, to check your ideas.

Application Exercise 3

Refer to the linked web tools Screencast-O-Matic (see https://screencast-o-matic.com/) or VoiceThread (see https://voicethread.com/). Outline a step-by-step communication guide to help faculty learn how to use the tool. Share work with a colleague or peer for feedback.

Communicating in Workshops

The development and facilitation of workshops on instructional design is a prime opportunity to communicate with faculty about instructional design. Often, faculty want to learn about educational technology without a sound pedagogical justification for how it helps to achieve student learning outcomes in a course (Zhu et al., 2011). Communications in planning or developing workshops help the ID to target the pedagogical goals of a department or group of faculty members and then coach them on the selection of the specific tool to achieve that goal. Workshops, or short educational sessions, comprise nearly 60% of all faculty development efforts across higher education institution types. Sessions range in duration from one to three hours and are often customized to discipline-specific needs (Beach et al., 2016). For example, Chairs holders of a biochemistry department may want a workshop on ideas for structuring activities that promote student engagement in an online course whereas an English department may be more concerned with approaches to assessing writing with rubrics.

IDs may help plan or run the workshop which begins with the individual consultation process, such as, clarifying the goals and purpose of the workshop. IDs may also conduct a pre-workshop needs assessment via a survey (see Sample Teacher Professional Development Survey, and Sample Workshop Evaluation Forms) to further analyze workshop topic needs for instructional design education in the broader institution. From this point, IDs create workshop objectives, develop a segment where the skill is modeled, and guide faculty in the use of any new skills for their teaching. For example, conducting a workshop on using Flipgrid (see https://info.flipgrid.com/) in the online classroom. A workshop

includes a demonstration of how instructors can use Flipgrid to host asynchronous video discussions with students online. In the practice segment, workshop participants practice creating a one-minute multimedia file of a topic in their course and then comment on another participants' files by video recording.

Workshops are a dominant approach to faculty learning and ideal space for IDs to lead communication with faculty regarding a broad range of skills from the introduction of the instructional design process to specific educational technology demonstrations with hands-on practice.

Application Exercise 4

After attending a workshop on Flipgrid, what could Jack do to follow up with Dr. Stem on the activities in which he can incorporate Flipgrid in his course? Brainstorm a couple of questions to ask Dr. Stem about the workshop and how he will integrate what he learned into his course. After writing down some ideas, refer to the prompts in Table 1 (see Appendix), the Implementation stage, to check your ideas.

This section of the chapter provided background on environments where faculty are likely to learn about instructional design for online teaching including one-on-one interactions, communicating in groups, and workshop settings. The next section discusses overcoming communication barriers.

Overcoming Communication Barriers

Three common challenges that IDs face are lack of faculty buy-in, working with subject matter experts, and faculty awareness or misconceptions of an IDs role (Intentional Futures, 2016; Richardson et al., 2019). Forward motion in any design project can be stalled due to faculty resistance, non-participation or follow-up, and general difficulty embracing technology (Belt & Lowenthal, 2020). How might IDs handle resistance and non-participation?

First, it is important to recognize that in learning new technologies or adapting new ways of teaching, IDs will often meet resistance or apprehension from inexperienced faculty. As educators, instructional designers, and faculty members, we observe many kinds of behaviors that suggest difficulty in the instructional design communications process. While not an exhaustive list, the behaviors may include one or more of the following: misunderstanding the online instructional process, miscalculation of effort needed to design a full course, avoidance of the design work process, or failure to follow-up. Misunderstanding the online instructional design process is when the faculty member believes that there is a direct transference of in-person course content to the online space with synchronous lectures, or scheduled class meeting times. Miscalculation occurs when the faculty member does not initially understand that the entire course requires planning and building in advance of its start date. This misunderstanding can derail a project because the faculty member is not expecting to spend the sustained time needed to build and plan the majority of the course. IDs need to clearly and consistently communicate expectations, time, and effort requirements during the individual meeting stage, early in the engagement process, and during the development stage. Ineffective communication including unclear expectations hinders the faculty-ID working relationship (Chen & Carliner, 2020).

Avoidance and procrastination may also be encountered in the design process. Once work begins, faculty may avoid meetings and calls with the ID. This can be because they feel overwhelmed or are not sure where to start. The ID's role here is critical in assessing where help is needed, being gently persistent, communicating regularly, and chunking tasks, so that faculty experience success. Small successes help the development process move forward.

Finally, IDs may support faculty that teach in different disciplines and modalities (e.g., online, blended) to build a variety of courses. Thus, exposure to courses across disciplines, coupled with educational technology expertise, position IDs as a nexus for instructional support with and among faculty. IDs can leverage this broad experience to overcome faculty challenges and barriers to the instructional design experience.

Application Exercise 5

Jill is a new ID and excited to begin working on her first ID project. She starts designing a course without having an initial meeting with the faculty member to delineate faculty and ID roles and responsibilities. How might this misstep in communication affect the design process? Reflect on your experience with faculty or interview an experienced instructional designer.

Examples in Practice

The communication matrices (see Appendix, Table 1) are framed by the phases of the ADDIE model (i.e., analysis, design, development, implementation, and evaluation), where applicable. We reference three faculty learning approaches with a concrete deliverable (e.g., a course, collaborative scholarship, or a MOOC), where the ADDIE process is applicable. Within the phases of the ADDIE model, the communication matrices are organized by their purpose, frequency, type of communication, prompts, and expected outcome. We hope that IDs will find this a robust communication reference for fostering effective communications with faculty and leading to smooth instructional design projects.

Implications for Instructional Designers

Our aim in this chapter was to provide resources to IDs for immediate use in communicating with faculty. Communicating instructional design goals with faculty is effective when it includes multiple methods including face-to-face meetings, collaborative tools, team meetings, and frequent status updates. It is also important to have a central website to use for communicating and accessing materials electronically and for submission of consultation forms and support content (see UMB FCTL Consultations and Sample Consultation Request Form).

We hope the communication matrix offered in this chapter (see Appendix) with associated prompts and the links to templates will help IDs establish new relationships with faculty members in a variety of settings. Embedded within this chapter are templates, including initial intake and consultation meeting templates, and instructional design project development tools, such as storyboards and project plan charts. The examples, tools, templates, and the communications matrix included in this chapter have been tested to support constructive and creative instructional design communications with faculty members across settings, project types and faculty development approaches. While applying these to communications resources for instructional design with faculty, we hope they also lead to smooth and fruitful collaborations across all skill levels and types of institutions.

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Appendix

Table 1

Communication Matrix Resources for Course Design, by Instructional Design Phase

	Analysis	Design	Development	Implementation	Evaluation
Purpose	Build rapport, assess faculty member's prior knowledge and experience level	Clarify role of the ID and faculty member; negotiate deadlines and deliverables	Manage development progress, monitor milestones attainment or address challenges	Pre-launch to review, acclimate faculty member to course tools, and test functionality	Collect feedback on course design and performance.
Approach	Initial meeting between ID and faculty	Regular meetings with the faculty member	Regular meetings with the faculty member; Follow up with non-responsive faculty	Regular meetings with the faculty member	Debriefing meeting; Planning meeting for revisions or enhancements.
Frequency	Four to six months prior to course start	Regular intervals, driven by course implementation	Regular intervals, driven by course implementation	Weekly or bi-weekly check-ins	Mid-point and end of course
Prompts	Thank you for meeting with me today. The purpose of this meeting is to discuss transitioning your course online. First, I would like to learn more about you and your course. How long have you been teaching this course? Have you taught online before or been a student in an online course? Do you have experience working with an instructional designer? Do you have any concerns putting	As we begin our work on this project, we will spend time outlining the course's goals, objectives, assessments, and activities. Now that I understand your availability (comfort, ideas) with creating an online course, I suggest we meet bi-weekly for an hour, until the month before course launch. Will this frequency work for you? We will develop a project plan of expected milestones, so that we can be sure to hit our start date target.	Your module objectives are aligned to what you assess in the course. For module 5, though, I don't see assessments. How can I help with this module? What assessments are you planning? Do you want to reschedule our next meeting so you have time to work on those? If you are hitting some roadblocks maybe we can brainstorm some ideas?	Do you have any changes you would like me to make? How comfortable are you with the functions of the learning management system/tools? What areas of the course would you like me to review with you or change?	While we made notes about issues during the course and some edits that needed to be made, now that the course has completed, what aspects of the course went well? What did not go well and needs to be improved? Have you reviewed your course evaluations? When would you like to get together to plan any revisions or changes to the course while it is still fresh?

	Analysis	Design	Development	Implementation	Evaluation
	this course online?				
Outcome	Project commitment between ID and Faculty member	Project development planning and milestones established	Completion of module specific material. Address roadblocks	Course testing and final changes	Enhanced course design or content changes for re-offering of course.

Conducting Needs Assessments to Inform Instructional Design Practices and Decisions

Jill E. Stefaniak

Higher Education | Instructional Designers | Needs Analysis | Needs Assessment

The purpose of a needs assessment is to determine the current state of performance and the desired state of performance. When conducting a needs assessment, it is important to gather sufficient data to understand the situation warranting instructional solutions. The purpose of this chapter is to provide guidance for instructional designers interested in conducting needs assessment practices on a variety of scales.

Introduction

Instructional designers can be assigned to projects at various stages. They may be assigned to work with a faculty member and provide support on an individual class activity or assist with transferring a face-to-face course to an online environment. Other times, they may be involved in a larger scale project that impact a number of courses being offered within an academic program or department.

Regardless of when instructional designers are integrated into a program, the focal point of their work never changes. The learner is the center of everything that they do. To address the needs of their learners and advocate for them accordingly, it is important to ensure that appropriate and sufficient information has been gathered that can inform their instructional design process. This can be accomplished through conducting a needs assessment.

Purpose of a Needs Assessment

The purpose of a needs assessment is to determine the current state of performance and the desired state of performance (Altschuld & Kumar, 2010). The difference between the current and desired states is where the need lies. While the process of conducting a needs assessment can be very cumbersome and time-consuming, many steps can be scalable to meet the demands of instructional design projects in higher education settings. The purpose of this chapter is to provide an overview of the process of needs assessment and resources to support instructional designers in gathering the necessary information they need to do their jobs.

When conducting a needs assessment, it is important to gather sufficient data to understand the situation warranting instructional solutions. While a needs assessment identifies an existing gap in performance (or an area for improvement), the purpose of needs analysis is to determine what is contributing to the gap in performance and/or problem being addressed. Understanding what factors are supporting or inhibiting a situation can help the instructional designer identify sustainable solutions that will hopefully eradicate the existing gap in performance.

Overview of Needs Assessment Process

Most needs assessments consist of five steps: identification of a problem, identification of data sources, data collection, data analysis, and recommendations. Each of these steps can be scaled to meet the size of a project an instructional designer in higher education may be working on, as well as the time limitations associated with those projects. Table 1 provides an overview of how an instructional designer may address each of these steps during a needs assessment as depicted by Stefaniak (2021).

Table 1.

Overview of Needs Assessment Process

Needs Assessment Step	Description
Identification of Problem	This step is typically completed in consult with a client (or the individual(s) requesting instructional design services). During this phase, the purpose of the needs assessment (the problem) is identified for the instructional designer to begin gathering data to address the gap in performance.
Identification of Data Sources	Once the problem to be explored has been identified, the instructional designer must identify data sources that will help them better understand the situation. The instructional designer must gather data that will help them explore the situation from multiple angles. Examples of data sources include, but are not limited to task analyses, direct observations, focus groups, interviews, document analysis, reviewing existing work products, and surveys.
Data Collection	This phase involves the instructional designer gathering data based on the data sources identified in the previous step.
Data Analysis	Once data collection is complete, the instructional designer begins to analyze all data to identify patterns and factors contributing to the problem identified at the beginning of the assessment. Depending on the findings from the data collection and analysis phases, the problem may be modified to be more consistent with the actual situation as depicted by the data.
Recommendations	Upon identifying patterns contributing to the problem, the instructional designer makes a list of recommendations to present to their client. These recommendations are typically prioritized according to the severity of need and level of urgency.

It is very rare that an instructional designer working in higher education will have the authority to make decisions for an entire design project. These projects often involve collaborating with faculty. Administrators and senior leadership may also be involved in large-scale projects involving the development of new programs or changes to organization infrastructure. Regardless of who may be involved in a project, it is important that every needs assessment project includes individuals who know about the issue, care about the issue, and can help implement any changes that occur as a result of the project (Cavanaugh & Chadwick, 2005).

Additional Resources

1. Framing problems (Svihla, 2020).
2. Determining environmental and contextual needs (Stefaniak, 2020).
3. Guidebook for assessing needs (Watkins et al., 2012).

Asking Questions

An overarching goal of any needs assessment is to identify performance gaps and opportunities for improvement. To make recommendations that can be sustained over an extended period of time, it is important that the instructional designer understands what is causing or contributing to the current state of affairs. By determining what factors are contributing to the current situation, the instructional designer can work with others involved in the project to design and implement solutions directly addressing any gaps in performance.

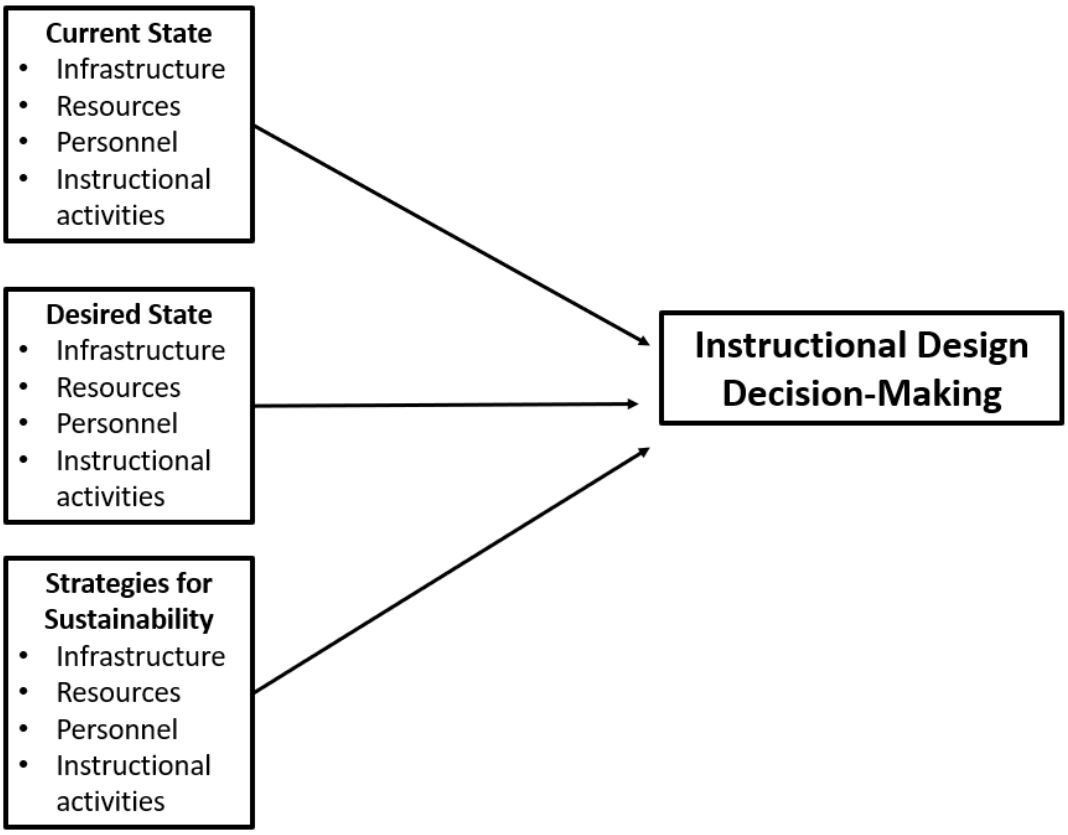
A common misconception that a lot of instructional designers have about needs assessments is that they take a long time to complete. While larger projects will most likely take weeks or months to complete, other needs assessments can be scaled to be completed quickly. There are lots of ways that needs assessments can be conducted rapidly in a matter of a few meetings or days depending on the project.

Conducting a learner analysis at the beginning of a semester is considered a needs assessment activity. Most of the time, instructional design activities that are presented with the ADDIE framework are limited to focusing on learner analyses (Stefaniak & Sentz, 2020). It is important that instructional designers expand beyond the learner analysis to better understand contextual factors impacting the organizational environment.

This can be accomplished by asking questions regarding resourcing, personnel, and plans for sustainability (see Figure 1). It is most beneficial to the instructional designer to ask as many questions as possible during a needs assessment to ascertain a detailed account of the environment. For purposes of needs assessments conducted in higher education, the environment could be considered the classroom, an academic program within a department, a department, a college, or the university as a whole.

Figure 1.

Factors influencing instructional design decisions



An image of current and desired state of affairs factors that influence instructional design decision-making.

Table 2 provides examples of the various types of questions an instructional design may want to consider asking while working on a needs assessment.

Table 2.

Examples of Questions to Ask During a Needs Assessment

Type of Project	Sample Questions
Designing a brand-new course	• What is the instructional delivery format (i.e., face-to-face, online, blended)? • What are the goals of the course? • What type of interaction and social presence does the instructor wish to have in the course? • What is the length of the course? • What aspects of the content will be most challenging for students?
Developing an online course based off a face-to-face course	• What are the goals of the course? • What aspects of the content are the most challenging for students in face-to-face classes? • What type of interaction and social presence exists in the face-to-face classes? • What type of interaction and social presence does the instructor wish to have in the online course?

Developing a new degree program	• What are the goals of the program? • How will courses be delivered (i.e., face-to-face, online, blended) • What type of interaction and social presence does the faculty wish to have in the program? • How will courses be scaffolded to promote complexity? • Are there certain types of learning experiences needed to provide students with an authentic experience?

When working as an instructional designer in higher education, it is important to gather enough information to inform what types of non-instructional solutions may be needed to support instructional efforts. Table 3 provides an overview of how an instructional designer may address each of these steps during a needs assessment as depicted by Stefaniak (2021). It provides a sample list of questions an instructional designer may consider when collecting information for projects warranting instructional solutions.

Table 3.

Example of Project Intake Form

INSTRUCTIONAL DESIGN PROJECT INTAKE FORM

Date: **Client:**

Instructional Designer: **Project Name:**

PROJECT OVERVIEW

1. What is the purpose of the project (instructional need)?
2. What is the scope of the project?
    1. Learning platform (Face-to-face, blended, online)
    2. Overarching course goal
    3. Learning objectives
3. What level of importance is the training? (i.e., severe, moderate, mild)

LEARNING AUDIENCE

1. Who is the intended learning audience?
2. What are the learners' experiences with the project topic?
3. What challenges do learners typically experience with this topic?
4. What are the learners' overall attitudes toward training?
5. What information will the instructional designer have access to regarding the learning audience? (i.e., job observations, meetings with learners, work products, interviews, etc.)

INSTRUCTIONAL ENVIRONMENT

1. How will the instruction be delivered?
2. How will learners access the material?
3. What is the length of the course?
4. What are the learners' roles during instruction?
5. What is the instructor's role during instruction?
6. What types of assessment need to be included in the instruction?

TRANSFER (APPLICATION CONTEXT)

1. How soon after the training will learners apply their newly acquired skills?
2. What are the anticipated challenges with applying these new skills in a real-world environment?
3. What resources are available to support learners during this transfer phase (i.e., job aids)?
4. Who is responsible for monitoring learners with transference?

EVALUATION

1. How and when will the instructional training be evaluated for effectiveness?
2. Who will be responsible for conducting an evaluation?
3. What methods of evaluation will be used to determine the efficiency and effectiveness of the instruction?

OTHER COMMENTS:

Determining Appropriate Data Sources

Once an instructional designer begins identifying questions that will help inform their team in designing appropriate solutions (instructional and non-instructional), it is important to gather data from multiple sources that inform the instructional designer of the current and desired state of affairs and help them approach their design work. Table 4 provides examples of data sources an instructional designer may consider when gathering information.

Table 4.

Data Sources an Instructional Designer May Gather During a Needs Assessment in Higher Education

Data Source	Examples

Interviews	• Conduct individual interviews with instructors • Conduct individual interviews with students who can speak to how instruction is currently delivered • Conduct individual interviews with program leaders to discuss instructional support needed
Focus Groups	• Conduct a focus group with 6-8 instructors at a time • Conduct a focus group with 6-8 students at a time who can speak to how instruction is currently delivered • Conduct a focus group with a group of administrators (i.e., instructors, program leaders, department chairs, etc.) who can discuss instructional support needed
Surveys	• Email surveys to currently enrolled students to seek feedback on current courses and instructional practices
Document Analysis	• Review course syllabi • Review instructors' course sites in learning management system
Direct Observation	• Review videos of instructional meetings from online course activities • Observe face-to-face class sessions to gain an understanding of the instructional content and interactions

Suggested Tips When Conducting a Needs Assessment

Regardless of the project that an instructional designer may be assigned to in higher education, the following suggestions should be taken into consideration while planning:

1. **Identify appropriate people.** Be sure to identify individuals within your organization who are familiar with the project, care about the project, and have the ability and authority to implement any changes that may result from the needs assessment.
2. **Develop intake forms for projects.** A large majority of instructional design support units at higher education institutions require faculty who are requesting support to fill out a form providing an overview of the project. Intake forms help to ensure that everyone involved with the project has a shared understanding of what the project entails, timelines, and resources needed.
3. **Ask WHY!** When gathering data sources and asking questions, do not be afraid to ask WHY? When conducting a needs assessment, asking follow-up questions to help understand why a situation is occurring or what is causing a problem in the organization helps the instructional designer mitigate uncertainty.
4. **Align Needs Assessment Activities with Given Project Constraints.** Every project comes with constraints. It is okay to scale your needs assessment activities based upon the time constraints or resources associated with a project. A needs assessment that an instructional designer may conduct while assisting a faculty member with modifying an existing course will look much different in comparison to supporting a department who wishes to develop a new online degree program.

Books

The following is a list of books that may be of interest to instructional design professionals working in higher education who are interested in learning more about how to conduct needs assessments in higher education. Altschuld, J.W., & Kumar, D.D. (2010). Needs assessment: An overview. SAGE. Kaufman, R. & Guerra-Lopez, I. (2013). Needs assessment for organizational success. Alexandria, VA: ASTD Press. Stefaniak, J. (2021). Needs assessment for learning and performance: Theory, process, and practice. Routledge. Watkins, R., Meiers, M. W., & Visser, Y. L. (2012). A guide to assessing needs: Essential tools for collecting information, making decisions, and achieving development results. The World Bank.

Examples of Needs Assessments Conducted in Higher Education

Ali, N. S., Hodson-Carlton, K., Ryan, M., Flowers, J., Rose, M. A., & Wayda, V. (2005). Online education: Needs assessment for faculty development. The Journal of Continuing Education in Nursing, 36(1). https://edtechbooks.org/-GypM

Babcock, A., Lehan, T., & Hussey, H. D. (2019). Mind the gaps: An online learning center's needs assessment. Learning Assistance Review, 24(1), 27-58.

Bolliger, D. U., & Wasilik, O. (2009). Factors influencing faculty satisfaction with online teaching and learning in higher education. Distance education, 30(1), 103-116. https://edtechbooks.org/-ravb

Lewis, K. O., Baker, R. C., & Britigan, D. H. (2011). Current practices and needs assessment of instructors in an online masters degree in education for healthcare professionals: A first step to the development of quality standards. Journal of Interactive Online Learning, 10(1), 49-61.

Vafa, S., & Chico, D. E. (2013). A needs assessment for mobile technology use in medical education. International Journal of Medical Education, 4, 230-235. https://doi.org/10.5116/ijme.5259.4a88

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Stefaniak, J. (2021). Determining environmental and contextual needs. In J.K. McDonald & R.E. West (Eds.), *Design for learning: principles, processes, and praxis.* EdTech Books. https://edtechbooks.org/-KjB

Stefaniak, J. (2021). *Needs assessment for learning and performance: Theory, process, and practice.* Routledge.

Stefaniak, J., & Sentz, J. (2020). The role of needs assessment to validate contextual factors related to user experience design practices. In M. Schmidt, A.A. Tawfik, I. Jahnke, & Y. Earnshaw (Eds.), *Learner and User Experience Research: An Introduction for the Field of Learning Design & Technology.* EdTech Books. https://edtechbooks.org/-IZHa

Svihla, V. (2020). Problem framing. In J.K. McDonald & R.E. West (Eds.), *Design for learning: principles, processes, and praxis.* EdTech Books. https://edtechbooks.org/-VTiX

Vafa, S., & Chico, D. E. (2013). A needs assessment for mobile technology use in medical education. *International Journal of Medical Education*, *4*, 230-235. https://doi.org/10.5116/ijme.5259.4a88

Managing Instructional Design Projects in Higher Education

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Instructional Design | Higher Education | Instructional Designers | Professional Development | Quality Assurance

This chapter provides newly minted and experienced instructional designers alike with the knowledge to manage Instructional Design (ID) projects in higher education contexts. As instructional designers and instructional design technology scholars, our goal is to help other instructional designers collaborate more effectively with academic and non-academic stakeholders. We provide best practices and templates for managing projects and communicating results. We conclude by suggesting professional development venues aligned with the priorities of the field and institutions of higher education.

Types of Instructional Design Projects in Higher Education

Instructional designers in higher education are involved in five types of ID projects: (1) course development, (2) institutional learning initiatives, (3) pedagogy and educational technology workshops, (4) quality assurance of blended and online courses, and (5) educational technology, pedagogy, and accessibility support. In the next five sections, we elaborate on these types of ID projects to emphasize the need for project management skills in ID practice (i.e., the sixth(6) section).

1. Course Development

The first type of ID project is course development. Instructional designers' primary role is to collaborate with faculty members on developing new courses and redesigning existing courses that meet quality assurance standards. Instructional designers also collaborate with other stakeholders in selecting and implementing educational technologies and pedagogical approaches to online, hybrid, face-to-face, and web-enhanced courses. Regardless of the instructional design team's composition, instructional designers rely on consistent processes for different instructional development types with quality assurance in mind. The typical types of course development include creating new course offerings, redesigning current courses, and enhancing in-person courses with educational technology. Full-time faculty may receive a stipend to develop brand-new courses in collaboration with instructional designers. Instructional designers are responsible for guiding the course development process from the initial meeting to the final quality assurance criteria based on established rubrics/guidelines.

Throughout the course development process, instructional designers are responsible for facilitating the course development process while ensuring that all quality assurance elements are present (e.g., Universal Design, Community of Inquiry, instructional alignment, technology requirements, and accessibility). Quality assurance rubrics (e.g., Quality

Matters, Blackboard Exemplary Course Rubric, or tailored rubric by the institution) come from research-based evidence that specifies mandatory requirements for all courses to support student learning.

2. Institutional Learning Initiatives

The second type of ID project involves leading or supporting learning initiatives at institutions of higher education. While these learning initiatives are different across institutions, Instructional designers participate in several projects that support pedagogical outcomes and educational technology practices. For a better perspective on the trends of teaching and learning in higher education worldwide, instructional designers should familiarize themselves with trends in five categories (i.e., social, technological, economic, higher education and political) as described in the Horizon Report (EDUCAUSE, 2021).

For example, instructional designers can support faculty in experiential learning, civic engagement, service-learning, micro-learning, flipped classrooms, game-based learning, adaptive learning, and undergraduate research for pedagogical practices. For technology practices, instructional designers can provide faculty support with Open Educational Resources (OERs), mobile learning, immersive learning experiences, video conferencing tools for collaboration, proctoring platforms, content curation, authoring tools, and learning analytics to support student outcomes.

3. Pedagogy and Educational Technology Workshops

Even though public higher education institutions face reduced state funds every year, institutions rely on student enrollment numbers and grants to support their academic and research operations. For this particular reason, pedagogy and technology choices need to be effective and aligned with institutional priorities. Technology integration frameworks and taxonomies help instructional designers and institutional stakeholders assess the impact of educational technology. Well-known technology integration frameworks include: Technology Acceptance Model (TAM) (Davis et al., 1989); Replacement, Amplification, and Transformation (RAT) (Hughes et al., 2006); Substitution, Augmentation, Modification, and Redefinition (SAMR) (Puentedura, 2013); and Technology Integration Matrix (TIM) (Florida Center for Instructional Technology, 2005).

4. Quality Assurance of Online and Blended Courses

Each institution is different in their implementation of course development and quality procedures. Quality assurance checks can be either informal or formal. In informal quality assurance , instructional designers generally check one or two aspects of online and hybrid courses based on rubrics. For example, instructional designers may check if all institutional policies and technical support information are present in online courses for a given program. In formal quality assurance checks, instructional designers are responsible for implementing quality assurance throughout the course development process. For example, using the Quality Matters Higher Education rubric informs all design aspects of a course and evaluates the course design upon completion.

5. Educational Technology, Pedagogical, and Accessibility Support

Instructional designers possess project management skills necessary to support stakeholders in educational technology, pedagogy, and accessibility. Depending on the reporting and structure, instructional designers may be designated liaisons for specific educational technology and accessibility resources. instructional designers may also answer questions about Learning Management Systems (LMSs) (e.g., using new instructional technology tools) and make instructional materials accessible. Regardless of the delivery format (e.g., face-to-face, hybrid, fully online, or blended courses), it is crucial that instructional designers help create learning environments that are inclusive and responsive to students' diverse needs. Ensuring accessibility of learning materials and resources is a crucial step in creating equitable and inclusive learning environments. To do so, instructional designers reference resources that explain how to create accessible content. Below is a summary of the fundamental principles based on the recommendations provided by the ADA (Americans with Disabilities Act), Quality Matters rubrics, and the Universal

Design for Learning principles (CAST, 2010; Quality Matters, 2021; Rabidoux, S., & Rottmann, 2017) that should be considered when designing courses, especially online courses:

● Images that are part of course content, including graphs and charts, should include descriptions. It can be done by providing descriptions in a separate document or providing descriptions using the alternative text feature embedded in the course LMS/development tool.

● It is important to use the appropriate hierarchy of different header levels (e.g., Heading 1, Heading 2, Heading 3, etc.) in documents provided as learning materials, such as a course syllabus and course web pages. Doing so ensures that learners with accessibility needs can easily navigate through documents or a particular course site.

● Considering the appropriate contrast of text and the background color is important to ensure usability and readability: The stronger the contrast, the better readability.

● Audio and video materials should be provided with written transcripts. Audio should be of good quality in both audio and video materials. Videos should be close-captioned and ensure closed captions provide accurate information of what is shown in the video. In addition, it is good practice to provide students with alternative ways to interact with the learning material such as providing accessible documents of lecture slides (e.g., accessible PDF files).

● Learning materials, such as Word or PDF documents, should be searchable, meaning that learners should be able to search for specific terms, words, or phrases within a document. Additionally, images that are part of the content, such as charts or graphs, should be described and tagged. In addition, it is important to make sure files contain the full file extension (e.g., .doc or .docx for Word files, .pdf for PDF files, .ppt or .pptx for PowerPoint files).

● Learning content should be presented clearly and logically so that learners can organize their knowledge and material in coherent mental structures. Learning activities should provide learners with options that allow them to demonstrate their knowledge and skill to their best ability. For instance, students could be given options on how to participate in introductory discussions such as writing a post or recording a short introductory video.

Below is a list of useful resources that Instructional Designers can refer to when ensuring accessibility of courses. Such resources include:

● Making your Word documents accessible to people with disabilities provided by Microsoft

● Creating accessible PDFs by Adobe

● Universal Design for Learning (UDL) Web Accessibility guidelines

● Web Content Accessibility Guidelines (WCAG)

● Some learning management systems (LMSs) have accessibility checkers. In addition, the following free online resources can be useful when checking course pages for accessibility: Test with Wave and Contrast Checker

6. Project Management for Different ID Projects

Project management is an essential skill for instructional designers to handle the above-mentioned types of ID projects effectively. According to the Project Management Institute (PMI, 2004) “Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements" (para. 5). Regardless of the organizational culture and type of ID project, Thamhain (1991) states that instructional designers must have three qualities: (1) interpersonal skills, (2) technical expertise, and (3) administrative skills. Interpersonal skills refer to skills related to providing direction, communicating, and dealing with stakeholders. Instructional designers bring a robust technical skill set that enables them to manage the technical aspects of projects and translate project requirements to stakeholders with varying degrees of understanding of technical knowledge. In terms of administrative skills, instructional designers must be able to organize, track, communicate, and oversee projects’ progress at different stages.

Instructional Design Project Management (IDPM) models incorporate elements of project management and the ID process to guide projects through the project management lifecycle of (1) initiating, (2) planning, (3) executing, (4) monitoring and controlling, and (5) closing. Greer (1992) created the 10-step ID project management model that guides instructional development. The first two steps of the project planning phase include project scope definition and project organization. The next five steps include information gathering, blueprint development, draft material creation, draft material testing, and master materials production in the instructional development phase. The follow-up phase focuses on three steps related to the production, distribution, and evaluation of instructional materials.

Gentry (1994) created the instructional project development and management model with eight processes that embed project management within the ID process. In Gentry's IDPM model, ID processes (i.e., production, design, adoption, needs assessment, evaluation, operation, installation, and prototyping) are interrelated steps that are sustained by six supporting components (i.e., management, facilities, personnel, resource acquisition and allocation, information handling, and communication). While supporting components are interdependent and interrelated to ID processes, executing project management processes efficiently is essential in the instructional design process.

Yang et al. (1995) used project management principles in software engineering to create a procedural workflow that describes the type of production activity in three phases: analysis, development, and evaluation. The analysis stage involves analyzing goals, learners, and resources. The development stage consists of constructing content, selecting strategies, materials, media, settings, and design measurements. The evaluation stage requires the implementation and pilot testing of instructional solutions.

Instructional Designers and Work Environments

Academia provides a diversity of work environments in which instructional designers perform their daily duties and take on new learning initiatives. Instructional designers' work environment defines the effectiveness and capacity for leading and collaborating with academic and non-academic departments on instructional design and technology-related projects. In short, instructional designers' work environment characterizes their capacity to manage projects. The most common types of higher education work environments that instructional designers work in are: (1) Centralized instructional design units (serving all universities' schools, colleges and departments), (2) Decentralized instructional design units (dedicated to schools, colleges, and departments), and (3) A mix of decentralized and centralized instructional design units. In all three types of work environments, instructional designers work in academic reporting lines (i.e., their role is placed in an organizational chart with the Dean, Provost or Academic Vice President on the top) or in non-academic staff/IT reporting lines (i.e., their role is placed in an organizational chart with a non-academic leader such as Vice President of Information Technology on the top; Drysdale, 2018).

Although the volume of projects and management strategies could be different to some extent, based on our experience, we believe that it does not matter whether an instructional designer is working in a centralized or decentralized instructional design unit. We do not think that there is a perfect way to organize instructional design units in higher education or in which instructional designers can manage their projects and perform their duties. Due to the specific and diverse organizational cultures, the institution's size, and the strategic plan each institution has in place to serve its mission, organizing ID units cannot follow a 'one-size-fits all' approach. Additionally, research on this topic is limited (Drysdale, 2018). Therefore, it is not certain as to what an ideal higher education work environment for instructional designers should be.

However, we advocate that instructional designers must work in academic reporting lines in either centralized or decentralized units. Instructional designers are as equally important as other academic staff and faculty and should be given the same resources, professional positions, and respect to manage their projects in a rigorous manner. Instructional designers – trained professionally as instructional designers – have received (and continue to receive) training to design learning and performance improvement in diverse contexts. They are trained in learning/educational psychology, ID theory, curriculum development, media design, applied research, educational and human-performance technology, project management, and many other aspects that qualify them to be academic staff or faculty members.

Central to their role, instructional designers collaborate with other academic staff and faculty to manage their projects effectively. In this case, placing instructional designers in a non-academic reporting line will most likely provide limited opportunities for collaboration and mutual respect – a challenging factor for instructional designers to manage their projects. For example, an instructional designer working within an IT unit in a non-academic reporting line will most likely be perceived and approached by faculty as tech support staff. This instructional designer will not be given a role in making design decisions on course design and delivery that can prevent design failures (Lachheb, 2020). Instructional designers, in this case, will have a limited (if any) role in managing their projects.

Additionally, instructional designers design for learners, not for consumers. Instructional designers working under non-academic reporting lines could be constantly pressured to prioritize efficiency over thoughtful and slow design processes. They will be asked to adopt rapid/cheap processes for course development that mimic product development processes, to prioritize volume of work over quality, and will be constantly judged by metrics that cannot capture the rigorous work they do. An instructional designer working within an academic reporting line usually is well-positioned within the institution to have an active and rigorous role in design for learning. From the initial meeting with a faculty member member to a course launch, evaluation, and iteration, an academic instructional designer acts as the guarantor of design (Nelson & Stolterman, 2012). Instructional designers working in academic reporting lines will have the opportunity to put their training into practice, enrich the learning experiences their institutions offer, and, most importantly, fully utilize their skills to make learning better.

Best Practices for Instructional Design Project Management

During the ID process, Instructional designers need to keep their supervisors updated about their ID projects' progress. The following practices help ensure well-coordinated, effective, and efficient ID project management.

1. Clear Communication

Clear and concise communication, both oral and written, is key for managing ID projects effectively. Such communication occurs at different stages. During the first stage, instructional designers usually meet with faculty members for the first time to discuss a course design project (i.e., an overview of the course, its learning outcomes, assessment, and what kind of support faculty members need). It is crucial that instructional designers clearly understand how to best help faculty during the ID process and clearly communicate to faculty members. It is helpful to document key takeaways from the initial meeting which include tasks for instructional designers and/or faculty members to complete, timeline for completing tasks, and further design steps. A communication plan helps instructional designers keep their projects on track and avoid misunderstandings or confusion between instructional designers and faculty members. Additionally, documented meetings with key takeaways makes it easy for Instructional Designers to share progress with supervisors.

During the second stage, instructional designers communicate with faculty members on the course design process's progress and agree on the next design steps. Communication takes place via emails or virtual meetings. It is good practice to keep emails and meetings concise and on task. During the third stage, instructional designers and faculty members are ready to finish designing the course. Instructional designers review the course and identify anything that needs to be added or modified.

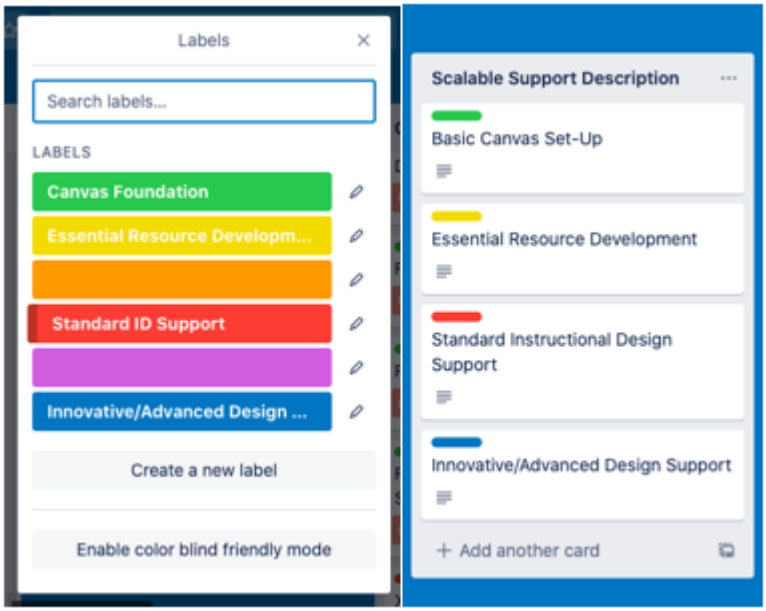
2. Well-Articulated Project Framing

It is critical that instructional designers identify the goals and scope of a project from the initial meeting. This is done to ensure that other stakeholders (e.g., faculty members, other instructional designers, supervisors) understand the project's identified goals and scope. One of the best practices is distinguishing among different types of ID projects and levels of support that faculty need. The rationale behind this is to help instructional designers prepare project planning that includes the estimated time for a project's completion.

One example of different support types is basic ID support, standard ID support, and advanced ID support. Typically, basic ID support includes an ID consultation and resource sharing including a course site template that faculty can reuse. Standard ID support involves building a new course using a template and focusing on the alignment between course content and assessments. Advanced ID support includes facilitating cross-departmental collaboration, creating interactivity and learner engagement activities, using enhanced branding and A/V content, and evaluating and aligning learning outcomes. One useful way to efficiently keep track of different ID projects is to use a web tool for project management, such as Trello, that allows for the use of labels and color codes for different projects (Figure 1).

Figure 1

A Screenshot of a Trello page showing Labels and Color Coding of Different ID Project Types



A Screenshot of a Trello page showing Labels and Color Coding of Different ID Project Types

3. Progress Tracking

Proper time management is at the core of ensuring that ID projects are completed in a timely manner. Therefore, instructional designers should find proper tools to keep track of projects. One way to track projects is to create a checklist with an estimated timeline and cross off items as the project progresses. Regardless of the tool, there should be an agreed upon system in place between instructional designers and supervisors to properly track project progress and a mutual understanding of the frequency at which the tool will be updated.

4. Project Close-Out and Reflection

Although there are certain general types of ID projects, each course design project is unique, and instructional designers always learn something new from each project. It is good practice to create a close-out document upon project completion and to share with faculty. A close-out document would include the name(s) of the instructional designer(s) and faculty, brief information about the project, lessons learned, ideas for the future, and links to project design assets (e.g., a link to a built course site, graphics created for a course site, etc.) The purpose of using this project close-out document is two-fold. First, it is provided to faculty to share key resources to maintain their courses. Second, it serves as a reflection tool for instructional designers (Lachheb & Boling, 2020).

Lessons-Learned from Instructional Design Practitioners

In a survey of instructional designers in higher education by Intentional Futures (2016), the top ten challenges that instructional designers face are the following: (1) lack of faculty buy-in, (2) time, (3) resources, (4) leadership/administration, (5) tools and technology, (6) institutional bureaucracy, (7) awareness, (8) project management, (9) pedagogy, and (10) working with Subject Matter Experts (SMEs). Even though instructional designers may experience these challenges in varying work and reporting structures, we offer five suggestions that enable Instructional Designers to handle their job responsibilities and ID projects effectively.

1. Set a Communication Plan

While instructional designers rely on ID processes to accomplish design and development tasks, ID processes do not account for the preparation of a communication plan to engage with stakeholders. Regardless of the ID process, instructional designers need to allocate time for preparing a communication plan that sets the frequency of communication and project expectations. A communication plan also enables instructional designers and stakeholders to formatively assess ID projects at different development stages. Instructional designers should be aware that stakeholders, especially those new to working with an instructional designer, may be reluctant to provide project updates. For this reason, instructional designers should provide examples of successful ID projects and a communication plan that allows stakeholders to set a baseline for project success.

2. Invest Time in the Analysis of ID Projects: Do Your Homework

Instructional designers in higher education are often involved in several projects at once. Reflection of day-to-day tasks is essential to understanding the time commitments devoted to each project. While ID processes guide the creation of instruction, new instructional designers frequently spend more time in development tasks. However, experienced instructional designers “do their homework” before embarking on a new design project. They invest additional time in the analysis phase of project requirements, audience, instructional activities, and assessment.

3. Leverage Templates or Rubrics to Improve Efficiency

Establishing a workflow enables instructional designers to correctly identify requirements, assessments, and activities throughout the ID process. During and between steps in the ID process, smaller steps in ID projects support project milestones including creating objectives, uploading assessment items, creating modules, and performing informal quality checks. However, these smaller steps are time-consuming tasks and may distract instructional designers from allocating project time effectively. Templates and design precedents (Boling, 2020) allow instructional designers to work efficiently and spend less time on repetitive tasks.

4. Seek Professional Development as a Continuous Endeavor

Attending excellent professional development allows instructional designers to learn new ID tools, thus, enrich their ID toolbox, and strengthen their professional relationships with stakeholders. Effort toward professional development should not be limited to one-time events such as conference presentations and workshops. Instead, professional development should be considered as a continuous endeavor toward seeking research-based evidence in pedagogy and educational technologies that support different instructional contexts and types of learners.

Instructional Design Project Management and Course Development Templates

Modalities of learning are evolving as the nature of higher education changes. Learners have become global and diverse. Higher education institutions strive to succeed in the 21st-century global environment. Meeting diverse learners’ needs through offering accessible programs and courses for online and non-traditional learners is a priority. These rapidly changing factors call for rigorous professional character among instructional designers who could be true

agents of change and guarantors of design (Nelson & Stolterman, 2012). We believe the following ID project management practices would support instructional designers' work in a rapidly changing higher education landscape.

Instructional Designers' Interpersonal and Communication Skills Built Around Project Management

For an instructional designer involved in a project, stakeholders are the primary beneficiaries of the project deliverables, services, or outcomes. In daily operations, instructional designers collaborate and communicate with each stakeholder at different levels of the institution. For high visibility projects, such as online program development with many stakeholders, instructional designers need to make sure the wider audience has accurate information about the project. Instructional designers need to know each stakeholder's role clearly and communicate at all authority levels. Interpersonal and communication skills are essential for instructional designers to manage a successful project.

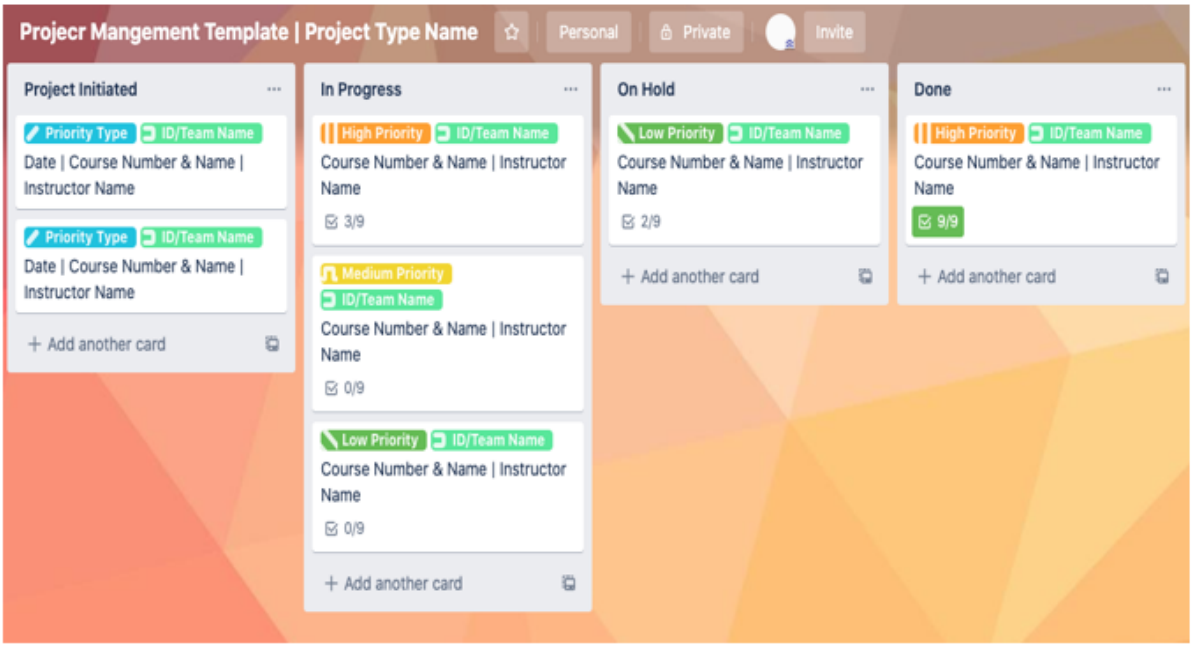
Instructional Design Project Management Process and Templates

Richey et al. (2001) identified four roles for instructional designers: analyst, evaluator, e-learning specialist, and project manager. The project manager's role is essential and provides solutions to the changing demands in higher education. When managing a project, instructional designers plan the project's scope and create a Work Breakdown Structure (WBS) by dividing the project deliverables and work into manageable components (e.g., design and build a plan with specific milestones for the project). During the implementation process, they perform the planned design and development efforts and engage the stakeholders to ensure that adequate information is exchanged with them.

At the end of the project, instructional designers review the project to ensure outcomes (e.g., online courses and programs) meet standards or quality assurance. They may also verify that project implementation was completed according to the agreed upon services with stakeholders through feedback collected to enhance these deliverables in the future (e.g., feedback surveys). The following template provides an example to help instructional designers or instructional designer teams manage a project and track progress. If necessary, the stakeholders can also be added to engage with the process by receiving up-to-date project statuses and exchanging effective information (Figure 2).

Figure 2

Instructional Design Project Management Template using Trello



Picture of a Trello planning template

Further, course design tips are offered through a lesson planning template, which aligns a broad course goal, a lesson objective, student learning outcomes, and student learning artifacts. This template can also be easily adapted into a course blueprint for the early stages of course planning.

Professional Development for Instructional Designers

Professional development efforts should focus on staying current in pedagogical and technological approaches. International and national conferences are great venues for presenting and sharing knowledge with colleagues. In contrast, local and regional conferences provide a close-knit network of professionals dedicated to educational technology support and course development management. Table 1 (see next page) summarizes the conferences dedicated to ID and online learning in higher education and the different types of audiences these conferences best serve (See also Inside HigherEd which delivers a directory of conference events in higher education).

Table 1

National and Regional Conferences and Who They Best Serve

National & International	Who They Best Serve				
	Instructional Designer/ Consultant	Instructional Technologist/ Tech. Coach	Educational Technology Director	Faculty/ Researcher	K-12 Teacher
Association for Educational Communication and Technology (AECT)	•	•	•	•	•

American Talent Development (ATD)	•	•	•	•	
Online Learning Consortium (OLC)	•	•	•	•	
International Society of Technology in Education (ISTE)		•	•	•	•
American Educational Research Association (AERA) - Instructional Technology Special Interest Group	•	•	•	•	•
University Professional and Continuing Education Association (UPCEA)			•	•	
International Council for Open and Distance Education (ICDE)			•	•	
EDUCAUSE			•	•	
Open Education Conference (OpenEd)	•	•	•		
Distance Teaching and Learning (DT&L) Conference		•	•	•	
Association for the Advancement of Computing Education (AACE)	•	•	•	•	•
Society for Information Technology and Teacher Education (SITE)	•	•	•	•	•
EdMedia + Innovate Learning	•	•	•	•	•
Association on Higher Education and Accessibility (AHEAD)	•	•	•	•	•
Regional Organizations					
Summer Institute on Distant Learning and Instructional	•	•	•	•	

Technology (SIDLIT)					
Association for Career and Technical Education (ACTE)	•	•	•		
Focus on Teaching and Technology (FTTC)	•	•	•	•	
eMints National Center		•			•

Instructional Designers should be able to self-assess professional knowledge and take steps towards professional growth and learning aligned with institutional goals. In the ID field, prominent professional organizations are the American Talent Development (ATD), Association for Educational Communication and Technology (AECT), Online Learning Consortium (OLC), International Society of Technology in Education (ISTE), and International Board of Standards for Training, Performance, and Instruction (IBSTPI). Table 2 provides information on each organization's competencies and different distance learning quality frameworks that can be sought.

Table 2

Instructional Design Competencies and Distance Learning Quality Frameworks

Instructional Design Competencies	Distance Learning Quality Frameworks
ATD - Competency Model for Learning and Development Professionals	International Council for Open and Distance Education: Quality Models in Online and Open Education Around the Globe
AECT - Instructional Design Standard for Distance Learning	National Standards for Quality Online Programs (for K-12)
ISTE - Standards for Teachers, Students, Leaders and Coaches	iNACOL National Standards for Quality Online Programs
IBSTPI - Instructional Designer Competencies	Blackboard Inc Exemplary Course Program
	OLC - Five Pillars of Quality Online Education
	QM Higher Education Course Design Rubric

Conclusion

In this book chapter, we detail our professional experiences regarding the different types of projects that ID professionals manage within their respective institutions of higher education. In return, instructional designers of varying degrees of professional experience can equip themselves with an understanding of how their work

environments and reporting structures influence the management, collaboration, and implementation of ID projects. We hope that instructional designers enhance their existing pedagogical and technical toolkit to support the development of effective, efficient, equitable, and enjoyable learning experiences. Instructional designers possess diverse skill sets that are important to maintain and enrich through professional development events and opportunities. The significant ID project management practices shared in this chapter will support instructional designers' work in a rapidly changing higher education landscape.

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Designing with Instructional Continuity in Mind

Natalie B. Milman & Ryan Watkins

Instructional Design | Instructional Designers | Instructional Continuity | Academic Planning | Disaster Planning | Crisis Planning

This chapter provides instructional designers working in institutions of higher education (IHEs) with an introduction to the complexities of supporting instructional continuity amid the numerous and varied realities that make it challenging for students or faculty to complete a course as designed. From pandemics to hurricanes and unexpected illnesses to terrorism, there are many events that can interrupt instruction. Instructional designers can help minimize the impacts of such disruptions by employing a variety of tactics. In this chapter we define instructional continuity, explore the role of instructional designers in cultivating it, highlight some best practices, outline major implications for instructional designers, and share several resources to prepare for if/when there are events that interrupt the teaching-learning process.

What is Instructional Continuity?

Life does not always go as planned. *Instructional continuity,* sometimes referred to as academic continuity or continuity of teaching and learning, is the capacity to maintain course schedules when plans are disrupted, typically by unanticipated events beyond anyone's control. Unexpected events leading to short-term or extended closures of campuses or course cancellations can occur for a variety of reasons: inclement weather, widespread illness, family emergencies, terrorist attacks, etc. Mitroff et al. (2006) developed a comprehensive list of the different types of crises that might occur in IHEs, as well as "ticking timebombs" (p. 6) that IHE stakeholders should be aware of and prepare for in case any occur. Mitroff et al. (2006) also noted that "most major crises do not consist of a single, isolated event but instead involve a complex chain of crises that the originating catastrophe sets off" (p. 62). Keeping this in mind when designing for instructional continuity is critical because there will likely be both expected *and* unanticipated effects resulting from any crisis that will need to be addressed or considered.

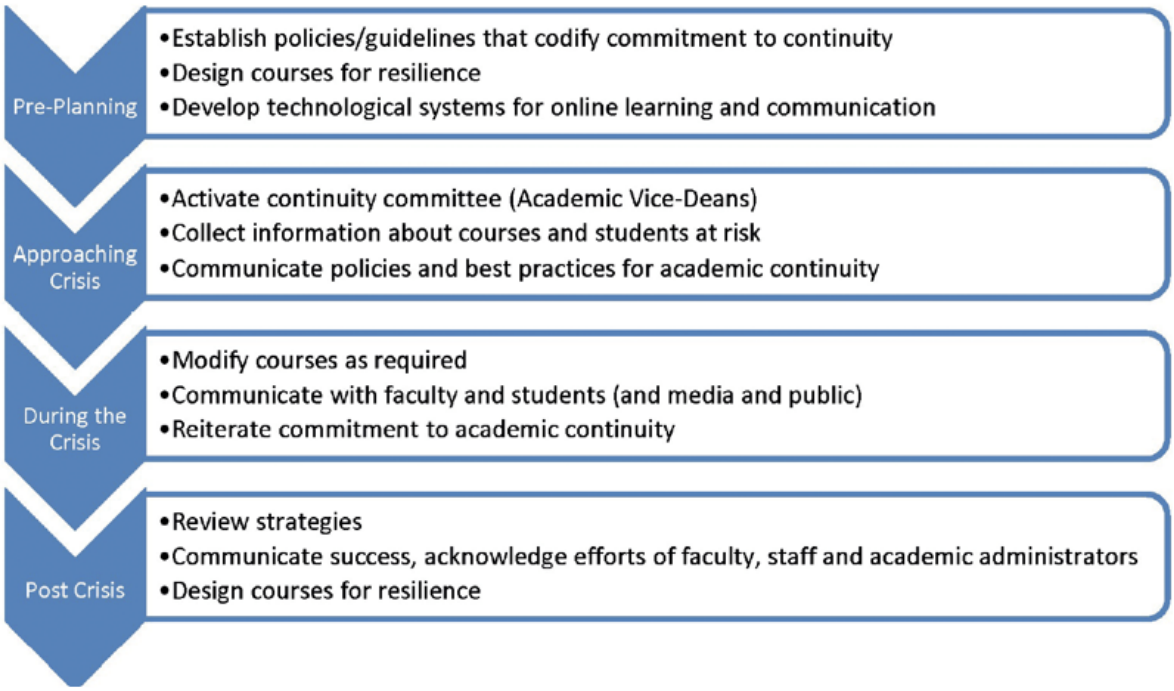
What is the Role of Instructional Designers in Supporting Instructional Continuity in Institutions of Higher Education?

Instructional designers in IHEs have varied tasks and responsibilities (Beirne, & Romanoski, 2018; Halupa, 2019; Hart, 2020; Intentional Futures, 2016; Ritzhaupt & Kumar, 2015; Rubley, 2016; Sugar et. al., 2011; Xie & Rice, 2021). Since many designers support course design and implementation, as well as faculty professional development, they play significant roles in helping faculty develop and implement plans for instructional continuity**.** Regehr et. al.'s (2017) academic continuity model (see Figure 1) shows four phases of instructional continuity where instructional designers

might concentrate their efforts. For instance, they might develop and lead training to teach faculty strategies and tools for instructional continuity, as well as incorporate instructional continuity strategies in curricula they help to develop or redesign. Instructional designers can use this model to help them develop, evaluate, and revise instructional continuity plans.

Figure 1

Regehr, Nelson, and Hildyard's Academic Continuity Model (2017, p. 82) Used with permission.



Visual outlining the steps in the Academic Continuity Model

Why is Instructional Continuity Important?

Though 2020 will go down in history as a year of worldwide disruption of our everyday lives and functioning, disruption is not unusual and preparedness is important as natural and human-made disasters have demonstrated, such as the 9-11 terrorist attacks, Beltway Snipers, Hurricane Katrina, Virginia Polytechnic Institute and State University shooting, H1N1 pandemic, Snowmaggedon, Christchurch earthquake, and more (see Mitroff et al., 2006). Frequently, disruptions are expected and occur with advanced notice, though often they do not. Some might only involve a few students and others will affect everyone within an entire university and/or geographic region. For example, a weather event in a local area may disrupt the ability for students to meet for classes on-campus, whereas a weather event in a distant area may impact the ability of students living in that area to access/participate in their courses online while the institution in which they study operates business as usual. Therefore, as instructional designers help faculty design and/or implement their courses, they can/should also incorporate instructional continuity strategies. These strategies could be as simple as including emergency contact information in syllabi, or more comprehensive, such as applying a modular design of courses to provide flexibility if/when there is disruption.

What are Best Practices for Instructional Designers to Support Instructional Continuity?

For instructional designers in higher education, successful instructional continuity during disruptions comes from being prepared at the institutional (see U.S. Department of Education, 2013) and course level. This often involves communicating and working with a variety of stakeholders within IHEs such as deans, department chairs, and information technology support staff, as well as developing continuity readiness and contingency plans – and more.

Although IHE administrators are responsible for preparing and coordinating with many stakeholders on and off campuses (e.g., financial impact, staffing, housing, etc.) when disruption occurs, there are several preparations that instructional designers should consider in relation to instructional continuity. By aligning continuity plans with various other plans (e.g., communication, resource prioritization, and assessment plans), instructional designers can be prepared for transitions during unexpected events. Moreover, instructional designers should be aware of emergency preparedness and evacuation plans in place that might impact the whole IHE.

Institutional Level Best Practices

Contingency Plans

Although many, if not most, disrupting events are unexpected, having contingency plans in place is beneficial, even if they are generic and not tailored for each type of disruptive event. For instructional designers, contingency plans can be based on general risk assessments for impactful events. For example, instructional designers who work near the Gulf of Mexico should have contingency plans for hurricanes. Unfortunately, IHEs should now have contingency plans for terrorist and shooting attacks which may close a campus for substantial periods. A necessary first step in contingency planning is conducting a *risk assessment* (or identify one already created for the institution) to determine the likely impacts of various disruptive events.

The contents of contingency plans will vary among IHEs, but their authors should be aware of the *diverse impacts* an event can have on IHEs: safety, physical space, finances, student housing, commuting patterns, and so forth. Many of these will have direct or indirect, influence on the appropriate instructional resources and responses. It is important to remember that many disruptive events can impact the *whole community*. Contingency plans should include alternative approaches for maintaining continuity for instructional designers, other staff, the teaching faculty, and students. These communities should know that contingency plans exist, as well as where to find additional information if/when a disruption occurs. Instructional designers should be proactive and share links to these resources with instructors and in course syllabi when appropriate. For example, if a natural disaster occurs everyone should know where to find necessary information (i.e., a website, a phone number, a Twitter account) and resources that will inform them on the steps necessary for maintaining instructional continuity.

Communications Plans

As highlighted during the COVID-19 pandemic, instructional designers can be considered "first responders" who provide critical support services to instructors when disruptions occur (Koenig, 2020, para. 1). Just as students should know how to contact their instructors, instructors should also be aware of the institution's plans for how to communicate with instructional design support services. For example, if there is a weather event and classes shift online for a short period of time, should instructors email requests for help, submit a "ticket," or call the office number? Regardless of the correct answer, this information should be shared with instructors so they are prepared because it cannot be assumed that Internet access will be readily available during the disruption.

Resource Prioritization Plans

During disruptions there are typically competing demands for instructional designers' help. Therefore, it is best to develop policies for instructional designers' time before any disruption. For instance, do courses with lab components get higher priority for assistance than those that are lecture-based? Do instructors with large enrollments

receive assistance before those teaching small courses? There are numerous considerations unique to the institution, but having procedures in place prior to disruptions will make it easier for instructional designers to schedule their time and avoid potential conflicts with instructors – especially if they are using established rather than ad-hoc protocols.

Assessment Plans

As accredited institutions, instruction in IHEs involves assessing student learning. When disruptions occur, assessing student learning becomes challenging. For instance, in-class exams often used during normal operations may not be feasible during a disruption. Instructional designers should be aware of available strategies and resources for designing diverse types of assessments that instructors might use (e.g., see Darby, 2020). From proctoring tools to recorded presentations and team collaboration tools, being prepared to offer alternatives for assessing student learning during disruptions is key to success.

Course-Level Design Best Practices

As noted previously, instructional designers often work directly with instructors to create robust designs (and re-designs) for their individual courses. There are several steps instructional designers can take when designing or redesigning courses to address any disruptions that might occur. The following includes recommendations for instructional designers when designing courses with instructional continuity in mind. Instructional designers should:

1. **Develop and share communications plan:** Include a detailed communications plan for all courses consisting of contact information for the instructor and alternative communication methods (if available). Do not assume that email services will be available during a disruption or that all students will have access to internet to locate contact information. For example, it is good practice to emphasize that students should download/keep course contact information for communicating with instructors and other institutional support services (i.e., email, phone, and website information). Likewise, students should also be strongly encouraged to contact the instructor with information about their status as soon as it is safe following a disruption.
2. **Prioritize and differentiate objectives:** Instructors should identify the most important objectives and determine which are most flexible to move to alternative delivery formats such as asynchronous online. This will enable instructors to more easily and readily teach in an alternate format. Unfortunately, if instructors do not know which objectives are essential, the transition will often be harder for them and more confusing for their students.
3. **Clearly describe assignments:** Good instructional design involves explicit articulation of expectations. Clearly described assignments not only help students understand what is expected, but in times of disruption, will also ensure they know what to do (e.g., consider using the Transparent Framework by Winkelmes, 2014 detailing how to access, complete, and submit assignments).
4. **Diversify assessment strategies:** When course designs already include a variety of instructional strategies (e.g., project-based learning, direct instruction) then the transition to an alternative format will often be less disruptive to the routines that students have established. For example, if students only experienced traditional lectures with little peer interaction during most of a term and then after a disrupting event the course moves to asynchronous online learning, students will be less prepared for independent learning, online engagement, or collaboration with peers than if they had already engaged in these before the disruption.
5. **Use digital feedback strategies:** Communicating and providing feedback to students is an essential element of quality instruction. Instructional designers should help faculty develop robust alternatives for providing feedback. For example, if an instructor is only providing written feedback on paper assignments submitted in-person during class, then the shift to a digital format could lead to substantial challenges. Whereas if the course was already designed to utilize digital assignments, then the change would likely be easier for the instructor and students.
6. **Modularize instruction:** Creating flexible instruction routinely involves modularizing instruction into semi-independent chunks. With modular designs, updates or changes can be made to smaller units of instruction without affecting other units. For example, if a course design includes 10 units (modules) of instruction and a disruptive event occurs during unit 4, then changes can be made to units 5 - 7 without requiring re-design of the whole course.
7. **Incorporate a variety of instructional strategies**: As an instructional designer it is valuable to have a diverse and long list of instructional strategies to recommend to instructors as they create contingency plans. Hirumi (2014) offers detailed descriptions of numerous instructional strategies that are grounded in research. This list can be supplemented with other unique strategies that are considered effective in one's institutional context.
8. **Design for equity, access, and care**: When developing flexible design for courses, it is important to reflect on equity and access challenges students and instructors may encounter. Creating contingency plans that address instructional objectives, equity, and accessibility for all students is the goal. Throughout the course design, instructional designers should apply universal design for learning (UDL) guidelines (CAST, 2018) and design justice principles (Design Justice Network, 2018). Incorporating human-centered design (Karakaya, 2021) which fosters a pedagogy of care is critical as students and instructors might need emotional support in addition to the course design practices described in this chapter. Instructional designers should also remind faculty to note individual student equity, access, accessibility, and emotional needs to tailor accommodations as needed and connect students with the necessary resources to address their needs.
9. **Practice:**Instructors should prepare students to use course conventions and technology tools to support instructional continuity. The time to help students prepare is *before the disruption* and this can be done early in courses by integrating student success skills such as time management or note taking (while watching online lectures incorporating course content, exercises, and assignments) and practicing using course technologies and protocols.

Implications for Instructional Designers in Higher Education

Instructional continuity and its associated challenges have a variety of implications for instructional designers in IHEs. First, it is critical for instructional designers (and those who prepare and support them) to acknowledge the value of instructional continuity in IHEs. Second, it is equally important for instructional design-related competencies and standards, as well as professional development, to incorporate instructional continuity planning. For example, IHEs offering instructional design workshops to faculty should include instructional continuity planning in that curriculum or if the IHE has a syllabus template for instructors, continuity planning elements should be integrated into the template.

Third, instructional designers should identify areas for self-improvement and professional growth related to instructional continuity planning. For instance, as disruptions occur, instructional designers should reflect on, document, and share lessons learned and determine areas for skills development and growth. Fourth, instructional designers should consider how they can capitalize on existing professional networks and how they might expand them via social media and professional associations to determine ways to improve instructional continuity planning and implementation. Since the onset of the COVID-19 pandemic, the topic of instructional continuity planning has appeared in many professional forums. Hopefully instructional continuity will continue as a focus area or topic of interest since the time to plan for future disruptions is before they happen. Finally, better understanding of the evolving roles of instructional designers within IHEs will likely result in better coordination among various stakeholders (e.g., IT departments, deans, department chairs) to address the many challenges associated with being prepared for the disruptions that will, unfortunately, happen.

Conclusion

Though IHEs can often feel like isolated islands, the truth is that education takes place within the larger context of our world – much of which we have no control over. When disruptive events occur, and they will, it is crucial to maintain instructional continuity as best as is possible given the circumstances. It is not always feasible, but in most situations teaching and learning will continue and allow students to progress towards achieving their educational goals. This chapter highlights many important factors that instructional designers should consider as they work within IHEs to create courses that are flexible and adaptable to changing, uncertain circumstances.

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Appendix A
Examples and Resources

There are many resources available for instructional continuity planning in IHEs. These can be used with faculty for collaborative design efforts and/or to determine the most appropriate applications in their courses. For example, EDUCAUSE (2020) has many Instructional Continuity Plans in their resource library and Stanford at DePaul University collected over 400 university contingency plans in an open access Google Spreadsheet. Also, the Institute for Business Continuity Training (IBCT) has free continuity planning templates.

For instructional designers and instructors, there are also numerous resources for making transitions during disruptive events with many of these being updated and expanded recently in response to the COVID-19 pandemic. For example, The Online Learning Consortium (OLC) curated resources for educators and administrators on its Continuity Planning and Emergency Preparedness website which includes a "Playbook" (O'Keefe et. al., 2020) and Padlet. Similarly, there is an open-source collection of resources (in an editable Google Document) created by Florence Martin at the University of

North Carolina, Charlotte. The journal *Information and Learning Sciences* also dedicated two special issues in 2020 to instructional responses to the pandemic. Two professional development opportunities involve taking a course such as *Resilient Teaching Through Times of Crisis and Change*, or volunteering for the Instructional Design Emergency Response Network (ID-ER).

Designing Non-Instructional Messages: Beyond Training

Sheri Conklin & Beth Oyarzun

Instructional Design | Learning Theory | Message Design | Non-instructional Messages | Communication

Message design is an interdisciplinary area of knowledge. Message design contains words, visuals, and forms used to design, produce, and transmit messages. In this chapter, we will review message design outside the realm of training. Although an instructional designer or technologist's primary function is training, there are many other duties an instructional designer has to perform, such as writing reports, leading instructional teams, or serving as a change agent, among many other functions.

Introduction

Message design is all around us. In the field of instructional technology, design, and learning, it could be the logo of your unit, the report you submit to an administrative assistant, an email to the project team or a report to your supervisor. Instructional message design is the real-world application of communicating and effectively conveying information and specifically addressing a need or solving a problem (Fleming & Levie, 1993).

Message design is an interdisciplinary area of knowledge. Message design contains words, visuals, and forms used to design, produce, and transmit messages. This field pulls from various disciplines, including cognitive psychology, industrial design, graphic design, instructional design, to name a few. Instructional message design tools and techniques will continue to be a critical aspect of the overall instructional design process. In this chapter, we will review message design outside the realm of training. Although an instructional designer or technologist's primary function is training, there are many other duties an instructional designer has to perform, such as writing reports, leading instructional teams, or serving as a change agent, among many other functions. This chapter will begin with the purpose, then move into various theories, and focus on message design formats with examples. At the end of each section, additional resources will be available.

Purpose of Communicating and Reporting

The purpose of instructional message design goes beyond educational materials; you may be writing an evaluation report from instructional training, writing a quarterly report, creating a job-aid, working with a team to produce a product. All of these scenarios require message design, and all of the scenarios have a different audience. Pettersson (2012) summarized the definition of a message as "information content conveyed from a sender to a receiver in a single context on one occasion." (p. 3). The idea is to design, transmit, and interpret messages. It is the use of learning

theories to communicate information using technology effectively. We will discuss some of the theories: gestalt, cognitive load, multimedia, and the IDEA model for message design.

Audience for Communicating and Reporting

As a beginner or seasoned instructional designer, you are aware of identifying your stakeholders. The same holds for creating compelling messages. By considering your audience or your stakeholder group. Consider the following questions:

1. Who are the individuals or groups that would benefit from this knowledge?
2. What purpose is the communication meant to serve?
3. When is the best time for this communication?
4. What format is best to use, given the purpose, the audience, and the timing?

Often we think of our audience as 'the learner,' but you need to remember there are a variety of audiences. You may be working with upper administration (report), with other instructional designers (communicating progress messages on a product), with graphic designers, customers, administrative staff, etc. Our audience is not always 'the learner'; therefore, just as you conduct analysis, you need to perform a stakeholder or audience analysis.

Theories for Message Design

Gestalt Theory

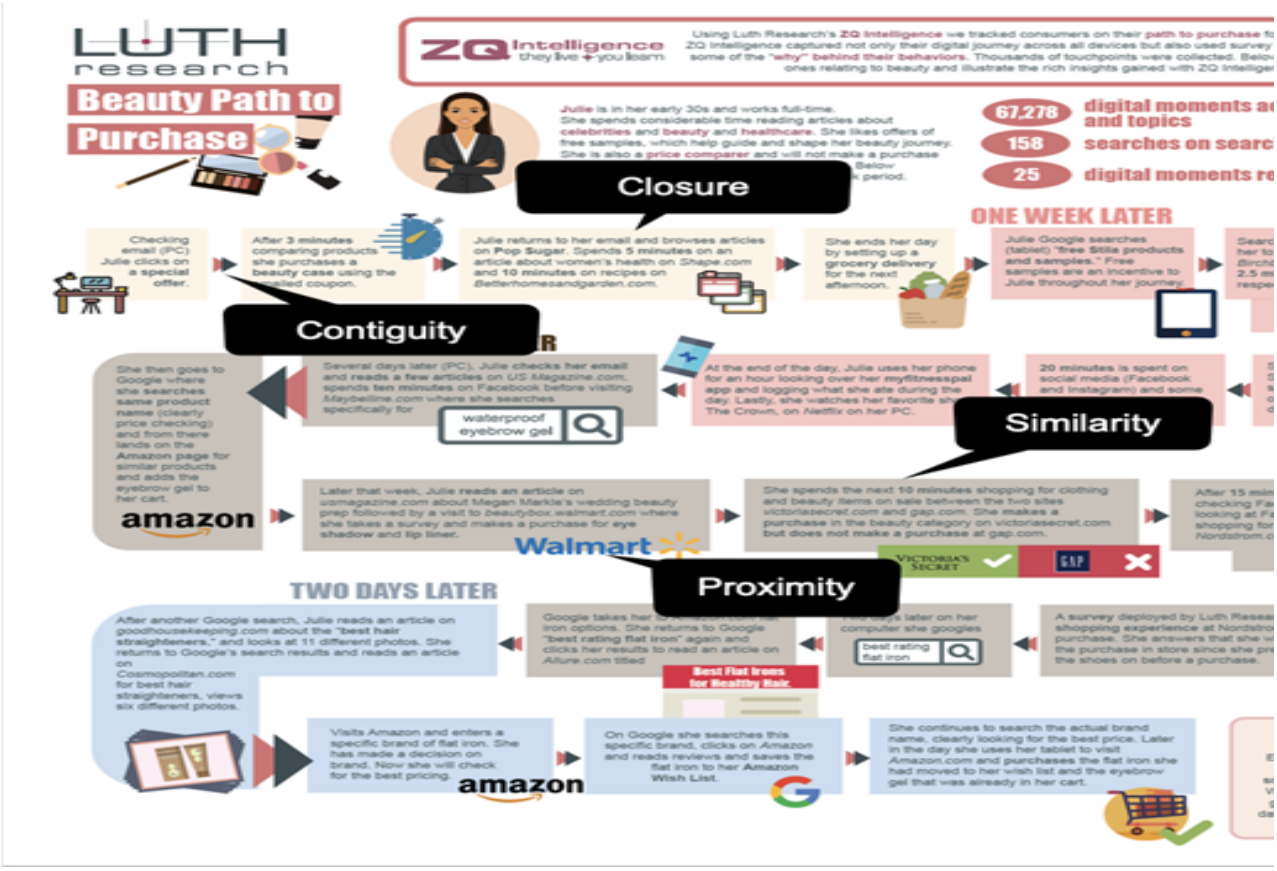
Gestalt is German for 'shape' or 'form,' yet a better definition, according to Kanizca (1979), is 'organized structure' (p. 56). This theory, based on psychology, states that a user sees whole images, not just parts. The main focus of the theory is grouping. Gestalt theory has evolved and contains four main principles: closure, contiguity, similarity, and proximity.

Closure is the ability to ensure the audience perceives they are receiving the whole message. For example, a closed shape seems complete, but a shape that lacks closure may make the reader feel like they have missed something. One method for implementing closure is the use of a frame around the text. Gestalt law of contiguity states that people tend to continue shapes beyond their ending points. If you use an arrow, the reader will continue their view in the arrow's direction. In Gestalt's law, objects that seem similar will be grouped in the viewer's mind. Examples of similar objects could be style, location, size, color, etc. Changes in text and font should be kept to a minimum as the reader may view font/text changes as the meaning of the text changes. The principle of proximity states that objects that are close to one another appear to form groups. For example, if you apply the principle of closure with text in a box, but it is not aligned to the referencing figure, the reader may *not* group the image and text when they should. The primary goal is to encourage the brain to see the whole and the parts that make up the whole (Moore & Fitz, 1993).

Notice in Figure 1, the author used the closure principle by enclosing each step in a text box. They also used similarity by grouping the text boxes by color, which denotes a timeframe. They also used the principle of contiguity to keep the reader moving through each text box by inserting an arrow. Notice there is a clear separation of the arrow from the text boxes. This is important as it assists with the flow of the eye. Finally, the author used proximity by placing a representative icon or logo associated with the text in the box. Remember, when developing reports or creating messages to inform users of an upcoming event, you want to engage the audience.

Figure 1.

Infographic with Gestalt principles



Infographic describing Gestalt principles

Adapted from Path to Purchase Beauty Journey (2021).

Additional Resource

7 Gestalt principles of visual perception: cognitive psychology for UX (2021)

Cognitive Load Theory

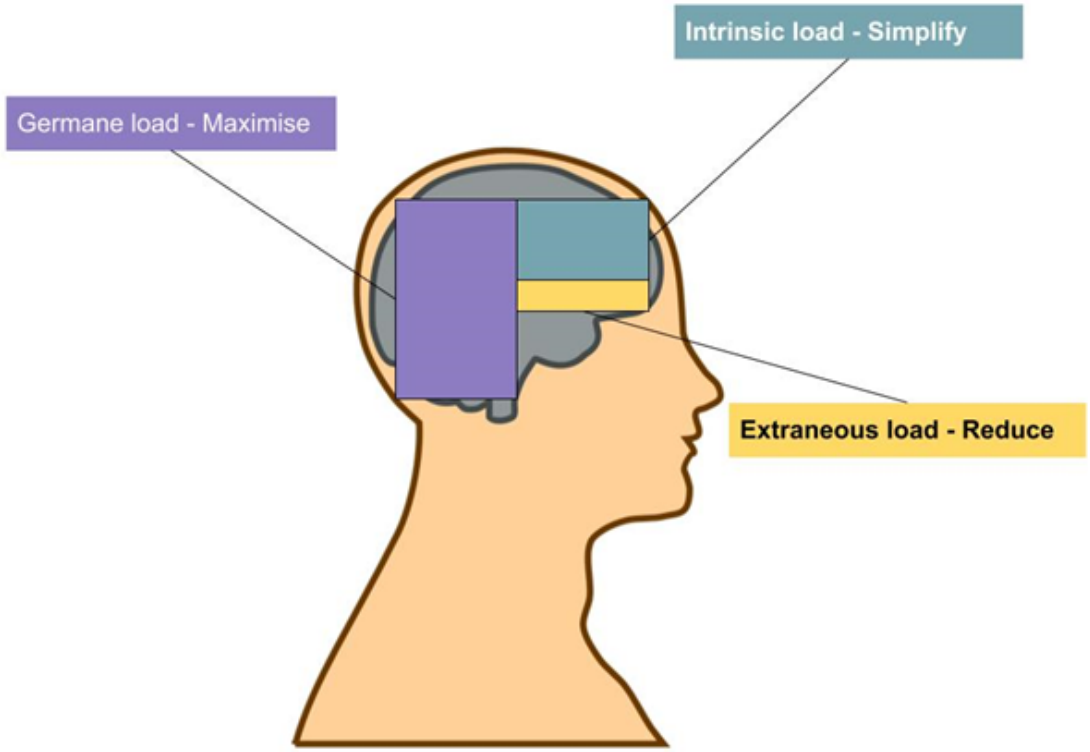
When communicating any message, consider the cognitive load of the intended receiver. Cognitive load refers to the amount of information a person can hold in working memory. Developed by Sweller (1988) and based on Miller's (1956) information processing research, cognitive load theory comprises three types: intrinsic, extraneous, and germane (Figure 2). Intrinsic cognitive load refers to the material's inherent difficulty, whereas extraneous cognitive load refers to elements that distract from the material and hinder information processing. Germane cognitive load refers to the elements that aid in processing the information presented, such as schemas' development. Background knowledge and expertise affect the intrinsic cognitive load, whereas message design can affect the extraneous and germane loads. As an instructional designer, you want to focus on germane cognitive load processes and reducing extraneous cognitive load. For message design, this means the ease with which information can be processed. As Morrison et al. (2019) stated, the goal of effective message design is to "…create an appropriate interface between the instructional materials and the learner" (p. 165).

There are four suggested principles to reduce a learner's cognitive load.

- Use worked examples which is a step-by-step demonstration
- Integrate multiple sources of information
- Remove repetitive or extraneous information
- Using auditory as well as visual information

Figure 2.

Types of Cognitive Load



Picture highlighting the types of cognitive load

Adapted from @mcdreeamie accessed at Compute Thought Blog

Additional Resource

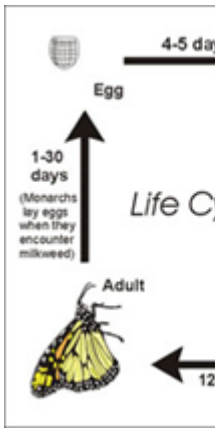
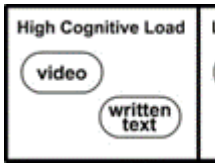
Infographic explaining all the Cognitive load effects (Sweller, Ayers, Slava, & Kalyuga, 2011)

Multimedia Learning Theory

Mayer's multimedia principles (2001) build upon the cognitive load theory and guide designing visual messages. There are 12 principles: coherence, signaling, redundancy, spatial, temporal, segmenting, pre-training, modality, multimedia, personalization, voice, and image (see Table 1). Taking these concepts into account when designing messages containing multimedia can increase the likelihood that the message is better received, thus reducing the receiver's cognitive load.

Table 1

Mayer's multimedia principles with descriptions and example

Principle	Description	Example
		Here only pictures and a single word repre 
Coherence Principle	Remove extraneous information	
Signaling Principle	Add cues to highlight material	In the image above the light arrow behind t cycle begins and ends.
Redundancy Principle	Use narration and graphics rather than narration and text	Example Video
Spatial Contiguity Principle	Present corresponding words and images close together rather than far apart	
Temporal Contiguity Principle	Present words and pictures simultaneously	Example Video
Segmenting Principle	Separate multimedia into chunks	Example Video
Pre-training Principle	Ensure viewers understand main concepts	Example Video
Modality Principle	Use graphics and narrations rather than animation and text	

Multimedia Principle	Use words with pictures instead of just words	
Personalization principle	Use conversational language instead of formal language	
Voice principle	Use a friendly human voice rather than a robotic voice	
Image principle	The narrator does not have to appear on the screen	Non-Example Video

Additional Examples

How to use Mayer's Multimedia Principles (DeBell, 2020)

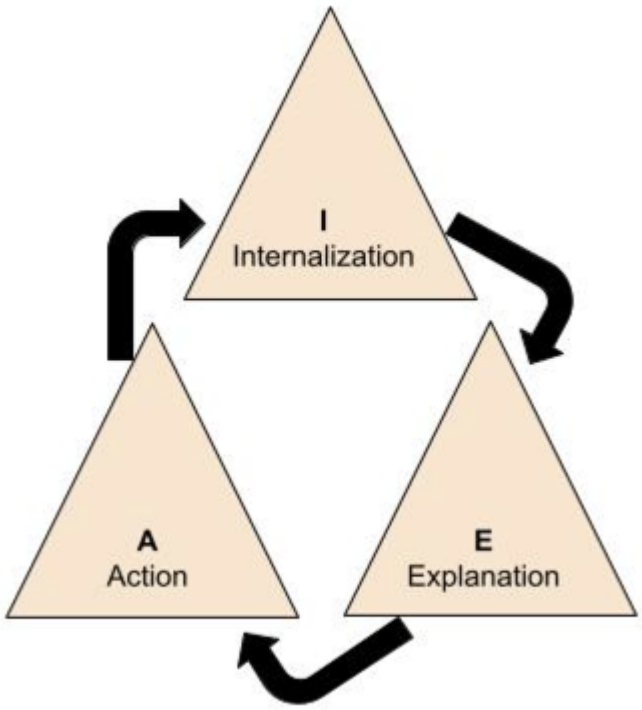
Video of examples and non-examples (Profoyarzun, 2020)

IDEA Model for Message Design

The IDEA model for message design is a generalizable framework for quickly developing effective messages. IDEA stands for internalization, distribution, explanation, and action (Figure 3).

Figure 3.

The IDEA Model adapted from Sellnow et al., (2017)



Picture of the IDEA Model

This model is typically applied to crises to enable quick and compelling messaging. The model can also be used for message design as communication extends well beyond the classroom walls (Sellnow et al., 2015). For example, working on a project with a team, you may need to have the team take action based on new information from the sponsor or client. This model states you must address internalization, explanation, and action. See the following questions for each (Table 2):

Table 2

Principles of IDEA model with questions

Principle	**Question**
Internalization	How am I and others affected (or potentially affected), and to what degree?
Distribution	Who needs to receive this message?
Explanation	What is happening, why, and what should the response be?
Action	What specific actions should I take?

Overall, you want the receivers to be motivated to attend to the message. The explanation needs to be honest and accurate as well as concise. Finally, be direct with the actions that need to be taken. Although this type of message is a non-instructional message, these techniques may assist with a quick turnaround time for the desired action required when communicating with a team or administration.

Message Formats

Above, we have discussed a variety of theories to apply when employing message design. This section will focus on the practical aspects of visuals and videos.

Text

A majority of messages use text to convey a message. Text is the written words, whereas typology is the study, design, and application of text and fonts (Lohr, 2008). You want to consider the length and modality of the message. For example, you may want to use Helvetica (sans serif) for short texts and New Times Roman (serif font) for longer texts. However, Rello and Baeza-Yates (2013) found that people with dyslexia preferred Helvetica overall for reading ease. Altogether, avoid cursive fonts as it is more difficult for readability.

Videos

When using video format, be concise with your presentation. Fishman (2016) stated there is a steep drop-off in the engagement of videos between two and three minutes. However, viewer dropoff depends on the content of the video. Conducting a learner and content analysis can help guide decisions as to optimal length. Van der Meij and van der Meij (2013) provided eight guidelines for developing effective instructional videos.

1) Provide easy access - Embed videos instead of linking or providing files

2) Use animation with narration

3) Use functional interactivity (provide learner controls) - This allows the viewer to resize the video, control captions, control speed, pause, and see duration.

4) Preview the task - This allows the viewer to see what will be demonstrated early in the video before going through the tasks step-by-step.

5) Provide procedural rather than contextual information - This helps the viewers repeat the information presented.

6) Made task clear and straightforward - Provide cues such as numbers or steps in the procedure and keep narration clear and to the point.

7) Keep videos short - Video engagement online drops off fast. Don't put in a long introduction. Jump right into the instruction and finish as quickly as possible.

8) Strengthen demonstration with practice - Build in pause points to allow for practice.

Applying these principles along with systematic planning will ensure your instructional videos deliver the message in a concise way to the intended audience.

Additional Guidelines and Examples

Video Behaviors and UX guidelines (Nielsen Norman Group, 2019)

A non-example from the 90s (Mycommercials, 2009)

A good video example (Pagliacci Pizza, 2013)

Development Tools

Designing non-instructional messages are an essential part of ID roles, as we have discussed in this chapter. However, once you have created the message, it is helpful to have some quality technology tools to bring the message to life. Here is a list of some tools you may find helpful.

Development Tools

Canva - Graphic Design (free or premium subscription)

Camtasia/SnagIt - Screencast recording and video editing (cost approximately $275 for both)

Adobe Spark - Graphic and short video (cost roughly $10/month)

Animaker - Animated video creation (free or premium subscription)

Vyond - Animated Video Creation ($49/month)

Colors - Color Scheme generator (free)

Color Hunter - Create color palettes from images

Unsplash - Free high quality, and high-resolution photographs

Conclusions

These are only some of the many learning theories and applications of message design and how they can be applied to non-instructional environments. Although many employers may not ask for message design, they want people who know the principles and theories surrounding message design, such as multimedia principles and cognitive load theory. Remember, when designing and developing the message, you also need to consider the message's audience and modality. Will this be sent via social media, virtual reality, mobile devices, etc? Optimize message design through evidence-based best practices such as Mayer's multimedia principles. Although we use technology to convey messages, it is essential to remember the message itself. The message is more important than the technology being used to convey it.

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Immersive Learning Environments: Designing XR into Higher Education

Heather Elizabeth Dodds

Educational Technology | User Experience (UX) | Immersive Technology | Extended Reality | Virtual Reality

The body of research supporting the inclusion of extended reality (XR) into higher education is substantial. However, due to the pandemic and the need to increase virtual presence with remote students and workers, the incorporation of diverse XR options into education is catching serious attention of university administrators. Instructional designers (IDs) are well trained in the analysis, design, implementation, and evaluation skills needed to select appropriate platforms and uses of XR. This chapter illustrates how IDs can assist in high-level design decisions regarding these resources. Familiar models and design approaches are recommended along with templates for working with leadership regarding research and funding and evaluating XR for best use for the higher education applications.

Introduction

With the dramatic shift to online learning with the arrival of the COVID-19 pandemic, faculty, staff, and students within higher education worldwide have made the sudden but necessary initial steps to incorporate technology into the learning environment in ways never imagined. However, forward-thinking administrators are wondering, “what comes next?” Simply shifting lectures to web conferencing is not revolutionary. Declining freshmen US enrollment of 13% has causes major financial instability in higher education budgets (Smalley, 2020). Administrators face the need to make brave and creative choices. Administrators also want to insulate their institutions from negative repercussions of the next major instructional interruption. Immersive learning answers this call and has already had a two-decade research base to pull from (Beck et al., 2020). Given that many XR experiences are sustainable (Bucea-Manea-Ţoniş et al., 2020) and do not require the learner to be on campus, a major shift to XR-for-learning might be the greatest change in higher education since the invention of the university.

Nevertheless, XR is not going to settle for a rebottling of ‘the next big thing’ in education. Following a fad is not a good idea. Instructional designers are best situated to consult on this topic because these professionals are comfortable analyzing instructional tools looking past any purported hype. Especially with decreased technology prices and increased access to XR, campus administrators might want to buy the technology first and think about use second. Instructional designers are obligated to advise on the best use of the technology even if that advice is sought after the purchase. This chapter will focus on research-based recommendations for XR design decisions.

Definitions

Extended reality

Terms in XR represent the evolving and changing human and computer interface. The terms 'extended reality' or 'cross reality' refer to "technologies and applications that involve combinations of mixed reality (MR), augmented reality (AR), virtual reality (VR), and virtual worlds (VWs)" (Ziker, Truman, & Dodds, 2021, p. 56). Immersive learning definitions draw from Milgram and Kishino's key taxonomy (1994) emphasizing the continuum of experiences that range from where a computer adds to a learner's reality with overlays of information, or a computer experientially transports a learner to a different place and time by manipulating sight and sound. Moreover, the social and connected nature of virtual reality experiences signals an association with the word metaverse, first used in Stephenson's 1992 fictional novel, *Snow Crash*, to describe a three-dimensional (3D) space where users, embodied as avatars, interact with others and the virtual space. In that fictional writing, the metaverse was designed to be the next version of the Internet; an Internet that one entered as a reality in 3D. With XR, this is still possible; the future lies ahead. Díaz, Saldaña, and Avila (2020) observe that within higher education, the incorporation of XR has already provided a rich research base for experiences that include interactivity, corporeity (users represented as avatars), and persistence.

Virtual reality

The terms metaverse, virtual reality (VR), mixed reality (MR) and cross reality (XR) are used interchangeably in common parlance despite nuanced differences that are debated among experts. All terms imply instances of the user having an immersive experience facilitated by technology. Virtual reality has traditionally been more popular terminology than XR (see Figure 1).

Figure 1

Google Search Term Totals

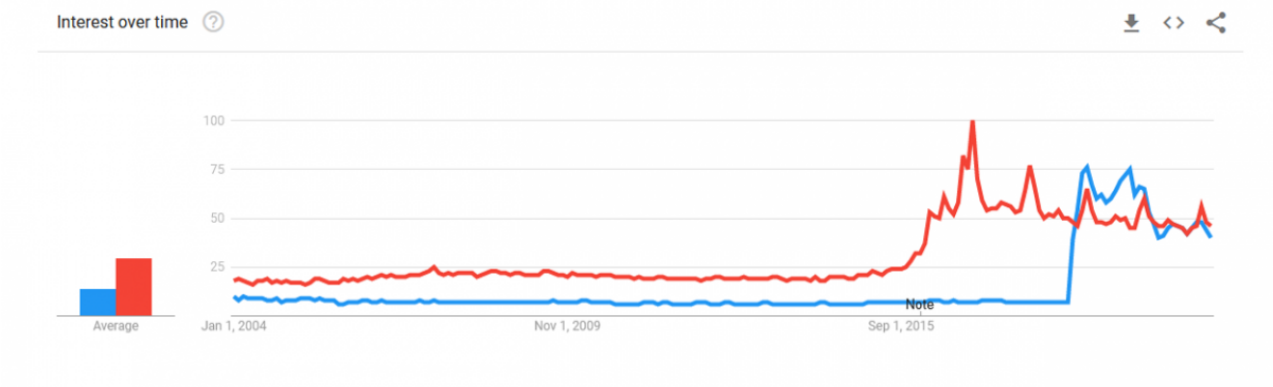


Chart showing totals for Google search terms

Note. Scores are a Google popularity index with no values. Blue is XR, red is VR. (Data source: Google Trends, 2021 https://www.google.com/trends).

Beck, Morgado, and O'Shea (2020) point out that varied immersive learning environments (ILEs) have immersion as the key characteristic, it "is the locale where the technical, narrative, and challenging aspects occur" (2020, p.1045). VR tends to refer to independent immersive experiences facilitated by headsets. The interchangeable use of terms in this field is a characteristic of the early evolution of a branch of technology. In this chapter, XR is used to represent all immersive experiences. Note that historically, ID would refer to users as learners. Given the interconnections between instructional design, user experience (UX), and human-computer interaction (HCI), the terms users and learners are used interchangeably in this chapter.

Presence

When asked, users tend to mention the feeling of being there or presence as the key feature of XR. It can "unlock doors to social experiences and give people a sense of belonging and fulfillment in a world changed by a pandemic that keeps many physically apart" (Hackl, 2020, para. 2). Lee (2004) defined presence as "a psychological state in which virtual objects are experienced as actual objects in either sensory or non-sensory ways" (p. 27). Presence has been studied in many facets. Users feeling presence is a best practice within XR.

Storytelling

Serrat (2008) defines storytelling as "the vivid description of ideas, beliefs, personal experiences, and life-lessons through stories or narratives that evoke powerful emotions and insights" (p.1). Stories bring the user through the experience and answer the critical question: Why are you making the user do this experience? Higher education users, often at adult ages, want that question answered. Users will not proceed with an experience if they do not know why they are being asked to do it. Storytelling has a direct connection to XR via experiences. XR users describe attending events or going to places. As such, becoming familiar with storytelling as a design feature is another best practice when considering XR.

Instructional Design Theory and Approaches

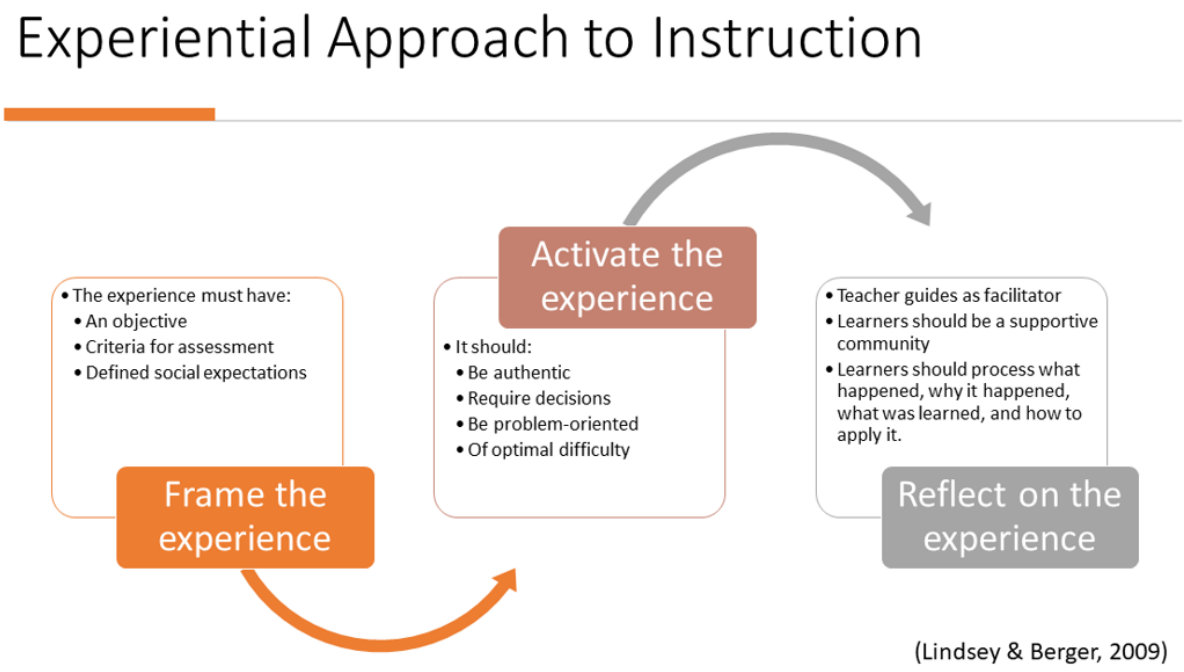
The foundational theory for most XR experiences is experiential learning theory. In cases where users create within XR, constructivist learning theory also applies. These theories recommend these elements for use in education:

- Be of high quality: XR experiences cannot be haphazard; the lesson must be pre-planned.
- Expose the learner to something different, a variation in the user environment. It is not enough to replicate reality; XR experience should be different from the non-XR (as in manipulatable/changeable).
- Include experimentation or manipulation of cause and effect. The user must be able to change something.
- Include reflective components. All theories stress the inclusion of guided pondering and contemplation.
- Have a direct tie to future action. XR experience should change or impact a future experience.

Criticism of these theoretical approaches suggests that learners do not always learn in the sequential nature that theories suggest (Lindsey & Berger, 2009). For example, learners can learn from third-person observations in XR. Nevertheless, Lindsey and Berger (2009) recommend that the experiential approach to instruction include three key features: the experiences must be framed, activated, and then reflected upon (see Figure 2).

Figure 2

Experiential Approach to Instruction (Lindsey & Berger, 2009)



Process chart for experiential instruction (adapted from Lindsey and Berger, 2009)

VR Design Model

Instructional designers venturing into 3D immersive designs will recognize the same skill set use for 2D design. Díaz, Saldaña, and Avila state that "the creation of virtual spaces to host training activities must follow similar design criteria in terms of rigor and quality as the design criteria of training spaces for the real world" (2020, p. 105). This chapter combines three different design models (see Figure 3): the ADDIE Design Model (Branson, 1978), Design Thinking (Brown & Wyatt, 2010) from user experience (UX), and the 3D Learning Experience Design Model (Kapp & O'Driscoll, 2009).

Figure 3

A comparison of ADDIE, Design Thinking, and the 3D Learning Experience Design models.

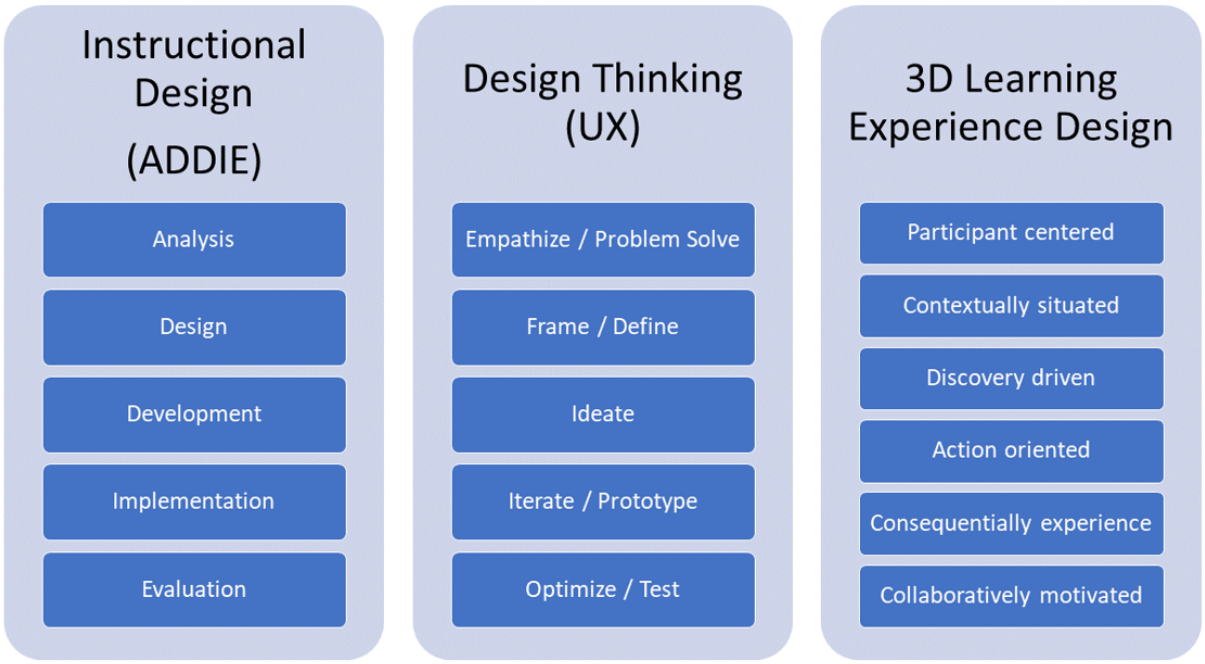


Chart comparing the steps typically found in instructional design, user design, and 3D experience design frameworks

Analysis

The first stage, also known as the empathy or participant-centered stage, asks the key question: Why is immersive learning the solution to the instructional problem? The experience must be instructionally grounded (Kapp, 2020). XR should not be selected for use in higher education just because it is perceived as 'amazing' or 'cool'. Given that the brain often believes what the eye sees, the expansive effects of XR are too influential to be casually selected. Kapp (2020) recommends that in any case where declarative knowledge is the goal, XR is not the correct choice. In many current situations, XR might not be the best selection when measured against expense, environmental sensitivity, and socio-cultural awareness. However, there is some large-scale research indicating that XR does outperform the competition when considering user emotions. There is some positive early research on the use of VR for procedural skills, communication skills, and corporate culture (Bailenson, 2020).

IDs must know what technology is available to the users. If all users do not have VR headsets, IDs should recommend WebXR (web browser accessible 2D VR). Users should also have some connection to prior immersive experiences that make XR a logical choice (Kapp, 2020). Furthermore, XR is recommended where the real-world learning experience would be dangerous, expensive, or impossible.

In summary, XR may be cost-effective for (See Appendix A on how to engage in leadership discussions regarding XR costs):

- Non-declarative knowledge learning
- Environmentally sensitive or sustainable applications
- Socio-culturally respectful applications
- Procedural skill learning
- Applications where the emotional influence is are dominant (i.e., emergency services: medical/police/fire/military)
- Communication & cultural skills (workplace relationships)
- Where the XR technology already exists or is easily accessible
- Where the learning would otherwise be dangerous (going inside a nuclear reactor chamber), expensive (field trips to far off locations), or impossible (watching the landing of a Mars probe from the surface of Mars).

Design and Development

Design. No XR experience currently suits all needs in higher education. Therefore, priorities must be determined. This is the phase where the solution is contextually situated or defined and framed. Administrators must choose which characteristics of XR will be most important to their users. Choices can be between access, immersion, and function (Dodds & Peres, 2020). For example, if it is most important that as many users as possible engage in the learning, then accessibility is the most important characteristic. IDs will need to find platforms that offer the greatest amount of accessibility. Those same platforms might sacrifice immersion and functionality to strongly deliver on accessibility (see Appendix B for how to evaluate a XR platform).

IDs should note that mainstream XR platforms tend to replicate reality, instead of engaging the phantasmagorical. Instruction should be designed around the user, rather than having the user adapt to the platform. Personalization within XR is a compelling characteristic that gives the user control over the experience (see Appendix C for suggested resources to research design choices).

Development. XR experiences can include a story arc (See Appendix D), a tutorial of user affordances, intentional user actions, and place the user into first or third person experiences (Spillers, 2020). VR currently uses the HCI elements of gaze, voice, gestures, sound, and interactive menus. IDs should note data collection abilities and privacy protections. For further XR development research, seek user interface (UI) style guides from companies such as Unity and Microsoft, mixed reality guides, and the W3 web standards.

Implementation

Research on the implementation of XR in higher education is in its nascent stages but there is promise if decisions are made wisely (Radianti, Majchrzak, Fromm, & Wohlgenannt, 2020). Because of the immersive nature of XR and drawing on other HCI field experience, users have expectations of how an XR experience should progress; users take their conceptions of reality into virtual reality. Every choice and affordance available within the experience should support the user. The interactions should be action-oriented to best take advantage of XR. For example, users should be able to flip switches and guide an airplane down for a landing, not simply select a multiple-choice answer to do so. User testing is critically important in all phases of design. IDs should test beyond the direct development team with diverse and inclusive cases and incorporate international collaboration to check for cultural or language bias.

Evaluation and Optimization

Traditional assessments used outside of XR are a common design choice. However, XR allows for a much wider selection for assessment and evaluation. Users can give audio or video feedback or modify objects. Users can express their knowledge, skills, and abilities directly within the platform. For example, users can move to indicate an answer to a question. Users can directly interact with some platforms as knowledge creators.

Conclusion

Immersive learning environments have the potential to save resources (i.e., fossil fuels, health, time) and increase user access. The COVID-19 pandemic has reminded us of lost shared experiences. XR is about building shared experiences. XR choices should focus on providing an experience to the user that they cannot experience via other media. IDs are reminded that there are users that cannot engage in XR because of vertigo, technical specifications, health concerns, or expense. XR is on the cusp of mainstream but it still considered a status symbol. Furthermore, gender, identity, and privacy issues continue to plague many XR experiences.

More research is needed in areas of accessibility. XR platforms are changing at an incredible pace. Major technology companies like Facebook, Google, Apple, and Microsoft all have significant research interest in XR. When companies of these sizes invest over time scales of 10 or 20 years, higher education must pay attention. XR experiences made for the social or work realms will need to be taught in higher education as critical skills and behaviors.

Immersive learning and XR is clearly not a fad. IDs have the critical role of consulting on media choices for their campuses. IDs can lead the way by advocating, recommending, designing, assessing, and researching learning options. The key features of shared experiences, depth of personalization, and compelling story arcs support this media choice for future opportunities. It is time to step through the looking glass of immersive learning and into XR.

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Appendix A

How to engage in leadership discussions on VR costs

1. Determine user need.
2. Determine existing technology including access.
3. Develop personas based on user roles, including diverse users (Microsoft, 2016).
4. Establish instructional goals.
5. Research effective use of VR in similar environments, subjects, or user groups.
6. Prototype and test VR with users.
7. Research costs for purchase, maintenance, access, safety, and upgrades.
8. Present on efficiency:

- Does VR achieve equivalent learning outcomes?
- Does VR cost less per user experience than traditional instructional methods?
- Does VR add access to previously inaccessible user groups due to danger, cost, physical or instructional access?

Appendix B

VR platform analysis for accessibility, immersion, and functionality

For more description, see Dodds & Peres (2020).

Accessibility

1. Equitable use
2. Flexibility in use
3. Simple and Intuitive to Use
4. Perceptible information
5. Tolerance for error
6. Low physical effort
7. Size and space for approach and use
8. Ease of technology

Immersion

1. User's expectations match
2. User's actions have non-trivial impact
3. Consistent world conventions
4. Deep play ability
5. Presence
6. Human factors
7. Feedback
8. Technical factors
9. Latency
10. Avatar

Functionality

1. Input devices
2. Selection, manipulation, and 3D user interaction
3. Navigation
4. Menus and interfaces
5. Systems
6. Quest

Appendix C

Resources for XR Design Choices

Immersive Learning Research Network https://immersivelrn.org/ This group focuses on research-based conclusions. It holds regular weekly, monthly, and annual events including guided adventures in XR.

Educators in VR https://educatorsinvr.com/ This group has an active Facebook group and Discord channel. It is a good place to meet practitioners in VR in education.

Microsoft's Inclusive Design approach is worth considering: https://edtechbooks.org/-THfv

Microsoft Mixed Reality guidance focuses primarily on augmented reality devices like the Hololens, but much of the research-based advice applies to XR https://edtechbooks.org/-iQCp

APPENDIX D

Storytelling in VR

Storytelling Arc	Pixar Story Arc	Story Example: Cinderella (Ng, 2011)	VR Story Arc	Story Example: VR
Introduction	Once upon a time, there was _____.	Awful life. Evil sisters.	Who What Where Why When	VR opens upon a scene (30 seconds)
Set the scene	Every day, __.	Gets ball invite. Makes clothes.	Practice affordances, navigation, guidance.	User invited to walk, change appearance, communicate.
Dilemma	One day, __.	Goes to ball and dances with prince.	Introduce conflict.	User is presented with a challenge.
Crisis	Because of that, __.	Oh no, she has to go!	Initiate change.	User must do some action.
Change	Because of *that*, __.	Bad to same awful life, not as sad as before.	Change expands.	Action has non-trivial consequences.
Resolution	Until finally, __.	Prince finds her. They live happily ever after.	Mission complete.	The world changes.

A Guide to Designing Accessible eLearning

Breana Hidalgo & Nikisha Watson

Accessibility | Higher Education | eLearning

When teachers deliver instruction online, they require adequate training and support to do so successfully because an online instructor's role includes different responsibilities than traditional classroom instruction (Kim & Bonk, 2006). This chapter includes information on the practical application and adoption of an accessibility training program for online instructors, developed by instructional designers at a state college for two- to four-year degrees located in central Florida.

Introduction

In January 2017, the US Access Board published a final rule updating accessibility requirements for information and communication technology (ICT) covered by Section 508 of the Rehabilitation Act, 29 U.S.C. §701 *et seq*. (1973). Federal agencies and contractors must comply with the Revised 508 Standards beginning on January 18, 2018. Given the recent Section 508 refresh and updated Americans with Disabilities Act (ADA) requirements, instructors and instructional designers are responsible for designing curricula that all learners can navigate, use, and understand. This responsibility applies to both the individual and the collective. Education professionals must prioritize evaluating materials and designing content that is more accessible, while institutions must support accessibility initiatives and creative problem solving to overcome barriers.

When teachers deliver instruction online, they require adequate training and support to do so successfully because an online instructor's role includes different responsibilities than traditional classroom instruction (Kim & Bonk, 2006). This chapter includes information on the practical application and adoption of an accessibility training program for online instructors, developed by instructional designers at a state college for two- to four-year degrees located in central Florida. The professional development training course aims to provide faculty with the conceptual and technical knowledge of accessibility principles to promote a deeper understanding of ADA compliance and its applications in facilitating and managing online course materials. The training was administered and went through continuous improvement for two years. It included a pilot program and subsequent cohorts culminating in over 300 eCertified online instructors.

Legal Context and Background

In general, guidelines for accessibility have followed the implementation of new laws or updates made to the legislation. There are currently three federal laws pertaining to the needs of individuals with disabilities in the United States. These are:

1. Section 504 of the Rehabilitation Act of 1973
2. Section 508 of the Rehabilitation Act of 1973
3. The Americans with Disabilities Act of 1990 (frequently referred to as ADA)

The Rehabilitation Act of 1973 is a federal law that requires programs and activities funded by federal agencies to be accessible to people with disabilities, including federal employees and members of the public. Section 508 covers ICT developed, procured, maintained, or used by federal agencies. The goals of the Revised 508 Standards include:

- Enhancing accessibility to ICT for people with disabilities
- Making the requirements easier to understand and follow
- Updating the requirements to stay abreast of the ever-changing nature of the technologies covered
- Harmonizing the requirements with other standards in the U.S. and abroad

Section 508 standards reflect Web Content Accessibility Guidelines (WCAG) 2.0 (Initiative, 2005), taking effect on January 18, 2018.

- Title II of the ADA prohibits disability discrimination in services, programs, and activities provided by State and local government entities. These entities include publicly-funded universities, community colleges, and vocational schools.
- Title III of the ADA prohibits disability discrimination in the full and equal enjoyment of the goods, services, facilities, privileges, advantages, and accommodations of any place of public accommodation. This includes private universities and vocational schools.
- By Title II and III, institutions of higher education in the U.S. must make online lectures, courses, materials, websites, LMS, MOOCs, and any other technology accessible to students with disabilities and the public if made freely available.

It is in every institution's best interest to meet WCAG 2.0 Level A.A. conformance, not WCAG 1.0 conformance, to ensure that students with disabilities have equal access and that the university does not violate federal law.

These laws protect individuals with disabilities from discrimination based on disabling conditions and require that all programs, activities, and services offered by employers and public and government institutions are accessible to people with disabilities. Section 508 compliance requires that we create courses that people with visual, auditory, or mobility disabilities can use as effectively as people without disabilities, thus creating accessible learning experiences for any learner.

The Positive Impact of Accessible Content

Higher education faculty are becoming increasingly familiar with accessibility requirements. However, it is critical to fill gaps in this skill set for educators because inaccessible content has real consequences for learners, including limiting students' ability to complete work on time. In the experience of implementing this accessibility training, a common reason that faculty gave for not creating accessible content is that they do not have students with disabilities or none who had officially requested accommodations. Though that may be accurate for an individual instructor in a highly specialized, physically-intensive, limited access field, it does not mean that those same students would benefit from accessible content. Furthermore, the National Center for Education Statistics (2019) found that nearly 19% of undergraduates reported having a disability.

For example, one of the significant gaps addressed by accessibility initiatives should be the inequitable access to technology for the student population. Because higher education professionals serve a diverse range of students who use many different technologies, it is essential to remember that many students are accessing courses on mobile devices and computers without cutting-edge hardware. In a survey by Clinefelter, Aslanian, and Magda (2019), 60% of students age 45 and younger reported using a mobile device for some or all online coursework. In a different study by Gonzales, McCrory Calarco, and Lynch (2020), roughly 20% of the respondents had difficulty with access to technology,

including broken hardware, data limits, and connectivity problems. In this case, students of lower socio-economic status and students of color disproportionately experienced hardships as a result of this digital divide.

In 2020, higher education witnessed the consequences of limited access to high-speed internet for both learners and instructors, experiencing the impacts of those limitations first-hand. The inability to connect to a stable, secure Wi-Fi network is a form of disability because it has a severe impact on learners, especially when completing course assignments and activities that are contingent upon stable, high-quality connectivity. Designing instructional materials with accessibility best practices in mind also mitigates the impact of slow or unstable Internet connections.

Accessible content is “learner-friendly” because thoughtful design takes priority (Myhill et al., 1999). To drive this home, consider another example: a new parent enrolled in courses may only be able to watch instructional videos while their infant is asleep. If the videos have accurate closed captions - as best practices recommend, and accommodation laws dictate - it is much easier for them to access the material without worrying about the volume of the audio or the availability of additional hardware, like a headset. Therefore, closed captions do not only benefit those learners who cannot hear the original audio. They make the learning experience equitable for learners in a variety of life experiences. They benefit students who are deaf and hard of hearing while simultaneously assisting countless others to absorb the same material.

One of the inspiring benefits of online learning is the potential for learning to take place anywhere and at any time. However, this can only be true if the learning materials are designed to support such flexibility. The accessibility course included with this chapter outlines some of the best practices in design and course authoring that impact accessibility. By thinking about accessibility while creating course materials, we can ensure equitable access for all students seeking opportunities afforded by higher education in an increasingly globalized and pluralistic world.

Accessibility Training Course and Resources

The course is designed to be an 8-credit hour, self-paced, asynchronous re-orientation to the andragogical and technological skills required for online teaching and learning that takes place over five weeks. The information focuses on increasing awareness and reinforcing the prioritization of online accessibility for digital instructional materials. Additionally, the course includes essential tools and technologies to make online and face-to-face course content accessible. It is designed primarily for instructors using Canvas by Instructure as their learning management system (LMS).

Download the Course

The training linked below is an example of accessibility training for faculty that was developed and continuously improved over 2 years using techniques discussed in this chapter, as well as instructional design best practices.

Resources to Download

1. Accessibility Training in the Canvas Commons
2. Course export file

1. Accessibility Training in the Canvas Commons
2. Course export file

The course export file is for use in non-Canvas courses or for importing directly into Canvas. To use it, download the file and import it into a course in the chosen learning-management system.

The course can be adapted for any LMS with changes to (or removal of) Canvas-specific content sections. Technical, skill-based assignments and corresponding rubrics ensure mastery of the objectives so that each submission complies with Section 508 accessibility standards.

Course Goals and Objectives

Assignments in the training are graded as Complete/Incomplete. The accessibility training prepares instructors and instructional designers to:

1. Describe the history and current state of accessibility regulations in the United States and at the organization.
    a. *Recommend adding specific policies, memos, mission statements, or procedures that support an accessibility initiative at your institution.*
2. Ensure that course(s) meet legal guidelines and standards.
3. Explain the importance of ensuring accessibility for online educational materials.
4. Create accessible online educational materials with text, image, audio, video, and presentation content types.
5. Check for accessibility in text, image, audio, video, and presentation content types.
6. Evaluate third-party digital content for accessibility and remediate accessibility issues.
7. Embed and incorporate accessible content in online courses.
8. Implement the essential skill sets necessary for teaching in an online environment.
9. Incorporate effective best practices and strategies for teaching in an online environment.
10. Optimize student learning using educational technologies and the learning management system (Canvas).

Accessibility Templates, Rubrics, and Checklists

All resources for this chapter and the training are provided in a public Google folder for easy access and download. Folder structure and summary of documents:

1. Training Course
    a. Contains an .IMSCC course export from Canvas of the Accessibility Training for Faculty
        i. Follow LMS instructions to import course package
    b. Accessibility Training Syllabus
        i. Syllabus for the training course (also available in the course)
2. Templates, Rubrics, & Checklists
    a. VPAT-Templates
        i. Voluntary Product Accessibility Template for publisher content
    b. Training Prerequisite Skills Checklist
        i. Checklist of entry-level skills for the Accessibility Training
    c. Rubric for Evaluating Accessibility in Digital Content
        i. Scoring rubric for evaluating a piece of digital content and assessing accessibility
    d. Publisher Content Review Rubric
        i. A quick-reference rubric for evaluating publisher content
    e. Course Accessibility Review Checklist
        i. An outline-style checklist used in assessing an online course for accessibility issues
    f. ADA Checklist
        i. ADA-based checklist for evaluating content using criteria that matches Section 508 Standards
    g. Accessibility Review Checklist
        i. Checklist designed to assess the level of effort needed to remediate an online course for accessibility; use this in planning for widespread accessibility remediation
3. Additional Resources
    a. Links to Online Resources
        i. Living document with resources for reference

Implications for the Instructional Designer

The following section includes advice for instructional designers or those planning to implement an accessibility initiative like the training course. Advice is provided based on instructional designers' experience implementing the accessibility training course discussed in this chapter.

Fostering Leadership Support

Both individuals and the institution must actively support, promote, participate, and take ownership of the work and outcomes of accessibility. To ensure that this occurs, be sure that faculty leaders and leadership are engaged early in the accessibility program's planning phase. According to the National Center on Disability and Access to Education (NCDAE) "institution-wide accessibility measures are better adopted and maintained when leadership supports the vision and commitment to accessibility" (*GOALS* Project, n.d.). Leadership support is one of the first indicators for Institutional Web Accessibility, a set of benchmarks that would "indicate" that "an institutional climate can foster and maintain web accessibility efforts" (Indicators for Institutional Web Accessibility, n.d.). The NCDAE and the World Wide Web Consortium (W3C) offer strategic planning guides on how to roll out a successful accessibility initiative:

1. GOALS Benchmarking and Planning Tool (NCDAE)
2. Strategic Planning for Web Accessibility (W3C)

Designing Relevant Training

Because digital materials and physical materials have different accessibility requirements, ensure that the training is tailored to the type of instructional content most frequently developed and distributed by faculty. To ensure the training is designed for their needs, administer a preliminary survey to determine what type of content faculty use the most in their courses and how they share content with their students. For example, if the survey finds that:

- 65% of the content used by faculty is text-based
- 30% of the content is presentation-based instruction (i.e. PowerPoint presentations)
- 5% of the content is video

The training design should follow a similar structure, with text-based training occupying most of the time. Furthermore, the survey indicates course methodology for additional insights to create relevant training for faculty. For example, if survey respondents report that the delivery of their courses is as follows:

- 65% entirely online
- 30% face-to-face
- 5% hybrid

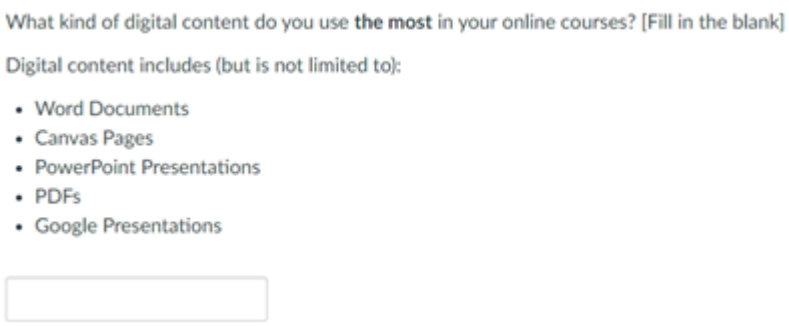
It would be useful to address the creation and management of course materials for online courses for a majority of the training with some instruction for materials provided in face-to-face classes. If this is not included, expect to be approached by learners seeking this instruction.

Keep in mind that accessibility in the hybrid delivery method is satisfied by making both online and face-to-face content accessible. While this is true, it would be considerate to ensure that teachers are still engaged and able to complete assignments in a way that is most relevant to them, regardless of the delivery method.

This survey does not have to be extensive (see Figure 1 for an example which is also included in the first module of the accessibility course).

Figure 1

Example of Survey



Picture of a sample survey question

This question is designed as multiple choice, but if it is sent as a preliminary survey, it is possible to use the rank-in-order question type to yield more specific, quantitative data.

Supporting Faculty

There are many approaches and strategies for faculty training, and Schrum (1999) offers four useful points relating to teacher technology training:

1. It takes considerably longer to learn about technology for personal or pedagogical use than learning a new teaching model
2. Access to the new technology at school and home is essential
3. Fear of the unknown must be addressed
4. The use of new technology may require teachers to reconceptualize how they teach

Learner cohorts were useful in implementation, as group facilitation contributed to widespread adoption through peer support and accountability. It is critical to establish the amount of time the trainer will have to grade and provide valuable feedback on the assignments. Limitations in the trainers' schedule might mean that the course design needs to have fewer formative assignments with robust feedback. If that is the case, include peer reviews to ensure that instruction quality and relevancy stay the same. With peer reviews, grading rubrics become the keystone for success. Peer reviewers will need a defined set of criteria to provide high-quality feedback (see grading rubrics included in the accessibility training course assignments).

Furthermore, learners will most likely require one-on-one assistance at some point in the training due to the technical nature of accessibility remediation in digital content. Scheduling open office hours for support is an option. However, it may not reduce the need for one-on-one assistance because of the highly individualistic nature of instructional materials in higher education. If staff availability is limited, the recommendation is that cohorts are no more than ten people at a time to allow for in-depth, quality feedback on assignments and one-on-one assistance as needs arise.

Additional support for these cohorts could take the form of synchronous workshops, but keep in mind that there will still probably have one-off requests for assistance that will be time-intensive for those with a low-to-moderate technology skillset. Having additional support through institutional technology never hurts and can be critical if the training involves software or hardware peripherals that are not typically installed on an institution-administered machine.

Designing for Mastery

Accessibility in digital content is dichotomous in that the content is accessible or it is not. Assessments in the training course follow this same duality in the grading scheme, but that approach is not always learner-friendly. Leveraging learner mastery, providing opportunities for reinforcement and additional practice through branching mitigate this rigidity. Below is a description of how the accessibility course could be adapted with branching to facilitate mastery.

The first assignment in a module creates or remediates content for the digital asset type covered in the instruction that precedes it. Successful completion of this assignment requires a passing score of 100%; learners should be allowed to revise their submission once it is initially graded, using the trainer's feedback to guide successful and complete remediation.

Achieving a 100% score on the first assignment unlocks the next module. If mastery is unsuccessful, learners progress to the next assignment and participate in a discussion activity with their peers about their previous assignment submission. In this second assignment, learners exchange their submissions and remediate each other's work. If this peer-reviewed discussion assignment submission did not earn 100%, the learner progresses to the quiz.

Keep in mind that grading a weekly submission (and multiple resubmissions) can quickly become time-intensive. Additionally, learners may express frustration with having to complete assignments to 100% satisfaction. In this case, recognize that this is a different grading and instruction method, but that failure is not absolute. It is common to remediate digital content more than once, especially as students have different needs with accessibility. It is critical to reinforce the behavior of keeping an open mind towards feedback and requests for accommodations that ask for further improvements.

That being said, be open to revising the training. If feedback from learner surveys and focus groups are pointing towards a much-needed change in the training for better adoption, adjust accordingly. These authors support frequent use of mastery and branching concepts used in more training situations and see immense value in leveraging unique and customized learning experiences to improve cognitive retention, especially for adult learners.

Summary

As accessibility gains more attention, instructional designers need to consider the cognitive aspects, ensuring to account for both message and information design in the learning environment. Instructional designers who have worked with remediating digital materials for online accessibility often state that when the content is made accessible for one set of learners, it is continually improved for all learners (Roberts, 2003). There are legal as well as ethical reasons for making accommodations for learners with disabilities.

Even with the wide variety of accessibility design guidelines, accessibility checkers, and assistive technology tools available, it can be difficult for instructional designers to gauge the accessibility of content. For a more thorough evaluation, instructional designers should elicit the help of other designers and accessibility experts. Work with the institution's Office of Disability Services to evaluate online materials to ensure equitable access to content. Rethinking accessibility and student experience is an ongoing collaborative effort of instructional designers, faculty, disability services personnel, and students.

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Data-Informed Design for Online Course Improvement

Chris Millet & Jessica Resig

Instructional Design | Learning Analytics | Data Analytics | Retention | Process Improvement

In this chapter, we introduce the Analytical Design Model, a strategy developed at Penn State's World Campus for improving course quality and student outcomes through an evidence-based approach to instructional design. ADM utilizes data from a variety of sources and offers an efficient and flexible process to analysis that results in concrete improvement targets for courses. ADM is not an instructional design model in itself, but rather a method for making instructional design more strategic and aligned to academic program priorities.

Introduction

Improving student outcomes in higher education is a critical challenge for all colleges and universities. Earning a degree is expensive, and while the American public continues to value higher education, they do have substantial concerns about cost (Fishman et al., 2018). In this environment, institutions are under increased pressure to demonstrate that the time students spend at college is of the highest quality and that it is effectively preparing them to engage in the world as productive citizens. This is particularly true for online learning (Allen & Seaman, 2015), as it is a comparatively new mode for higher education. Most online learning units of colleges and universities employ staff specifically to monitor student progress, develop predictive models, and craft a wide variety of retention strategies. These initiatives often focus on specific populations (e.g., first generation, military). They may borrow from ideas such as "improvement science" from the Carnegie Foundation (Bryk et al., 2015), which was created to provide a framework for educators and college administrators to use to systematically analyze the student learning process and implement highly targeted improvements.

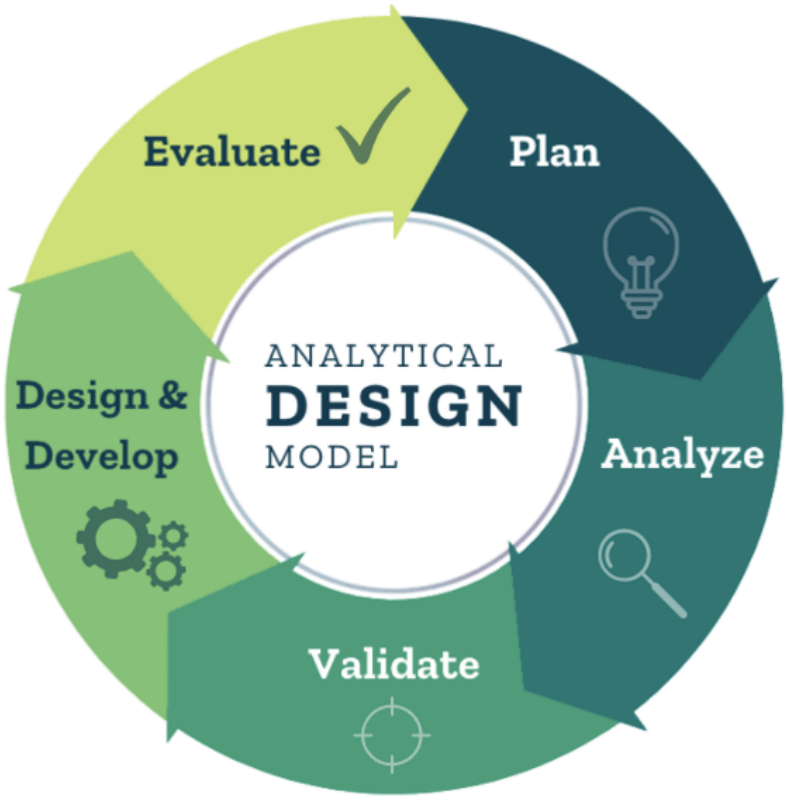
This chapter will outline one such framework that is being developed at Penn State's World Campus. With this framework, we seek to equip faculty and learning designers with a process and set of tools for utilizing learning analytics and other quality measures to pinpoint course design improvements. The model we introduce here, the Analytical Design Model (ADM), is specifically constructed to be flexible and allow for institutions at varying levels of maturity with data science and data infrastructure to see benefits and, over time, to iterate toward greater sophistication in these areas. In short, we hope this model is approachable regardless of an instructional designer's (ID) prior experience or institutional challenges and serves as the basis for design units to build a culture of data-informed decision making to support student success.

Introduction to the Analytical Design Model

The primary purpose of the ADM is to provide IDs and faculty with a framework for utilizing empirical evidence to precisely target improvements to course content. It is not, in itself, an instructional design model, but rather an approach to analysis that complements traditional instructional design approaches. Thus, it can be used in conjunction with any instructional design (ID) model that incorporates an analysis or evaluation phase. The outcome of an ADM implementation is a set of improvement targets that can serve to focus one's design efforts and increase the likelihood of a positive impact on student success. Such well-articulated targets also serve as discrete elements to measure in a post-implementation evaluation on the efficacy of changes. The targets are not a prescription for how the identified instructional problem should be solved. Rather, ADM offers processes and tools that serve as the basis for productive and creative collaboration between IDs, faculty, and other stakeholders as they seek to improve student success and retention.

Figure 1

Analytical Design Model



The primary phases of ADM include (see Figure 1):

1. **Plan**: Establish *Guiding Questions* based on program and institutional needs and initial intuitions about where improvements may be needed. These questions will focus the analysis, identify essential data sources, and help to avoid unproductive detours.
2. **Analyze**: Gather data, analyze, and develop insights to address the guiding questions. Triangulate with multiple data sets to build confidence in any assertions. Produce specific *Revision Prioritization Scores* based on the analysis.
3. **Validate**: Involve instructors and other practitioners in reviewing the interpretations and ensure they align with real-life experiences. Practice transparency to ensure that methodologies are sound. Prioritize *Revision Targets* based on stakeholder needs and level of impact.
4. **Design and Develop**: Engage in instructional design consistent with the ID's preferred processes informed by *validated Revision Targets*.
5. **Evaluate**: Collect additional data related to revision targets to assess the efficacy of any changes. Update the data collection protocols, reprioritize targets, ask new guiding questions, and begin to prepare for the next ADM iteration.

Each phase of the ADM is highly deliberate and utilizes an evidence-based approach to produce a specific deliverable that acts as an input to the next phase. For example, guiding questions drive the analysis and revision targets focus the design. The evidence collected relevant to the ADM may include data about student use of a learning management system (LMS) or content management system (CMS), engagement between students, assessment outcomes, surveys, quality evaluations (e.g., Quality Matters), or alignment maps. Data may be collected through existing learning analytics infrastructures, access to unprocessed system logs, or through manual processes (e.g., surveys, interviews, evaluations). The model is quite flexible about what data should be included – the only requirement being that data collection is purposeful and aligns with a well-defined set of guiding questions. When multiple data sets are aligned to a common set of questions, it becomes feasible to triangulate any findings because there are multiple pieces of data to support each assertion. As Cohen and Manion (1989) explain, triangulation seeks to "map out, or explain more fully, the richness and complexity of human behavior by studying it from more than one standpoint and, in so doing, by making use of both quantitative and qualitative data" (p. 269). Triangulation is critical to ADM as we often work with smaller data sets that are limited in terms of the length of collection (one or two semesters) or number of students. Depending on an institution's maturity with data and learning analytics, being able to incorporate diverse data sources that include low-tech options while still achieving a high degree of validity is quite useful. By utilizing technical standards such as IMS Caliper (Caliper Analytics, 2020) that enforce structure and a common vocabulary to education-related data, it becomes much easier to make linkages across disparate data sources. These data tools create a mechanism for collecting data outside the LMS (Pardo & Kloos, 2014) and greatly simplify triangulation.

In summary, it may be useful to think about ADM in the following ways:

- **It's approachable**: ADM is specifically constructed to be easy to implement, regardless of an institution's data maturity.
- **It's opportunistic**: IDs may use whatever data they have and scale the implementation based on time and resources. Iteratively adapt the process based on institutional maturity.
- **It's humble**: Data in ADM merely augments an inherently creative human-centered approach to design. Draw on existing analytical skill sets but allow stakeholders to validate the interpretations before proceeding.
- **It's efficient:** While upfront analysis takes some time, more precise targeting of instructional design efforts can offset this initial investment.

The Role of Analysis in Instructional Design

In the context of instructional design, analysis identifies "the probable cause for a performance gap" (Branch, 2009, p. 23). As analysis is a core concept of our model, we must consider why it is important to instructional design. We will do this by viewing analysis through two lenses: business processes and pedagogy. Both organizational needs and learner success must be balanced for any design model to be considered effective and sustainable.

Business Justification for Analysis

Most learning design organizations in higher education do not have the luxury of dedicating significant time and money on rigorous analysis efforts in pursuit of course improvements. One common strategy is to focus analysis efforts on specific programs that are underperforming in terms of enrollment, student outcomes, or other key success indicators. In these cases, their limited scope and strong strategic alignment justify the level of effort required for a proper analysis with lengthy data gathering and subsequent improvement. Conversely, the bulk of courses within a normal revision cycle may not justify such an investment. More traditional production tasks (e.g., content authoring or multimedia development) may then be prioritized with analysis playing a smaller role. However, as we discuss later in this chapter, learning designers can reassert the role of analysis by demonstrating: (a) that there is clear alignment with program priorities and an articulation of expected benefits and (b) that potential increased efficiencies and efficacy as a result of this upfront work outweigh the investment in analysis. A well-defined model such as ADM can produce clear documentation that satisfies both of these conditions and can help gain buy-in with stakeholders.

Pedagogical Justification for Analysis

When making decisions that impact pedagogy, analysis has always been central to an ID's toolkit. Many design models indicate that analysis is the first step an ID must complete before beginning a design. Indeed, the 'A' in ADDIE, the foundational framework that IDs learn early in their training, stands for analysis. It is essential that an ID spends time understanding the instructional problem that the ensuing design must address. In practice, this process is often not informed by empirical evidence. However, Muljana and Luo (2020) indicate that while understanding and adoption of learning analytics is currently low, IDs largely view its potential as positive. Integrating analysis and data-informed practices into instructional design may be more approachable than current adoption of such practices suggests.

Learning Analytics, Data, and Institutional Maturity

Learning analytics (LA) are concerned with "the measurement, collection, analysis, and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs" (Siemens et al., 2011, p. 4). LA *is* a powerful capability and ADM is bolstered by having at least limited LA infrastructure in place. There are many approaches to building LA maturity at an institution. Developing an institution-wide strategy (as described by the modified ROMA approach in Ferguson et al., 2015) to implement LA may require a broad understanding of policy and stakeholder priorities and a deftness with change management. However, the iterative nature of ADM suggests a more incremental approach towards LA maturity.

Some of the barriers to change that learning design leaders may face in establishing a data-informed decision-making culture come from ethics and privacy concerns over the potential for improper use of student data. ADM helps mitigate this risk by prioritizing transparency and validation with faculty and IDs as an accountability measure on any and all data interpretations. Involving policymakers throughout this incremental maturation can also ensure that institutional policy adapts and grows in response to the needs of LA initiatives.

Risk can be further managed by having a well-defined project with clear objectives. This will assist in identifying what types of data may be required to support the analysis. Indeed, many institutions engage in data risk classification that assigns risk levels to specific data types. Determining the data needed to complete an ADM implementation at the outset can ensure IDs do not later find themselves in the position that they cannot obtain the access needed. Table 1 can help in understanding the types of data that inform an ADM process and the associated risks attached to them.

Table 1

Possible Data Sources and Associated Risk Categories

Data Source	Considerations	Risk Category*

Quality Evaluation	Utilizes rubrics provided by Quality Matters and others. Deals with course content, not student data. Labor intensive.	Low
Student Surveys	Uncovers student perceptions. Useful when combined with other data. May not get high response rates. Requires valid survey instruments.	High
Instructor observations	Qualitative. Collected though interview with instructor. Can be helpful during validation phase.	Medium
LMS usage logs	Can be structured or unstructured (see below). May require significant data cleanup. Requires statistical techniques to properly interpret.	High
Student performance (grades)	Highly sensitive. Useful when correlated with other sources.	High
Student information system records	Highly sensitive. May be difficult to obtain. May not be necessary depending on guiding questions.	High

Note. * Each institution may classify risks differently. Consult your local data policies.

Analytical Design Model: In Detail

This section articulates each phase of the Analytical Design Model in detail and provides an example to show how each of these phases work in practice.

Plan

The ADM begins with a robust planning phase. During this time, course and program faculty, IDs, and other relevant stakeholders meet to initiate the project, develop guiding questions, and define goals and expectations. Higher education is a complex system (Chow, 2013) and online course offerings inherently face highly contextualized opportunities, needs, and constraints. This early attention to setting a shared vision establishes the foundation for a revision process tailored to best meet the unique needs of courses and programs.

It is important to note that the driving force for initiating this process is course, program, and institution specific. In some cases, identified issues with student performance, retention, or engagement determine the need for course improvement. In other instances, courses or programs choose to revise on an established schedule or in a pre-defined order based on course sequences in a program. Additionally, broad institutional goals, such as reducing materials costs or increasing retention, and external influences, such as changes in state or federal legislation, necessitate course revisions.

During the initial project meeting, important topics to discuss include:

- an overview of the process and timeline
- available expertise and resources
- roles and responsibilities of team members
- any internal or external motivators for the revision
- general perceived areas of interest and/or concern

Once the group has committed to using the process, establish a set of guiding questions for the project. These initial questions may be based on specific program needs, anecdotal observations or areas of interest, or specific challenges. For example, when evaluating a three-course sequence that was flagged for revision due to low student performance, guiding questions focused on understanding how well the content coverage was aligned across the course sequence, how well students demonstrated mastery of key concepts in each class, and how students interacted with the course

materials and each other. By the end of the planning phase, the group should have clearly documented guiding questions and goals.

Analyze

The analysis phase requires determining which data sources address the guiding questions, analyzing those sources, and making observations based on the findings. When preparing for analyses, consider the available data sources and develop a plan to address the guiding questions and goals. As outlined in Table 1, a variety of different qualitative and quantitative data may inform an ID's understanding of phenomena in the course. Triangulating data across multiple sources (and semesters when possible) develops a more rich, comprehensive, and meaningful view of the current state of the course. Quantitative analysis may include behavioral analytics, such as click-stream data and access reports, and performance analytics such as assessment scores by item and category, item analyses, and overall course grades. Qualitative data may be drawn from student surveys and feedback, instructor observations and reflections, and discussion forum and assignment content analysis. Other indicators of course quality may be derived from creating an alignment map of the course objectives, content, and assessments. An alignment map template has been provided. Our institution also utilizes the Quality Matters (QM) standards to evaluate online courses. A QM pre-review during the analysis phase provides another data source that allows us to identify areas of improvement to better meet the expectations outlined in the QM standards.

After outlining which data sources to use for each guiding question, determine how to analyze those sources. For example, when creating an alignment map of course objectives, content, and assessments, it may be beneficial to collaborate with the course instructor when creating the map. Similarly, LMSs and third-party tools typically have built-in item analyses, grade reports, and other information that may be ready to use. For each of the guiding questions and data sources, decide what and how to measure. Then, conduct the analyses and capture observations in a reporting format that can be shared with the course development stakeholders. Based on the specific project, needs, and capabilities, the report may take the shape of a comprehensive document, an interactive dashboard (e.g., using tools such as Power BI or Tableau), or another format that works for the context. Quantifying data across a course and comparing performance, interaction, and alignment across lessons determines where to focus attention and resources. The ADM Example Implementation at the end of this chapter illustrates our approach to prioritization.

It is important to maintain thorough description of the methodology including data sources and how data was cleaned and analyzed. Include explanations for every interpretation made in service of answering the guiding questions. These decisions should be transparent and documented along the way allowing for open dialogue and ensuring that stakeholders can confidently revisit the analysis and data sets to expand, refine, or revise as needed.

Each guiding question should be addressed with multiple pieces of data to make informed observations about the course. In parallel to crafting observations, explore existing academic literature related to the guiding questions to determine what kinds of interventions may be effectual and draw comparisons to local circumstances and contexts. With these observations, revision prioritizations and guidance from prior research, frame a set of conclusions for each guiding question. The conclusions may include recommendations or suggestions for future action steps which can help inform the instructional design process moving forward. Because this process relies on human decision-making, it is important to be sure to revisit data sources, look for specific information to help support observations, and revise and refine the questions, goals, and targets as needed while creating the report.

Validate

During the validation phase, regroup with all stakeholders to review the methodology, discuss observations and revision prioritization, and refine reporting and suggestions as necessary. Ultimately, the validation process involves honest conversation that asks stakeholders "Could this mean what we think it means?" and inviting feedback in service of improving the findings prior to acting on them. For example, during an analysis of an upper-level management course, we were able to note that students frequently paused video presentations at similar intervals, which we hypothesized reflected their note-taking behavior. During the validation meeting, the faculty member confirmed that the videos in

question were content-dense and challenging. These valuable insights were carried forward into the redesign to inform how we presented content to learners.

Design and Develop

The steps of the ADM up to this point prepare IDs and course authors to enter course revision armed with a set of contextualized, validated, and well-supported recommendations upon which to act. While the data-informed nature of ADM is more intensive than analyses commonly conducted in higher education contexts, the ADM outcomes can serve to fill the role of a thorough needs assessment as called for by many traditional instructional design models (Branch & Kopcha, 2014; Dick et al., 2015; Morrison et al., 2019). To best engage with the ADM outcomes, the course design team should progress through stages of ideation, prioritization, design, and development. Any instructional design process naturally involves relying on a degree of design conjecture as IDs interpret the analysis and integrate their expertise and observations to make decisions (Stefaniak et al., 2018). By using results from the ADM and ideating around identified needs and then prioritizing those ideas, course design teams can more intentionally focus their resources and efforts.

Evaluate

During implementation ongoing evaluation should monitor the progress of revisions to best support student success. Establish expectations for continuous communication with the course team, determine the scope of ongoing iterations, and decide which data sources to use over time to monitor course progress. Supporting iterative improvement may mean revisiting part or all of the ADM to revise questions and goals, add new or expanded data, and create more timely reports, updates, or dashboards for ongoing use. Performing a data-informed revision for the primary project is valuable, but committing to and supporting ongoing analysis for continuous improvement will allow the team to increase revision efficiencies and focus efforts more proactively.

Analytical Design Model: Example Implementation

This example highlights three phases of an ADM implementation: planning, analysis, and design and development. In the real-life implementation of this example, we included validation and evaluation, but have left those out here for brevity. Our model is not prescriptive and each approach is highly contextual (i.e., you can adapt your own implementation). The statistics and visualizations are specific to the data available but are general enough to align with what most institutions can accomplish with locally-available data. Most importantly, in considering ADM in your own organization, this should create a clearer picture of the type of effort involved. We have used fictitious organizations throughout the example.

Phase 1: Planning

This section outlines Forest State University (FSU) Online's current progress toward producing the deliverables necessary to achieve the goals established at the onset of the project. A proposed timeline for the next steps is included below:

Goals

- Identify potential revisions and their intended impact on student performance.
- Prioritize revisions based on the needs of key stakeholders (Business faculty, FSU Online program management).
- Recommend a revision plan based on analysis that allows for 1) small short-term improvements, and 2) more significant course revisions.

Deliverables

The FSU team will deliver:

- A comprehensive report that includes:
    1. a description of the methodology used to analyze data,
    2. an analysis of student behaviors, performance, and course alignment addressing the Guiding Questions, and
    3. a set of prioritized recommendations for revisions to BUS 101 and 102.
- Regular status updates to key stakeholders throughout the project duration.
- A preliminary project plan to address recommended revision within the 2019/2020 academic year.

Timeline

- Fall 2019
    - By December 15: FSU and faculty stakeholders review the Business Course Analytics Report to prioritize short-term improvements and more significant revisions
    - Mid-December - January: Faculty and IDs collaborate on short-term improvements for SP20, larger revisions for SU20
- Spring 2020
    - January: All short-term improvements implemented in SP20
    - March 1: Mid-semester check-in - tentative analysis of revisions based on emerging course data; corrective actions taken if necessary
    - By April: All improvements and revisions complete for SU20
- Summer/Fall 2020
    - Conduct ongoing post-revision analysis to validate changes

Project Team

The following individuals are identified as stakeholders on the project team:

- Program lead faculty: responsible for helping to set the vision for program revision and course goals during the planning phase; receives ongoing updates throughout the project; ensures ongoing resourcing for course improvements.
- Course instructor/author: provides critical insights into the current state of the course and collaborates with the ID at each stage of the process to revise the course as needed.
- Instructional designer: works closely with all parties during each stage of the process; conducts analyses, creates data visualizations and reports, develops recommendations, and collaborates with course author to prioritize and revise the course.
- Programmer: queries data sources to create data sets for analysis; supports data privacy and protection practices; cleans and structures data as needed.

Guiding Questions

- Question 1: How are students interacting with FSU content? To what extent, if any, does this interaction relate to performance?
- Question 2: What types of behavioral patterns can be identified both within FSU content/systems and within LearnMore publisher content and systems?
- Question 3: To what extent are the learning objectives, content, and assessments in BUS 101, 102, and 103 aligned?
- Question 4: Are there specific topics or objectives within BUS 103 with which students who have completed the FSU BUS 101 and 102 struggle?

Phase 2: Analysis

Methodology

This report presents the findings and recommendations from a multi-semester exploration of course alignment and student behaviors and performance in BUS 101, 102, and 103. This exploration is designed to inform revisions of BUS 101 and 102 to ensure students are better prepared for success in BUS 103.

Student performance and content interaction data were collected during the Spring 2019 and Summer 2019 semesters. During early Fall 2019, FSU Online met with faculty for each course to develop a comprehensive course alignment map and to collect LearnMore's LearnLab performance data.

The following sections address the study's four guiding questions, outline overall observations, and detail suggested next steps to inform the revision process.

Revision Prioritization Score

The Revision Prioritization Score (RPS) provides an objective, quantifiable metric to guide revision efforts based on alignment, performance, and interaction. These three factors can be weighted to reflect goals of the program and revision efforts. For the purposes of this review, categories were weighted evenly. The RPS and detailed descriptions of the measurements for alignment, performance, and interaction are provided below.

Revision Prioritization Score Formula

$$100 - \left(\frac{(Alignment * weight_1) + (Performance * weight_2) + (Interaction * weight_3)}{Sum\ of\ Weights} \right)$$

Alignment

Alignment is defined as the extent to which the course and lesson learning objectives, lesson content, activities, and assessments work together toward the achievement of the stated objectives. Alignment was evaluated in direct consultation with faculty for each course. The alignment score is calculated as follows:

$$Alignment\ Score = \frac{Sum\ of\ Objective\ Scores}{Total\ Number\ of\ Objectives * 2} * 100$$

Objective Score = 1 point if objective is covered in content + 1 point if objective is assessed

Performance

Assignment grades were collected from LMS data. Scores were converted to percentages and averaged for each lesson to create a lesson **Performance Score**.

Interaction

Content for BUS 101 and 102 has been developed in the FSC Online CMS. This system tracks when students access course content, how they interact with content, and the extent to which they consume media.

Additionally, BUS 101 and 102 use a LearnMore textbook that is equipped with LearnLab, an interactive and adaptive reading tool that integrates guided, distributed practice problems and active learning strategies to improve student learning. LearnLab provides instructors with information about the length of time students spend in the system, as well as their degree of completion for the chapter.

Information from both FSU and LearnLab systems were combined as follows to calculate the interaction score:

$$FSU\ Interaction\ Score = (\%\ accessed\ content * 90) + ((\frac{(\%\ accessed\ media + \%\ used\ interactive\ content)}{2}) * 10)$$

$$LearnLab\ Interaction\ Score = \%\ used\ LearnLab$$

$$Interaction\ Score = \frac{FSU\ Interaction\ Score + LL\ Interaction\ Score}{2}$$

Observations

Though not formally accounted for in the RPS, observations play an important role in determining how to prioritize revisions moving forward. During the alignment mapping process, faculty identified which lessons in BUS 101 and 102 are prerequisites for BUS 103. These lessons should be given special consideration when deciding where to focus revision efforts to have maximum impact on students' preparedness for BUS 103. Additionally, faculty identified lessons in which content is outdated or misaligned. These lessons should be revisited during revision regardless of RPS to ensure that content is current and accurate.

Detailed Course Analyses

Analysis Part 1: Alignment

When using the LearnMore textbook chapter objectives as a foundation, BUS 101 and 102 cover a total of 204 learning objectives. Of those, 47 objectives are not discussed in the FSU content, but are assessed in the course, 12 are covered by the FSU content but are not assessed, and 8 are not covered by the FSU content or assessed. These objectives that lack content, assessments, or both should be reviewed to determine if they are within the scope of the course or if they should be removed. If they are deemed within scope, the lesson materials should be reviewed to determine if/what types of content and/or assessments may be added or adjusted to improve alignment.

Table 2

Lessons 9 and 10 Objective Coverage

#	Learning Objective	Covered in FSU Content? (Y/N)	Assessment
1	Recognize the ethical quandaries in a business situation and recommend actions to address such issues.	Y	None
2	Identify legal issues germane to many business situations and assess the relationship between strategic decision making and regulatory requirements.	Y	Excel Quiz Problems
3	Recognize the social impacts of business decisions and suggest appropriate sustainable practices.	Y	Excel Quiz Problems
4	Identify key challenges of globalization in business operations.	N	Excel Quiz Problems
5	Exhibit knowledge of the major cultural, economic, social, and legal environment faced by multinational corporations.	N	Quiz Problems

Note. Blue – Objective covered in FSU content but not assessed; Yellow – Objective not covered in FSU content but assessed; Gray – Objective not covered in FSU content and not assessed. *Table 2 shows a sample lesson objective alignment map, which indicates whether and how an objective is covered in content and assessed. This table is drawn from the data gathered in the alignment mapping spreadsheet, which is shown in Table 3.*

Table 3

BUS 101 Lesson 9 Alignment Map

Course Objectives	LO	Lesson Objectives
1, 2	1	Recognize the ethical quandaries in a business situation and recommend actions to address such issues.
2	2	Identify legal issues germane to many business situations and assess the relationship between strategic decision making and regulatory requirements.
2	3	Recognize the social impacts of business decisions and suggest appropriate sustainable practices.
2	4	Identify key challenges of globalization in business operations.
2	5	Exhibit knowledge of the major cultural, economic, social, and legal environment faced by multinational corporations.

Content Pages	LO	Practice/Activities	LO	Assessments	LO	Tools Used in this Lesson
Overview of Regulation	2	LearnLab	3,8	Lesson 9 Discussion	3, 8	LearnLab

Business in Society	3	Lesson 9 Problems	1, 2, 3	Excel
Key Legislation in Business	2	Lesson 9 Quiz	3, 7, 8, 9 , 10	
Operating at a Global Scale	2, 4	Lesson 9 Excel	3, 7, 8, 10	
Multinational Corporations	5			

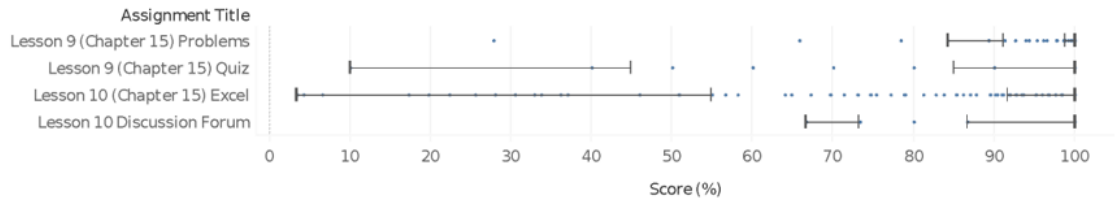
Note. *In addition to using these maps to better understand alignment issues, FSU uses the course alignment maps as an input for Quality Matters course pre-review. By including information in the alignment map about technology tools used in the lesson, as well as connections back to the course-level objectives, this sheet is able to meet several needs.*

Analysis Part 2: Performance

Student performance on assessments in BUS 101, 102, and 103 was evaluated by lesson, topic, and assignment category to help identify trends and issues from a variety of angles. Figure 2 below shows the range of student average scores on assignments for BUS 101 Lesson 9.

Figure 2

Lesson 9 Assignment Performance



Analysis Part 3: Content Interaction

To better understand how students interacted with course content, we evaluated how many times students viewed lesson pages throughout the semester (see Figure 3), how many students accessed the course content for each lesson (see Figure 4), and how students engaged with multimedia and third-party tools (see Table 4).

Figure 3

Course Content Page Views by Date, Spring 2019 BUS 101

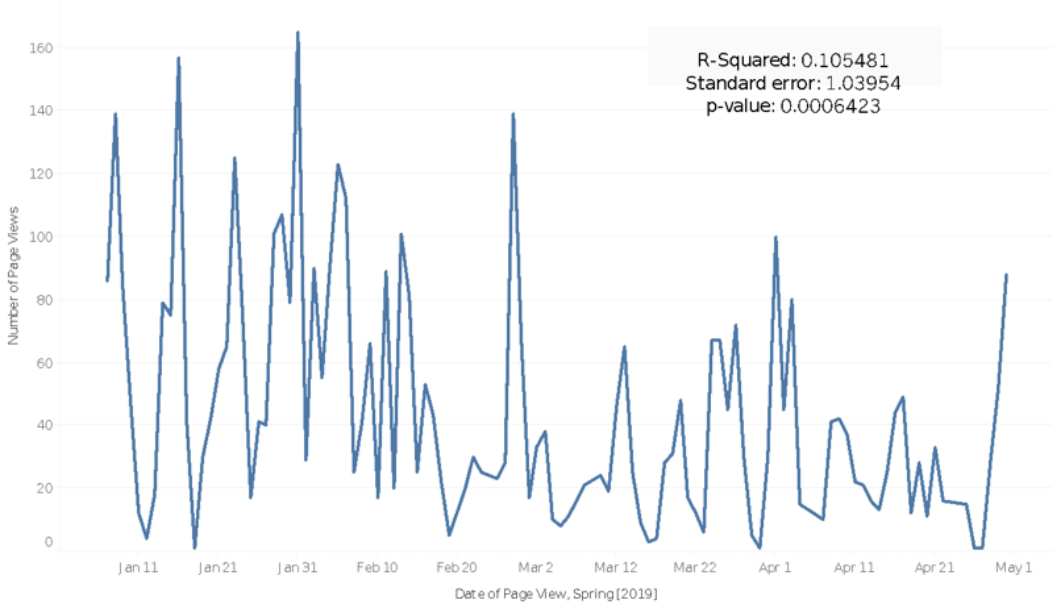


Figure 4

Number of Enrolled Students Who Viewed Lesson Content, by Lesson, Summer 2019 BUS 102 001

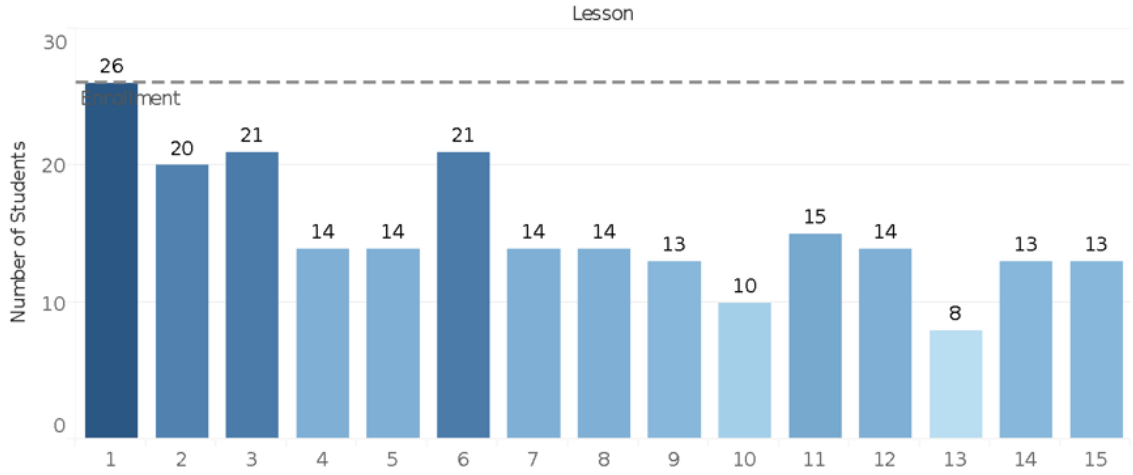


Table 4

Content, Multimedia, and Third-Party Tool Interaction, BUS 102 Lesson 9

Accessed FSU course content:	52%
Played FSU lesson media:	50%
Used interactive FSU content:	50%
Completed LL LearnLab:	36%
Avg. time spent on LearnLab by due date:	52 min.

Analysis Summary and Findings Upon completing the analysis of lesson alignment, content interaction, and performance, a revision prioritization score was calculated for each lesson to help focus attention on those parts of the course during design and development (see Table 5).

Table 5

BUS 102 Course Revision Prioritization Snapshot

Lesson	Alignment (%)	Content Interaction (%)		Performance (%)	Revision Prioritization Score
		FSU	LearnLab		
Lesson 1	78.6	95.3	N/A	86.13	**13.23**
Lesson 2*	100	73.9	46	86.82	**17.74**
Lesson 3*	92.9	81	43	88.95	**18.72**
Lesson 4 & 5*	92.9	50.8	43	83.06	**25.71**
Lesson 6	86.4	81	36	83.62	**24.43**
Lesson 7 & 8	90	44.5	43	88.22	**26.01**
Lesson 9 & 10	83.3	52	36	81.66	**30.35**
Lesson 11	83.3	57.4	36	87.22	**27.59**
Lesson 12 & 13*	94.4	46.3	36	89.17	**25.09**
Lesson 14*	82.1	57	21	87.53	**30.46**
Lesson 15*	88.9	45.4	25	82.49	**31.17**
Midterm	N/A	N/A	N/A	74.5	NA
Final	N/A	N/A	N/A	76.54	NA
Composite	**88.44**	**62.24**	**36.5**	**80.71****	**27.16**

Note. Key for Revision Prioritization Score Ranges = **0-20, 20-30, 30+**

Phase 3: Design and Development

Ideation and Prioritization

Based on the insights from Table 5 and the analysis phase, the course design team meets to brainstorm ideas for course improvement and then, to prioritize those ideas into concrete revision targets.

BUS 102 Revision Targets: Lesson 9 & 10

- Explore strategies to improve student performance on Excel-based assessments. This may include increasing the amount of distributed practice, integrating active learning strategies, and/or adjusting assignments to improve retention.
- Review all objectives either 1) not covered by FSU content but assessed (n=20); 2) covered by FSU content, but not assessed (n=3), or; 3) not covered by FSU content and not assessed (n=1), to determine if/where appropriate changes may be needed to best meet learners' needs.
- In cases where students are clearly struggling with assignments (especially Excel problems and quizzes), consider providing content in new or enhanced formats (video recordings, self-check activities, graphics, etc.) to increase opportunities for retention and practice.
- The topic of globalization is covered by LearnMore reading in both BUS 101 (Lesson 9) and BUS 102 (Lessons 8 and 9). However, LMS content in BUS 102 Lesson 8 relates to business analysis. Revisit this content to determine where globalization should be covered and to ensure that student skills are built and scaffolded over time.

*Lesson topic is prerequisite to or continued in BUS 103; ** Weighted to reflect 45.9 exam weight.

Conclusion

Developing a comprehensive approach to data-informed course improvement takes time, and course, program, and institutional circumstances may pose a series of challenges when working towards implementing the ADM. Ideally, forming a team that includes individuals with broad skill sets in instructional design, learning analytics, educational research, and programming supports the use of a larger toolbox of strategies and approaches that a design team can leverage. However, this ideal state of support for the ADM also implies having well-established resources, institutional culture, and data infrastructure. For IDs in a small unit or who face limited opportunities to collaborate, the ADM is flexible enough to start with available resources. For example, IDs who do not have access to the data infrastructure or sharing necessary to get detailed or customized LMS data can use existing reports generated by their LMS and multimedia systems to better understand learner performance and frequencies of behaviors. Additionally, IDs tasked with faculty development can support skill building with course instructors and authors to facilitate more data-informed course design decisions from the faculty perspective. With these challenges in mind, IDs looking to integrate the ADM into their professional practice should plan to iterate towards more complex implementations.

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Learning Analytics as a Tool for Improvement and Reflection on Instructional Design Practices

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Instructional Design | Learning Analytics | Higher Education

In this book chapter, we provide guidelines and best practices to instructional designers working in higher education settings on how to use learning analytics to support and inform design decisions. We start by defining learning analytics and frame such a definition from a practitioner point of view. Then, we share best practices on how to use learning analytics to support and inform design decisions in designing courses in higher education. We share examples of learning analytics—through screenshots—gathered from our instructional design experience in higher education and comment on what implications such examples have on design decisions. We conclude by sharing a list of commonly available tools that support gathering learning analytics that instructional designers can put at their disposal throughout the design process, and in conducting needs analyses and formative/summative evaluations.

What is Learning Analytics?

Learning analytics has become a popular buzzword among educators. Unfortunately, like most buzzwords, it has slowly lost meaning as it has become more widespread. The Society of Learning Analytics Research (SoLAR) defines learning analytics as a field of research interested in understanding student learning based on their interactions with digital environments. While this definition is generally satisfactory for research purposes, it fails to capture the breadth of practices instructional designers, instructors, administrators, and other stakeholders in higher education engage in under the umbrella of learning analytics. The definitions used by researchers are also often overly broad. The definition given above by SoLAR implies that any time a student touches a computer and data is collected, learning analytics is happening. However, if we look at the body of practices actually taking place under the banner of learning analytics, we see that learning analytics has a much more focused goal. Learning analytics is the use of digital technology to capture learning as it happens (Seimens, 2013). Learning analytics captures students reading, clicking, and in other ways interacting with computers and uses this data to attempt to explain the act of learning. This differs from other related fields, such as educational data mining, which takes a more outcome-driven approach to analytics, but is not (always) as interested in the exact way in which learning is happening.

The field of learning analytics is often perceived as an esoteric quantitative field, out of reach of anyone without an advanced degree in mathematics or computer science. However, one area of increasing interest to learning analytics researchers is the implementation of descriptive tools that allow teachers, students, and designers to easily reflect on the learning process and improve instruction (Bodily & Verbert, 2017; Phillips & Ozogul, 2020; Sergis & Sampson, 2017;

Wise & Jung, 2019). While the amount of researchers being conducted in this area is extensive, there are three main categories of learning analytics tools that are of particular interest and utility to instructional designers:

1. Student-facing: Student-facing learning analytics simplify the complex data collected from learning management systems and other digital sources to create dashboards and other visualizations that allow students to reflect on the current state of their knowledge and set goals to improve their learning.

2. Teacher-facing: Teacher-facing tools tend to give a more complex and nuanced view of learning than student-facing tools. They often include class or course-level summaries of students' time interacting with different digital resources, as well as the ability to explore the activities of individual learners and the patterns across learners.

3. Designer-facing: Designer-facing tools often are similar to or even synonymous with teacher-facing tools in their design. However, because of designers' unique roles, these same tools are often leveraged in different ways. While a teacher may be interested in adjusting their day-to-day instructional strategy, a designer may be more interested in adjusting the overall structure of the course.

While some learning analytics tools may have different dashboarding features for students, teachers, and designers, in many cases, they are merged into a single tool, and it is the job of the instructional designer to customize the dashboards to meet the needs of the specific audience. As a whole, we refer to these three learning analytics tools as instructional-focused learning analytics.

Best Practices for Instructional-focused Learning Analytics in Higher Ed

In this section, we discuss seven best practices (BPs) for using instructionally focused learning analytics:

1. Be data-informed, not data-driven.
2. Default to the simplest analysis that answers your question.
3. Interpret results in context.
4. Understand how your software is generating metrics.
5. Focus on interpretation over prediction.
6. Seek opportunities for professional development.
7. Where possible, seek collaboration with researchers.

As a general guiding principle and a best practice, we first recommend that instructional designers use instructional-focused learning analytics as a design tool in a designerly way (Lachheb & Boling, 2018) to inform/support their design decisions and judgments (Boling et al., 2017; Gray et al., 2015; Lachheb & Boling, 2020; Nelson & Stolterman, 2014). This entails adopting a data-informed design approach and not a data-driven design approach. Data-driven design is an approach that usually implies fast cycles of user-testing and design iterations based on feedback/data received and, essentially, data and algorithms deciding what designers do. In designing for learning, a fully data-driven approach is not only impractical and raises some ethical questions, but also goes against the nature of instructional design practice —designing for learning and human performance demands a careful, slow, deliberate, and well-thought-out process, to design for learners, not customers. Designers must be the guarantors of design, not the data they have (Nelson & Stolterman, 2014). Data reflect a subjective worldview that must be accounted for when design judgments and decisions are made (Datassist Inc We All Count, 2021).

Second, when using data that belong to any category of instructional-focused learning analytics, we recommend that instructional designers always default to the simplest analytics necessary to solve the problem they are facing. Some of the most informative learning analytics are simply counts of the frequency of certain occurrences. For example, the frequency of how many times a page was accessed/viewed shows what content is getting the most attention by students. Designers who are more comfortable with complex analyses can engage with more complex learning analytics, but often these analyses do not reveal any additional information.

Third, we recommend that instructional designers interpret numbers within the context of the course. For example, an LMS dashboard can show a student consistently submitting late assignments and keeps getting a "B" grade in all assignments. These two numbers can suggest some kind of relationship on its surface. For example, late submitted assignments are of poor resulting in low scores. However, this relationship might not exist at all because the course has a late submission policy that takes a letter grade for each submitted assignment, regardless of its quality. In this case, if this late submission policy were not in place, all the students' assignments would score an "A".

Fourth, we recommend that instructional designers understand how the tools that generate instructional-focused learning analytics "crunch the numbers". For example, many video platforms display the average "drop-off" percentage for each video, which indicates the length of time a student watched a video before closing the page or pausing the video and never restarting it. A video platform can calculate this number in 25% increments (i.e., the average drop-off percentage is measured by viewers reaching playback quartiles). A 10-minute video lecture, for example, can include in its last quartile (i.e., its last 2.5 minutes) a recap/summary and/or the instructor talking about optional resources they have shared already with the students. Most likely, students who are used to this format of learning will not watch the last part of the video lecture because it was optional, and they got what they need from the lecture deeming that the least 2.5 minutes was not worth their time. That being said, the highest average drop-off percentage for this video lecture that could be hoped for is 75%.

Fifth, we recommend that instructional designers focus on interpretation over prediction. Researchers are still searching for the "holy grail" of predictive analytics, with moderate success (e.g. Piech et al., 2015). Still, unless the designer has a strong understanding of statistical methods, this is probably not the most effective use of their time. For example, when finding out that the 10-minute video lecture —mentioned in the previous example—had an average drop-off rate of 75%, the focus should be on interpretation over prediction. An appropriate interpretation should be as follows:

For this video lecture, and given how the video platform calculates the average drop-off percentage, 75% is a good indicator that the students watched the whole 7.5 minutes of the video lecture, but they skipped watching the rest of it since it was optional and included repetitive content.

A prediction analysis that will not lead to a sound design decision, in this case, would be:

Students in this course do not watch lectures that are longer than 7.5 minutes, thus, future lectures should be no longer than 7.5 minutes, otherwise, students will not watch them. Or, students who skipped to watch the optional resources will fail their exam.

Sixth, we recommend that instructional designers seek out opportunities for professional development to increase their proficiency with analytics tools and methods. The same barriers for learning analytical tools that existed in the past have begun to break down. Websites such as Udemy.com, Coursera.com, and Skillshare.com offer affordable courses on statistical analysis, machine learning, learning management systems, and many more topics. Courses are gauged towards a variety of audiences from those with no experience with analysis to those with years of experience looking to learn a highly specific skill. Resources specific to learning analytics are less common. Still, the Society of Learning Analytics Research's yearly summer institute offers various workshops on both technical and pedagogical concerns in learning analytics.

Last, we recommend that instructional designers collaborate with researchers interested in or with expertise in learning analytics. Instructional designers working in higher education can take advantage of the available scholars and research centers across campuses to collaborate on learning analytics initiatives. This collaboration could be quid pro quo for the researcher and the instructional designer. Learning analytics researchers are constantly complaining they cannot get buy-in from practitioners (Herodotou et al., 2019) and designers can rely on the researchers' expertise to empower their suite of design tools with instructional-focused learning analytics.

Examples in Practice

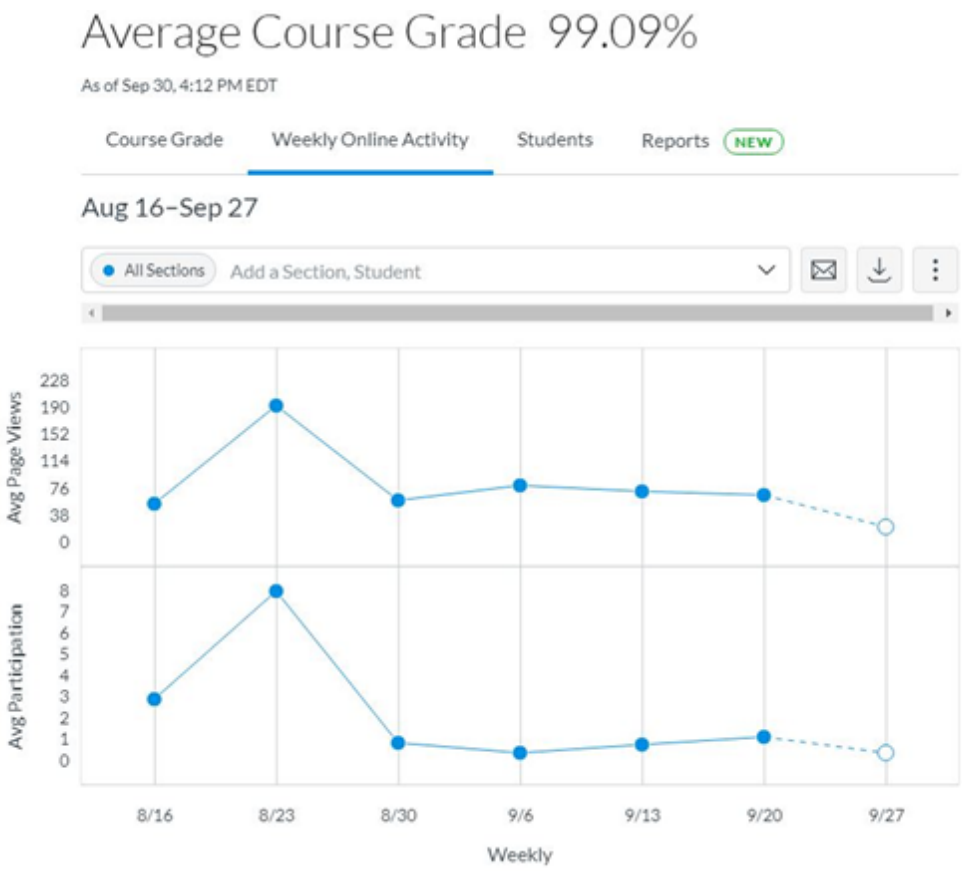
In this section, we share examples of learning analytics—through screenshots and explanations—gathered from our instructional design experience in higher education and we provide commentary on what implications such examples have for design decisions. Examples of how these examples may be used to inform teachers, students, and designer-facing dashboards are indicated and throughout, we reference the best practices outlined previously (e.g., “BP #2”).

Example 1: Canvas LMS Student Analytics

The dashboard of learning analytics in figure 1 shows students’ weekly online activity on the course, the average page views, average participation, and other analytics. This type of data provides an idea of how frequently students interacted with learning materials. It is also possible to identify certain patterns in terms of what type of content students frequently viewed and at what time, as well as what type of content was most viewed. This information can help instructional designers identify what the most viewable type of content was (e.g., a specific discussion topic) which could help instructors identify what topics lead to more engagement among students. A simple surface view of Figure 1 and 2 do not provide insight as to why students interacted more with a particular learning material or activity. Designers should consider BP #3 (interpret in context) when viewing this information. Week 1 may not be comparable to other weeks because it represents syllabus work. Use BP #5 (Focus on interpretation) to consider the content of each week when interpreting data. If week 5 contains the first mid-term, we may expect an increase in activity.

Figure 1

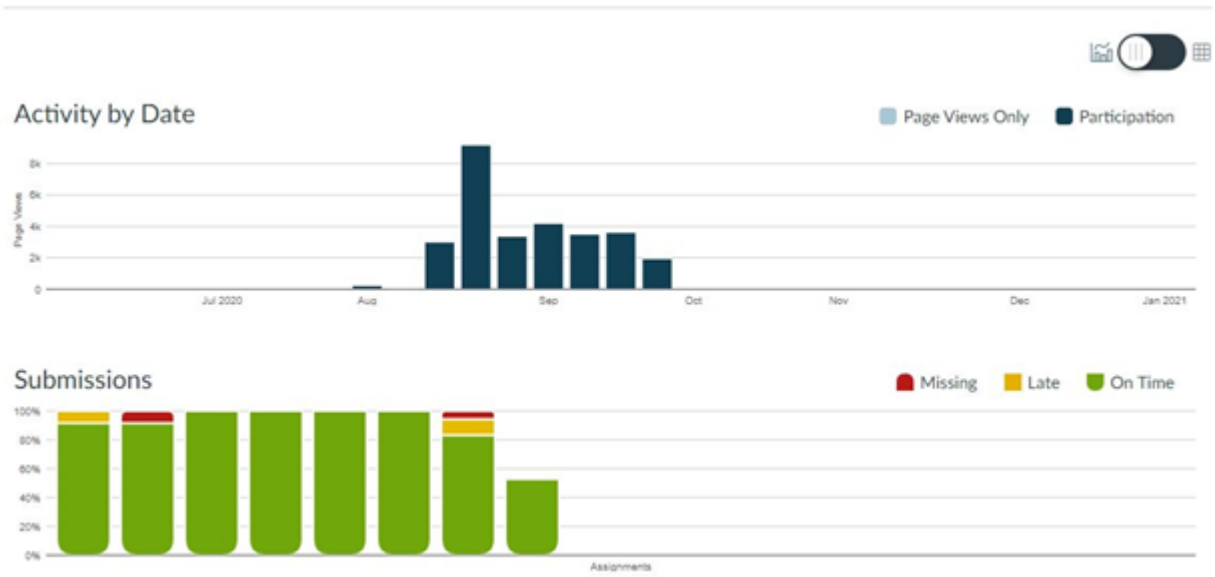
A dashboard of Weekly Online Activity from a Canvas Dashboard



A dashboard of Weekly Online Activity from a Canvas Dashboard

Figure 2

Aggregate Student Activity by Date



Aggregate Student Activity by Date

Knowing which week students were most active helps both instructional designers and instructors seek insight as to the type of content that is more engaging and seek student feedback on why content was . Further, looking at this type of data provides instructional designers an opportunity to reflect on the variety of activities and content given to students. Instructional designers can review learning material, such as readings, learning activities, quizzes, or discussions, and identify potential factors contributing to student interest or lack of interest in a particular topic. For instance, readings could include various perspectives and experiences of diverse populations meaning students were able to identify personally with the material. Additionally, learning activities based on real-life cases and clearly written, allow students to easily understand what they were asked to do and draw on lived or vicarious experiences when answering questions. It is noteworthy that a more complex analysis would, in this case, most likely not lead to greater interpretability. What is needed to augment page view data is a qualitative review of learning content (BP #2).

Tracking student activity, such as frequency of page views, duration of viewing certain pages, and inconsistency of student online activity, encourages instructional designers to think about potential difficulties students might experience accessing learning materials. This could be due to various reasons such as, insufficient internet bandwidth, slow internet speed, or outdated software. Implications for future design can include alternative ways of presenting learning material. For example, high-resolution images can cause webpages to take a long time to load. Removing such images and replacing them with lower resolution images or links to external pages may improve accessibility (see figure 3).

Figure 3

Examples of Different Approaches to Styling LMS Pages

Examples of Different Approaches to Styling LMS Pages

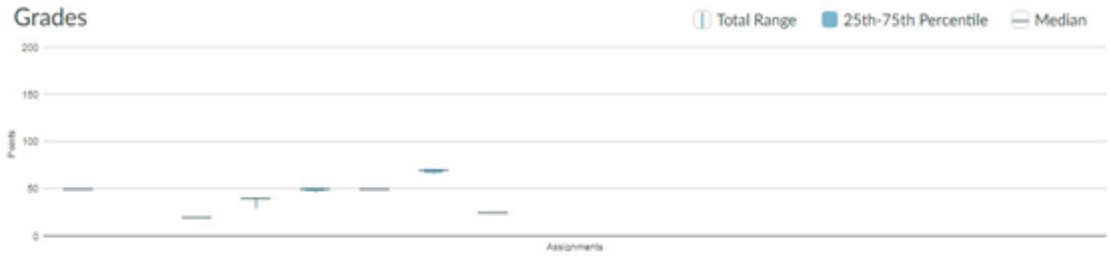
Note. The page on the left would take more time to load because of the images used.

Example 2: Students' Analytics in an Online Course (Canvas LMS)

This dashboard in Figure 4 shows a detailed snapshot of students' weekly online activity on the course, including page views, submissions status (i.e., on time, late, missing), and current grade. It may be tempting to attempt to use this information to predict student's future grades; indeed, there is a large body of research that attempts just that (see Piech et al., 2015). However, in line with both BP #6 (seek professional development opportunities) and BP #7 (collaborate with researchers), we suggest that designers refrain from such analysis unless they are comfortable with complex analysis or have the opportunity to collaborate with learning analytics researchers who are interested in predictive modeling. Instead, in line with BP #5 (focus on interpretation over prediction), we suggest that instructional designers focus on interpretation in context. This type of engagement can be used to create a user experience map – a map of a student's end-to-end experience. Because Canvas displays metrics at many levels of granularity (see Figures 4 and 5), instructional designers can map a student's journey at many levels: module-by-module, week-by-week, or even day-by-day. This type of experience mapping can lead to the identification of drop-out or high-difficulty points in the course. After points are identified, context is important in determining why a certain activity presents a challenge for students by asking if the material is inherently difficult, or is something poorly explained or designed?

Figure 4

Examples of Student Level Engagement

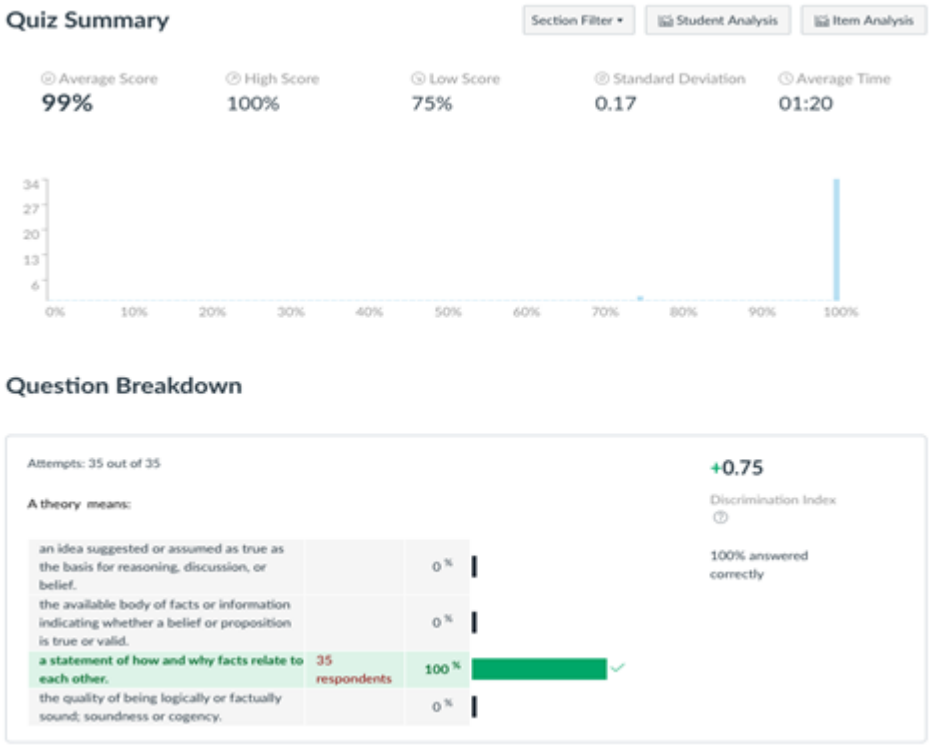


Student	Page Views	Participations	Submissions	On Time	Late	Missing	Current Score
Bates	574	9	6	5	1	1	98.93%
Becker	685	9	6	6	0	1	100%
Billings	1656	10	7	7	0	1	100%
Buchta	226	4	7	7	0	0	100%
Chavez	1278	4	8	7	1	0	97.38%
Closser	572	11	8	8	0	0	99.34%

Examples of Student Level Engagement

Figure 5

Assessment Summary (Canvas)



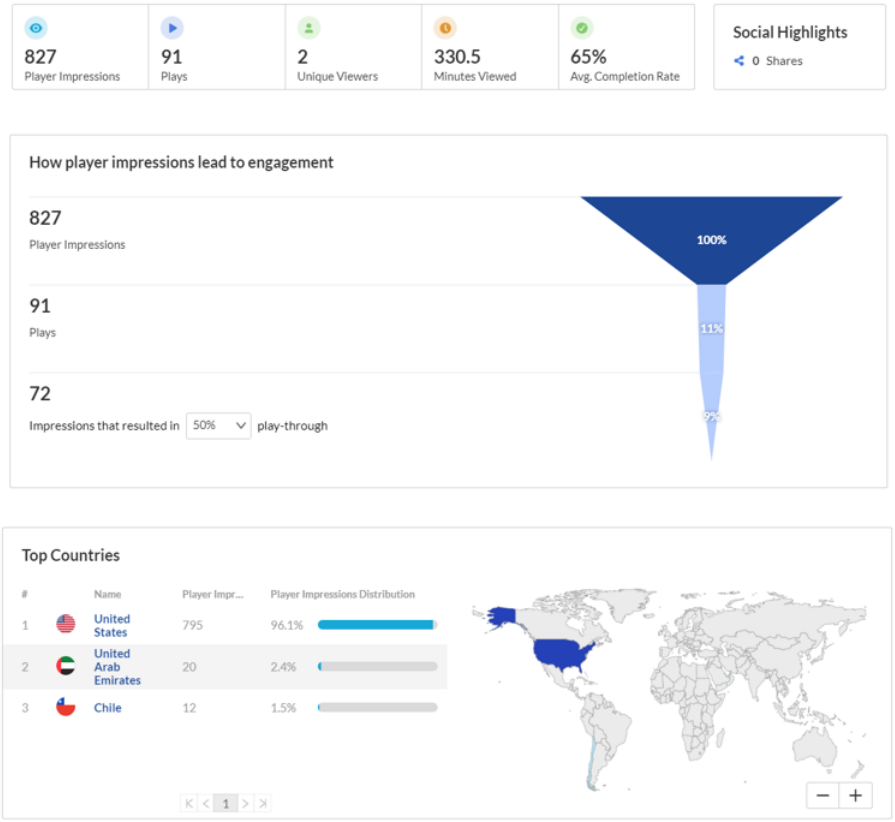
A Picture of an Assessment Summary in Canvas

Example 3: Video Engagement in an Online Course (Kaltura Video Platform)

The dashboard in figure 6 shows a detailed snapshot of students' views, total minutes, completion rate, video engagement based on impressions, countries in which video was viewed, and the device overview. This type of data helps both instructional designers and instructors identify what topics were most interesting for students based on the number of views. For instance, if only a few students viewed a given lecture or additional video material, instructional designers and instructors can further analyze the material to see what could be improved to increase engagement and interactivity (e.g., length of a video, narration style, use of more visual aids or examples). Video dashboards are an important example of how BP #4 (understand how software generates metrics) can be utilized. In figure 6, we see that the "average completion rate" is 65%. However, different video software tabulates completions differently. Some software considers a video completed if it has been "mostly" finished, while others require it to run through until the last second. Depending on the content of a specific video and the way the software records completions, this may radically change the interpretation of this metric. If a video is a recording of a class, and the last minutes contain no content, then completion may be a meaningless metric. In this case, Kaltura reports both the number of plays and total minutes viewed, which allows us to manually calculate average minutes watched per view, which may be a more useful metric.

Figure 6

A dashboard of Video Engagement



A Picture of a Dashboard of Video Engagement

Overall, it is important to consider that data only gives instructional designers a static snapshot of students' activity and performance. It does not tell the full story and it is up to each instructional designer to interpret this data to determine how to make effective use of it to improve design practices and future learning experiences. Interpretation is an integral part of the design process that helps designers grasp the nuances of an existing design situation. Such interpretation is a subjective process during which instructional designers draw on their own unique previous experiences and call on their core judgments which include one's values, perceptions, and perspectives (Nelson & Stolterman, 2014) as to what a good learning experience should be. While interpreting data for future designs, it is important to reflect on one's beliefs and biases which would allow consideration of multiple points of view, perspectives, and experiences. Having an open and flexible mind can help instructional designers consider the unique characteristics of a learning context or learners to create inclusive learning environments.

Example 4: Student-Facing Dashboards for Mastery Learning

Student-facing dashboards serve a variety of purposes. More advanced dashboards can recommend learning resources, prompt discussion with other students, or even recommend other courses. However, most of these applications require extensive analytical and design customization while scalable versions of these tools still seem to be several years away. Many dashboards simply ask students to reflect on their learning experience (e.g., time on task, progress towards completion) and revise goals and plans for completing instruction. These types of dashboards are often coupled with simple instructional tools, such as worksheets, that prompt students to further reflect on their learning.

Unfortunately, there are still not widely scaled student-facing dashboards, even for reflection. Scholars are widely in consensus about what student-facing dashboards for reflection on learning should do and look like. Therefore, we believe that these types of dashboards will shortly be widely available. If instructional designers are adept developers or have access to developers, it may be feasible to design such dashboards. If not, we still feel it is important for

instructional designers to be aware of this type of reflective learning analytics positioned to integrate into learning management systems in the near future.

Implications for the Instructional Designer(s)

Learning analytics is best used as a design tool that can support design decision-making and the subjective judgments made by instructional designers . The use of learning analytics as a design tool implies the following:

● Learning analytics are powerful in their descriptive nature but alone are not sufficient to predict or modify learning.

● Learning analytics provide designers the ability to support their design decisions and/or to defend their design judgments when challenged by other design stakeholders.

● Learning analytics do not show the whole picture and must be contextualized within the broader instructional context.

● Learning analytics will be gathered automatically by some tools, but often manual data collection is still necessary for some contexts.

● Accessing, analyzing, and/or gathering learning analytics requires thoughtful collaboration with other stakeholders at the university, mainly system administrators and data analysts within IT departments.

● Learning analytics by themselves say little– the interpretation of the designer is what makes findings interesting and actionable.

● Learning analytics should supplement, not dictate, design decisions—data alone is frequently biased based on the context in which it was collected.

Available Tools

Most widely used learning management systems (LMSs), such as Blackboard and Canvas, provide learning analytics as a default feature. Typically, learning analytics supported within learning management systems provide data on student activity, submissions, and grades. In addition, data provide summaries of weekly instructor-student, student-student, and student-content interactions and student performance over the semester within LMSs. Further, instructional designers and instructors can see counts for assignments and type of submissions (e.g., quizzes, assignments) as well as storage utilization and recent student-login information. In sum, such learning analytics provide a snapshot of how frequently students interact with course materials (e.g., course website page visits), student overall performance, and individual student performance.

Additionally, platforms that host media, such as Kaltura, YouTube, and library databases, provide learning analytics by default. Learning analytics available within those platforms provide data on the number of views, minutes viewed, and location.

● Tools that provide learning analytics by default: Learning Management Systems LMS, platforms that host media (e.g., Kaltura, YouTube, library databases) grade books in each LMS, analytics tools supported within LMSs.

● Tools that help to collect learning analytics: survey tools (e.g., Quratlics, Google Form, Google Analytics)

● Researchers. The Society of Learning Analytics Research has a large body of researchers and practitioners who are often open to collaboration. They hold international and local events, with a summer symposium focused on practice, and can be contacted at https://edtechbooks.org/-kxM.

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The Use of Q Methodology to Evaluate Instruction in Higher Education

Xigui Yang & Meimei Xu

Evaluation | Evaluation Methods | Q Methodology

This chapter introduces the use of Q methodology to evaluate instruction in the context of higher education. As an important component of instructional design, evaluation is essential to ensure the quality of a program or curriculum. Different data collection methods and analysis tools are needed to evaluate educational interventions (Frechtling, 2010; Saunders, 2011). Instructional design practitioners are required to be familiar with a range of quantitative and qualitative analytic methods to perform a variety of evaluations in different contexts. Q methodology is a unique mixed method that utilizes both quantitative and qualitative techniques to examine people's subjective viewpoints (Brown, 1993). We propose that Q methodology should be included in the evaluator's toolbox. We attempt to provide instructional design practitioners with some practical guidelines to apply Q methodology to evaluation based on a systematic overview of evaluation and Q methodology. Suggestions and limitations of using Q methodology for higher education evaluation are also discussed.

Definition and Benefits of Evaluation

Instructional design is an integrative and iterative process that involves analysis, design, development, implementation, and evaluation (ADDIE; Branch, 2009). As an integral element of the ADDIE paradigm, formative and summative evaluation function as quality control of instructional design projects. With the focus on future performance improvement, Guerra-Lopez (2008) describe evaluation as the comparison between objectives and actual results in order to "produce action plans for improving the programs and solutions being evaluated so that expected performance is achieved or maintained and organizational objectives and contributions can be realized" (p. 6). Evaluation not only benefits performance improvement but also "provides information for communicating to a variety of stakeholders.… It also gives managers the data they need to report 'up the line', to inform senior decision-makers about the outcomes of their investments" (Frechtling, 2010, p. 4). In higher education settings, evaluation is critical for enhancing course design, refining curriculum, promoting student learning experiences, and ensuring program success (Brewer-Deluce et al., 2020). Evaluation also helps create faculty development opportunities to advance instructional design quality across courses and programs.

Q Methodology in Instructional Design

Q methodology (Q) is a unique approach to studying the target audience's subjective perspectives on a certain topic (Brown, 1993). A concourse of statements representing all dimensions around the topic at issue is established first, and then participants are directed to sort out a series of statements sampled from the concourse (usually 30-50) into a

normally distributed grid (Watts & Stenner, 2012). The sorts are thereby statistically analyzed to identify both diverged and converged viewpoints among participants. Surveys and interviews are necessary to facilitate interpretation and member-checking. Q has been widely applied to various disciplines such as public healthcare, marketing, and political science and has gained increasing attention in education (Rieber, 2020). However, Q has not become a popular methodology in educational studies (Rodl, Cruz, & Knollman, 2020). Reiber (2020) introduced Q to the field of instructional design and demonstrated how Q could be used for formative evaluation, needs assessment, and learner analysis. He maintained that Q was a powerful alternative to traditional approaches (such as surveys, interviews, and focus groups) to better understand learners' needs, perspectives, and inform instructional design decision-making.

A Review of the Use of Q for Evaluation

In higher education, the limitations of the traditional evaluation methods have become apparent. More scholars have discovered the huge potential of Q (Brewer-Deluce et al., 2020; Collins & Angelova, 2015; Ramlo, 2015a, 2015b). Brewer-Deluce et al. (2020) critiqued that conventional Likert-scale surveys fail to capture diverse viewpoints of students, and qualitative data from open-ended questions or interviews are limited, fragmented, and difficult for consistent data analysis. These traditional evaluation methods usually produce “minimal useful, actionable suggestions for course improvement” whereas Q can be helpful in “identifying areas for course strength and improvement that are aligned with student needs in an evidence-based way” (Brewer-Deluce et al., 2020, p.146). Therefore, Q presents “a viable solution to ongoing course evaluation limitations” (Brewer-Deluce et al., 2020, p.147).

Harris et al. (2019) incorporated Q into the framework of realist evaluation, a framework focused on determining “what works for whom, why and in what circumstances within programmes” (p. 432). They argued that Q and realist evaluation are compatible because of three reasons: First, both Q and realist evaluation utilize mixed methods; second, context is the key for both Q (which lies in the development of concourse) and realist evaluation; third, they both adopt the logic of abduction in the process of interpretation to make sense of the data collected. Harris et al.’s (2019) work provide theoretical support for the use of Q for evaluation.

In the evaluative practices in higher education, some scholars have successfully experimented using Q in course evaluation, teacher evaluation, and program evaluation. For instance, Brewer-Deluce et al. (2020) stated that their well-established undergraduate anatomy course did not benefit much from regular course evaluations when they constantly received positive survey results and unhelpful responses from open-ended questions. Therefore, they employed Q beyond the regular evaluation methods to gain more valuable insights. From the Q case study, Brewer-Deluce et al. (2020) discovered that students had different preferences on different components of the course. Students also made suggestions for course improvement based on these results. Collins and Angelova (2015) carried out a Q evaluation of the 35 learning activities in a graduate-level course for Teaching English to Speakers of Other Languages (TESOL) methods. Results showed three distinctive perspectives, i.e, better learning through group activities, preference on independent work, and better learning from online activities. These perspectives are not as likely to be discovered from Likert surveys. Similarly, Ramlo (2015a) used Q to evaluate the effectiveness of her intervention of flipped learning in a college Physics course.

Besides these single-course evaluations, Jurczyk and Ramlo (2004) conducted a series of Q evaluations on several undergraduate Chemistry and Physics courses across multiple semesters using the same Q sort tool. This Q sort tool consisted of statements about the overall course structure, lecture quality, lab quality, lecture instructor, and lab instructor. Although their evaluations only involved limited numbers of participants in some classes, Jurczyk and Ramlo (2004) asserted the potential of standardized Q evaluation tools for cross-course evaluations (Brewer-Deluce et al., 2020).

Ramlo and Newman (2010) introduced Q to program evaluation with an example of evaluating an inquiry-based informatics course. They claimed that the results of Q could create more meaningful and useful stakeholder profiles for program effectiveness based on personal values, opinions, attitudes, and needs rather than demographic factors. Using

the same approach, Ramlo (2015b) conducted a program evaluation study for a Construction Engineering Technology program with both faculty and students included as participants.

As Ramlo (2012) pointed out, Q can be a versatile tool for multiple purposes in higher education such as needs assessment and program evaluation when the viewpoints of faculty and/or students are important. However, the existing literature shows that Q has been used for evaluation mostly by researchers rather than instructional design practitioners. Therefore, the purpose of this chapter is to introduce Q to practitioners for evaluative practices in higher education contexts.

A Practical Guide on How to Use Q for Evaluation

All methods have their strengths, applicable contexts, and weaknesses. We propose that Q can serve as a supplement of the current evaluation methodologies (Rieber 2020) because (1) Q is helpful to reveal nuances of participants' viewpoints that might be ignored by traditional survey methods, and (2) the hands-on Q sorting activity is usually found to be engaging for participants and thus can generate more authentic results. Additionally, Q does not require a large number of participants as it does not aim to generalize results to a larger population (Brown, 1993).

Effective evaluation using Q requires practitioners to create a series of systemic evaluation statements, develop open-ended questions that align with evaluation purposes, administer Q sort activity, analyze data, and interpret results. In the following section, we try to provide practitioners with a step-by-step guide on how to use Q for evaluation. Based on theories and practices of evaluation (Oliver, 2000) and procedures of Q (Rieber, 2020), a Q evaluation sequence normally contains the following five steps:

1. Identify stakeholders and evaluation objectives

2. Create concourse and draw sample statements

3. Construct and administer the Q-sort activity

4. Factor analysis and interpretations

5. Report and communicate results

Step 1: Identify stakeholders and evaluation objectives.

An evaluation framework can guide evaluation practices. The initial step is to create an evaluation framework that requires practitioners to identify related stakeholders and evaluation objectives. Before creating evaluation protocols and measurement indicators, instructional designers need to identify the purpose of the evaluation. The evaluation objectives can be identified through a needs assessment from all relevant stakeholders for the program. A needs assessment is an essential part of program evaluation (Spector & Yuen, 2016; Stefaniak et al. 2018; Tessmer et al., 1999). Needs assessment of relevant stakeholders can provide vital information for the development of evaluation objectives. Instructional designers can ask a series of needs assessment questions to relevant stakeholders to identify where the needs are and how the evaluation helps with the needs. For instance, in a typical course evaluation, the stakeholders might be the students, faculty, teaching assistants, lab staff, and so on. The evaluation objectives can be aimed at investigating the effectiveness of the overall course, the instructional approaches, or a specific learning activity depending on the contexts and purposes.

Step 2: Create concourse and draw sample statements.

A well-established concourse is the foundation for effective Q evaluation. This step requires practitioners to investigate all relevant contextual factors, concerns, or issues influencing the program (Harris et al, 2019) and develop a concourse based on systematic analysis. To evaluate the effectiveness of a group project in a course, for example, the concourse might include statements related to the learning task, instructor support, group member commitment, communication

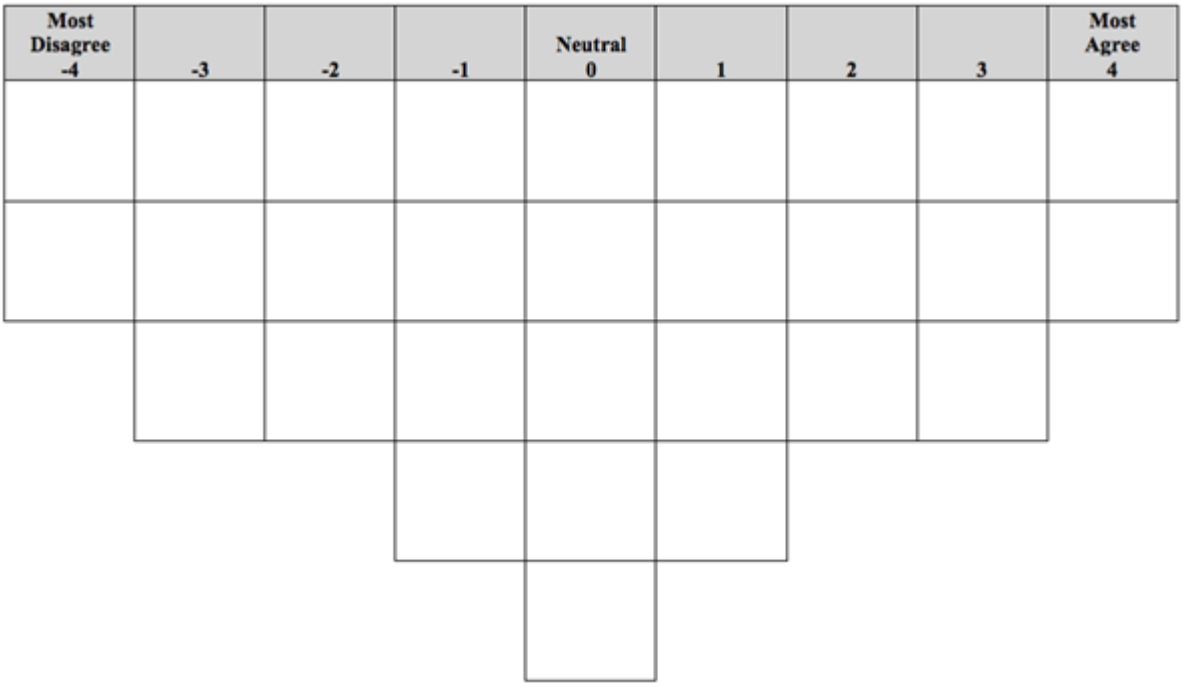
and collaboration, and quality of work. There are multiple ways to generate statements for the concourse. Scholars can create statements based on existing literature and research, personal experiences and observations, or a combination of both (McKeown & Thomas, 2013). Although not required, it is recommended to refer to relevant literature to get inspiration from validated statements in evidence-based empirical studies or theoretical articles. This is sometimes helpful for the interpretation of results as well. More practically, the development of a concourse makes use of the results of the needs assessment mentioned in the first step, that is, survey responses or quotes from interviews. After the concourse is created, a series of statements should be sampled to be used for the Q-sort activity in the next step. A well-rounded concourse can have hundreds of statements, with the sampled statements (i.e., the Q set) ranging between 30-50 statements (Stephensen, 1985).

Step 3: Construct and administer the Q-sort activity.

When the Q set is ready, evaluators need to decide the shape of the Q-sort grid. The Q-sort grid is an inverted normal distribution shape that ranges from most disagree to most agree (Watts & Stenner, 2012). The figure below shows a Q-sort grid for a Q set of 29 statements. Normally, there is no specific required shape for a Q-sort, thus evaluators need to discern the shape at their discretion based on participants' familiarity with the evaluation topic. When participants have less expertise on the topic, the bell curve tends to be designed more flat (Watts & Stenner, 2012).

Figure 1

An Exemplar Q-sort Grid for 29 Statements



A picture of a Q-sort Grid

To guide the sorting process, evaluators pose a major guiding question for sorters. Using the group project evaluation as an example again, the guiding question might be: What do you think of the group project in our course? The actual Q-sort process first requires participants to sort all statements into three general categories (disagree, neutral, and agree). After this, participants fill statements into the Q-sort grid based on the three categories, and then move statements around if changes are needed. After sorting, participants are often asked to fill out a follow-up survey to explain why they sorted certain statements (e.g. the extreme options) the way they did. This is a helpful step for evaluators to have a deeper understanding of the sorters' viewpoints. Depending on the objectives of the evaluation, sorters can also be invited to participate in post-sorting focus groups or individual interviews.

Traditionally, Q-sort is administered with paper cards of statements in face-to-face settings. Many researchers still prefer this means of administration when possible. However, recently, online Q distribution tools such as QSortware, HTMLQ, and Lloyd's Q Sort Tool are utilized for convenient administration and data collection.

Step 4: Factor analysis and interpretations.

After the Q-sort data are collected, the investigator can conduct corresponding factor analysis and make meaningful interpretations for evaluation purposes. PQMethod has been widely used by researchers as a data analysis tool. More information about Q-sort administration and analysis tools can be found on the Q Methodology official website (https://edtechbooks.org/-YRGh).

KenQ is recommended as a powerful tool that takes care of all tedious statistics with a user-friendly interface. In KenQ, evaluators upload the sorting data to stage for factor analysis which is done with just a few clicks to conduct the major steps of correlation matrix, factor extraction, factor rotation, and factor display. At the end of factor analysis, evaluators download the results as a .csv file. They can also save the visualization of the idealized Q-sort for each factor (participants who share similar viewpoints are grouped as a factor). Idealized Q-sorts are considered the perspective of an average person in that factor. Through the interpretations of the viewpoints of all factors emerging from the factor analysis, evaluators identify successes and problems of a course or program.

Step 5: Report and communicate the results.

After the Q-sort analysis, a written report communicates the evaluation activity and results. The written report normally contains both qualitative data analysis results (participants' responses to the open-ended questions and interviews) as well as quantitative analysis results (factor analysis of the Q-sorts). The target audience for the evaluation report include decision-makers, key stakeholders, and policymakers. The report should contain all relevant information including the evaluation objective, the evaluation protocol, major findings, and an action plan with recommended solution strategies.

Limitations and Implications

Despite all the advantages of Q, the limitations of Q are also obvious. As Brewer-Deluce et al. (2020) mention, this approach can be time-consuming. It also presents challenges of Q-sort administration and requires some level of data analysis expertise. There will be a learning curve for those who are new to Q. Another limitation of Q is the issue of generalizability (Brewer-Deluce et al., 2020). Although it is possible to create standardized Q-sorts to apply in different contexts, factors emerging from one evaluation are not expected to be generalized to other contexts or populations. It suggests that evaluators need to adapt and leverage different resources to create specific Q sorts appropriate for their evaluation projects and contexts.

However, more online distribution tools and data analysis tools become increasingly available to help evaluators conduct Q analysis easily. Using Brown's (1993) car analogy, learning to use Q methodology functionally is like learning to drive a car (not to make a car from scratch). It does not require knowledge of all the mechanics; however, it requires practices to get proficient. Once mastered, Q methodology will be a useful tool in an evaluator's toolbox.

Conclusion

This chapter discussed the use of Q as an alternative to conventional evaluation methods in higher education settings. Based on a systematic review of evaluation and Q, we propose a series of practical guidelines for instructional design practitioners to conduct evaluation projects using Q. We also briefly discuss the benefits and limitations of Q. Context is central to the practices of evaluation (Vo & Christie, 2015) – no single evaluation methodology can fit all contexts. It is the evaluator's responsibility to decide what tool(s) to use for a specific evaluation project. More empirical studies using Q for evaluation purposes are needed to demonstrate the usefulness of Q. We have provided practitioners with practical

guidance on the use of Q for evaluation. For specific examples to illustrate how to follow these guidelines, readers should refer to relevant research by Susan Ramlo (e.g., Ramlo & Newman, 2020; Ramlo, 2012, 2015a, 2015b), who has conducted multiple evaluation and assessment studies using Q, and Watts and Stenner's (2012) book, which provides a comprehensive description of Q theory, Q research, and Q data analysis and interpretations.

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An Examination of the People and Processes Involved in Quality Assurance

Colin Taper & Ginu Easow

Instructional Design | Quality Assurance

Quality Assurance (QA) in higher education is a concept that owes its beginnings to quality assurance in the industrial sector. The purpose of this chapter is to describe strategies instructional designers can implement to promote quality assurance within their institutions.

What is Quality Assurance?

Quality Assurance (QA) in higher education is a concept owing its beginnings to quality assurance in the industrial sector. A rapidly changing higher education scenario in response to the ever-expanding need of skilled individuals across various disciplines and the call for a return on their investment from parents and students are some of the underlying causes for higher education to pursue QA (Wilger, A. 1997).

There are many definitions of quality assurance in higher education. In a literature review for the National Center for Postsecondary Improvement (NCPI), Wilger (1997) identifies the *most complete* definition, as follows:

> *"Quality Assurance is a collective process by which the University as an academic institution ensures that the quality of educational process is maintained to the standards it has set itself. Through its quality assurance arrangements the University is able to satisfy itself, its students and interested external persona or bodies that:*

- *Its courses meet the appropriate academic and professional standards,*
- *The objectives of its courses are appropriate*
- *The means chosen and the resources available for delivering those objectives are appropriate and adequate, and*
- *It is striving continually to improve the quality of its courses"*

(Wilger, 1997; pg 2-3)

What Does Literature Say About Quality Assurance?

There is a plethora of research (Ryan, 2015; Wilger, 1997) that examines available literature in relation to quality assurance in higher education. Some of the major themes that have emerged across the various publications were

considerations for building a QA program and the impact of QA program on all primary stakeholders, which include students, faculty, senior leadership. The reviewed literature (Ryan, 2015; Wilger, 1997) also identified the need to focus on the primary emphasis of a QA process, the process itself, how it operates, and how the information produced is used and reported. When discussing impacts of a QA program, a majority of the literature highlights the perception of the QA program among the key entities, the acceptance based on the institutional culture as well as skepticism in choosing one QA model over another due to a lack of universally agreed upon QA framework between local, regional, national and international higher ed institutions (Ryan, 2015).

There are myriad quality assurance agencies within the higher education environment. In the United States, regional accreditation is conducted by seven accrediting bodies in six regions. The accrediting bodies are:

- Western Association of Schools and Colleges (WASC) Accreditation Commission for Senior Colleges and Universities
- Southern Association of Colleges and Schools Commission on Colleges (SACSCOC)
- Middle States Commission on Higher Education (MSCHE)
- New England Association of Schools and Colleges(NEASC)
- the Higher Learning Commission (HLC) and the
- Northwest Commission on Colleges and Universities (NWCCU)

In addition, professions that require licensure and certifications mandate their own set of guidelines that the specific programs have to meet. Review of the literature indicated a variety of QA models that can be adapted to suit a specific need. One of the most prominent ones in recent times has been the Quality Matters program (https://www.qualitymatters.org/) that has a systematic QA process laid out with tools, rubrics as well as professional development with a focus on continuous improvement of design of online programs. However, it does not account for the quality of faculty interaction and delivery in the online programs. These differences inherent in the emphasis of a single QA model combined with other themes discussed before showcase why the higher education community does not have a universally agreed upon QA framework.

Developing a QA framework that can be universally used requires much collaboration across the various local, regional, national and international agencies. What follows provides instructional designers starting the QA process with some practical considerations based on research (Ryan, 2015; Wilger, 1997) and practical experience irrespective of the model or QA agency utilized. The focus is on practical considerations from the “people” and the “process” perspective – the two critical components that play a significant role in the efficient and effective implementation of QA. Understanding these perspectives allows an instructional designer to map QA processes accordingly.

The People

In the following sections we describe three primary stakeholders of a university’s online learning QA effort: students, faculty, and upper administration. All three should be accounted for if such an effort is to be successful. The rationale is that all three are connected by common themes: quality course design, facilitation, and revision. Our aim is to provide QA-useful insight into each stakeholder.

Students

Unlike faculty, an instruction designer (ID) will seldom interact directly with students; rather, interaction occurs via the instructor and the student feedback received. Based on our higher ed experience, a challenge that an ID faces is assisting faculty in determining the appropriate/relevant method of collecting student feedback to use, the frequency of its use, and an approach to using that feedback to inform course adjustments.

Student Role in QA

We have yet to encounter a faculty member who denies the role of student feedback in determining course quality. What is noteworthy, however, is that some faculty are not comfortable receiving feedback from students. As one faculty

stated:

> *It's never a nice email to get when something's goofed up or it's just explained poorly and needs to be improved. So, some people I think are more open to that than others. If you're defensive, then you're going to say, 'Well, that student just doesn't know what they're doing. They should be more cognizant of what they're doing in the class or more tuned in' versus really stepping back [and stating] "Wait, I didn't actually communicate what I thought I was communicating or that didn't look as good and intuitive as I thought it should have"*

It is important, therefore, for an ID to recognize that some faculty may be hesitant to collect feedback from students. Additionally, faculty may only feel comfortable, at least initially, receiving student feedback in the form of end-of-course evaluations.

Means of Collecting Student Feedback

Most institutions use an end-of-course student evaluation tool; our institution uses the IDEA Student Rating System. In this section, the focus will predominately be on instructor-driven student feedback tools and recognizing the importance of providing instructors with options for feedback collection. Faculty who have taught exclusively in a face-to-face format may be used to gathering student feedback in an informal or ad hoc manner, such as after or before class conversations, which can provide the instructor with insight into the student's experience. Such conversations are less likely to occur in an online course and consequently, an instructor will need to be more deliberate in collecting student feedback.

One way to view instructor-driven tools is through the lens of two categories: continuous and time-specific. An example of a continuous tool is a weekly reflective student journal. An example of a time-specific tool is a mid-course survey. Collection tools can additionally be broken down by question type: students' opinion regarding the course (e.g., What aspects of the course would you change?), students' opinion regarding a specific aspect of the course (e.g., What did you find challenging about group assignment *X*?), and a students' reflective analysis of their own academic performance (e.g., Was the Chapter 5 quiz challenging for you? Why was that the case?). It can be helpful to make faculty aware of their options regarding collecting student feedback.

Incorporating Feedback

Once faculty have gathered student feedback, they may need assistance classifying the feedback to answer questions such as: Does it address aspects of course design, course facilitation, or neither? For instance, a student may state that the course assessments were quite difficult. An ID may be better positioned than the faculty member to review the course learning activities to determine if students were provided enough opportunities to practice the skills that the assessments required of them.

Additionally, faculty may need assistance with an approach for incorporating student feedback. One approach appropriate for weekly or midpoint feedback is to disclose to students the feedback that they submitted. Faculty can place feedback into two categories (i.e., possible change and not possible change) and define what steps, if any, will be taken to address these changes. Our experiences have shown us that such an approach validates that students' voices are being heard and that the faculty is addressing students' needs.

For changes or adjustments to future iterations of a course (e.g., student feedback on an assignment), it may be helpful to provide faculty with a strategy to incorporate those changes. This may involve creating a system for cataloguing student suggestions and creating a plan that allows for enough time to make alterations. A plan such as addressing one module or unit a day in the semester prior to the one in which the course will run may provide structure not previously considered.

Faculty

At institutions where a significant percentage of online courses are facilitated by the faculty who design them, faculty are gatekeepers of course quality. In implementing a QA effort, IDs need to consider general faculty awareness of what constitutes a quality online course and effective and ineffective approaches to achieving faculty buy-in with a QA effort.

Faculty Awareness

Based on our experience, faculty do not need to be convinced of the significant role they play in online course QA. There is a perceived sense of agency. An ID does need to consider faculty's familiarity with an external validation process. Some programs or schools regularly go through an accreditation process that examines its academic efficacy. For example, because of licensure exams, certification exams, and the need to meet both accreditation and state standards, faculty in some schools are quite familiar with external guidelines. Other faculty may not have any experience with such efforts. Lack of familiarity implies a need to convince such faculty of the validity of the QA effort. Convincing could take the form of testimonials from faculty peers who have successfully implemented QA-informed practices into the design, delivery, or revision of a course. If such faculty cannot be identified, an ID could reach to other institutions where such faculty may be found.

Another consideration is whether faculty are aware of what constitutes online course quality. The answer to this varies from institution to institution. QA is impacted by factors such as the following:

- the number of staff and faculty who formally support the pedagogical side of online learning,
- prioritization of online learning by the institution's upper administration
- a number of years the university has offered online programs.

At our institution quality online courses are those that are formally developed with an ID and reviewed using a rubric similar to the Quality Matters (QM) Higher Education Rubric for Online & Blended courses or are courses comprise a program seeking QM certification. For example, at one university, current program-level QA efforts require faculty to participate in either the Quality Matters (QM) "Applying the QM Rubric" workshop or an internally developed three-week workshop. Both focus on foundational concepts of course design, the latter also focuses on foundational concepts regarding course facilitation.

With respect to effective and ineffective approaches to achieving faculty buy-in with a QA effort, it is a fair assumption that QA efforts increase a faculty's workload. Some suggestions as to how to effectively achieve faculty buy-in for a QA effort follow:

1. *Define a faculty champion*. Some faculty members have expressed to us that strictly top-down efforts are seen as ineffective. Therefore, having a fellow faculty member speak to peers about a QA effort could be a more effective strategy. As Rogers (2003) suggests, a champion's people skills, as opposed to his or her position in an organizational chart, will be the asset most valuable to achieving buy-in (p. 383). Another consideration is that the champion may need to be positioned to engage with administrators about resources the faculty need, such as course release or stipends, to successfully engage with the QA effort.
2. *Involve faculty from the beginning*. It may be the case that the QA effort is a top-down mandate. Nevertheless, faculty should be involved in the specifics of the QA effort from the outset. A good suggestion is to have the faculty champion lead these conversations. The faculty champion is better positioned to listen to faculty grievances and to effectively applaud the efforts that the faculty are making.
3. *Establish connections for faculty*. Perhaps a faculty member is seeking tenure. It may be helpful to see how the work being done to improve the quality of online course design could be included in a retention, tenure, and promotion packet. Perhaps a faculty member is quite invested in the effectiveness of their teaching. Experience indicates faculty are much more familiar with the phrase *teaching effectiveness* than they are with the term quality assurance. Our interactions have revealed that faculty perception about the latter term is the implication that something is currently wrong with the course, a message that faculty may not take well.

Another type of connection deals with the jargon an ID may use. It is important that faculty are able to grasp the concepts related to the QA effort. Terms such as *alignment*, *objectives*, *formative assessment*, and *accessibility* may be foreign to faculty, thus there is a need to explain such concepts in a manner that allows faculty to reinvention of their pedagogical practices will not be necessary.

Upper Administration

Very few upper administrators would sincerely state that they do not support an institutional QA effort. Yet, there is potentially a significant gap between a chancellor, president, or provost stating "I am for this QA effort" and the allocation of resources to make the effort possible. As one administrator put it to us:

> *If in any case where the leaders do not fully invest or do not provide full support, it would be difficult to achieve the QA process solely from bottom-up process, as it would be much more difficult to overcome the administrative or functional divisions to get adequate data and resources, and would usually discourage the efforts to end up as status-quo, within a silo.*

It is crucial, therefore, that QA efforts have the support, both in word and in resources, from an institution's upper administration. However, the reality is that all institutions will not be able to allocate resources towards the effort. This is especially true during trying economic times. Additionally, an ID may not even have access to the institution's upper administration. If either or both is the case, an ID could consider leveraging any available resources from peer institutions or reduce the scope of the effort. The template (see Appendix) provided will allow those who do not currently have access to resources and/or senior leadership to make a strong case for resources once they become available.

Getting a Seat at the Table

It is probable that many IDs are not able to directly address their institution's upper administration. At some universities there is an associate vice chancellor who advances QA efforts, but this may not be the case for all. If the structure of an institution is such that there is not a direct report position who can advance the cause to upper administration (i.e., a champion), one needs to be identified.

Speaking the same language

What makes for a quality online course or program? If there have been previous QA efforts regarding online courses or programs, it may not be necessary to have a champion engage the president or provost in an education campaign about what quality means when applied to online courses. The QA champion would need to associate the effort with a topic viewed as important to upper administrators. For example, student enrollment and retention are key considerations for an institution's administration. What motivates a student to enroll and persist in a face-to-face program can be quite different from what motivates them to enroll in an online program. While the institution's overall reputation may consistently be a factor, variables such as location, amenities, or a successful athletic team are less likely to attract and retain online students.

Sustainable, Data-driven Efforts

Two important considerations of a QA pitch to upper administration are whether it is data-driven and whether sustainability has been considered. One person who has knowledge of this subject informed us:

> *I have seen enough cases where misunderstanding and therefore misuse of the QA process from the upper administration end up wasted resources and efforts, and especially closing the door for true opportunity because of the lack of trust in the validity of the process.*

This insight lends credence to the template (See Appendix) provided, a template that is informed by institutional data and promotes the sustainability of the QA effort.

By focusing on practical considerations of a QA effort from the “people” and the “process” perspective, we believe an ID will be well-positioned to successfully map and implement a QA effort.

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Appendix

Roadmap to Plan the Quality Assurance Journey at Your Institution

Understanding the contributions of people to the QA process will lay the foundation to leverage interpersonal skills in relevant processes to create a QA roadmap at your institution. As a first step, to help you get started with creating your roadmap to plan your QA journey, we have attempted to provide you with a template broken down into a series of six steps and key questions to consider. As an instructional designer, you will be able to see glimpses of the ADDIE process in the various steps identified below. We would also like to clarify that this template is an adaptation of a plethora of templates that you might find on the world wide web.

<table>
<tr><td colspan="2">Step 1: Needs Assessment for your Institution
(Suggested timeline: 8-10 months prior to implementation date)</td></tr>
<tr><td colspan="2">Description: The first step is identifying the need for QA in your institution. This step is identical to the Analysis phase in the ADDIE process. While this could be a daunting task, the recommendation would be to start small by attempting to get answers to the following questions:</td></tr>
<tr><td>Questions to Consider:</td><td>Notes</td></tr>
<tr><td>1. Why is QA a need at my institution?
● is it for a program or a process?
● is it at the local, regional, and or national level?
2. Why was the request made?
3. Who made the request?
4. Who are the key project sponsors?
5. Who can make decisions that will help you implement the QA process?
6. What knowledge and skills levels will be needed to plan, develop and implement the quality assurance (Remember it is not and cannot be a one-person endeavor)
7. Are there any licensure and certifications that might be required for the QA team (that you will need to put together)?</td><td></td></tr>
<tr><td colspan="2">Once you get answers to the above questions, your objective should be to get all the identified stakeholders at the table for a meeting. The purpose of this meeting will be to discuss the following:
(Suggested Timeline: At least 6 months before you would like to start the implementation)</td></tr>
<tr><td>Questions to Consider:</td><td>Notes</td></tr>
<tr><td>1. Set the goals for the QA journey for the identified program or process (number of goals and description of the goals)
2. Do these goals need to have subtasks or component parts?
3. Identify the external (local, regional, national, or global) QA recognition that the program or process your institution would like to pursue (if applicable).
4. Identify a liaison from the program/department(s) that can be your implementation partner.</td><td></td></tr>
</table>

Step 2: Planning the QA Implementation (Setting Goals & Building Teams) **(Suggested Timeline: at least three-six months of time prior to implementation)**	
Description: This second step is geared towards laying the foundation for your roadmap. During this step, research the basics of the Quality Assurance process that you need to establish and implement. This would mean that you will need to take into account the following considerations:	
Considerations:	**Notes**
Set up recurring meetings with the identified program/department liaison to research and respond to the following questions:	
What: 1. What are the specific goals and outcomes that need to be achieved? 2. What data points will be needed to show as evidence to support the achievement of the identified goals? 3. What will the reporting structure look like or what will be the chain of command for any decisions to be made? 4. What are the benchmarks to evaluate the success of the quality assurance program?	
Who: 5. Who are the key stakeholders who will need to do the work to execute and implement the plan? (For ex: Program coordinators, Institutional Research and planning, Student Success Center; Instructional Design peers from your own department etc.) 6. Who can be your champion (leadership within your department, faculty and stakeholders)?	
When: 7. Develop a backwards timeline which means who you need to start by: 8. Identifying the target date of achieving the goal and work backwards 9. Identify a timeline for the specific program or process to achieve those goals and its sub parts. 10. Are there some goals that need to be achieved first because others can build on them? 11. Are there resource constraints that will impact the timeline? If yes, what adjustments will need to be made to the timeline? 12. Are there any dependencies from other departments that will impact the timeline?	
How: 13. How will you keep this effort organized? 14. Do you need to identify a collaborative software? 15. Where will you store the files and documents developed/shared for this effort? 16. How will you communicate with all the stakeholders and partners and how often will you do it? (Recommend to do it on a weekly or bi-weekly basis at least for an hour) 17. How will the progress/setbacks be communicated to the project sponsors and leadership?	

Step 3: Building the Plan and the Cadence **(Suggested Timeline: at least two-three weeks prior to implementation)**	
Description: At this point, you have set the goals and have the teams (resources) identified to help you with the implementation. Now it's time to build the plan using the following considerations:	
Questions to Consider:	**Notes**
1. Create a Quality Assurance Implementation Plan (QuIP) document based on the information gathered in Step 1 and Step 2 ***[Note*:** Most QA entities do provide templates specific to their Quality Assurance program. We recommend using the specific program template or use any project plan template to document your implementation plan.**]** 2. Identify specific institution entities who will need to provide approval to the plan 3. Identify if they need to document their approval by signing the implementation plan. If yes, create a specific section in your plan to document all approvals 4. Identify a timeline to gather these approvals	

Step 5: Celebrate the Launch Success
Description: Congratulations! You have started the QA journey at your institution. Celebrate the launch and remember, this is just the start. As with any project, you have to continue to monitor and track the project to ensure a successful implementation.

Step 6: Monitoring QA Implementation to Identify Enhancements
Description: As with any project, monitoring the project is key to make sure that all the identified components are working together to achieve the targeted goals. So, make sure to use the proposed meeting cadence to **communicate, communicate and COMMUNICATE!**

Instructional Designers Leading Through Research

Nadia V. Jaramillo Cherrez

Research Methods | Higher Education | Instructional Designers

As instructional designers helping subject matter experts design innovating learning experiences and leveraging educational technologies, they oftentimes find themselves conducting research to support the work they do. This research can take many forms, from reading research articles, investigating and testing educational tools, conducting research studies, participating in research communities, to serving in professional organizations. This chapter includes scenarios that illustrate how instructional designers can engage in research such as building a research network with professionals with different levels of research skills, creating partnerships with SMEs to conduct classroom-based research, and how to set up a research and evaluation agenda connected to professional development goals.

Introduction

The work of instructional designers (IDs) is complex in scope and depth. Research shows that this work involves traditional as well as non-traditional design tasks ranging from organizational tasks to design work to project management (Cox & Osguthorpe, 2003). Research has also pointed to the fact that IDs conduct academic research in learning design (Cox & Osguthorpe, 2003; Rowley et al., 2002). While IDs assist subject matter experts (SMEs) with the design of innovative learning experiences and the integration of educational technologies, IDs constantly explore creative and innovative learning design approaches. IDs “step into the unknown” (Yanchar & Hawkley, 2014, p. 280) to examine and adapt strategies, ideas, and tools that help face the challenges and complexities of the teaching and learning processes (Yanchar & Hawkley, 2014). In addition, IDs guide SMEs in creating learning plans, developing course materials, addressing accessibility needs, and using digital tools for optimal and effective instruction. The expertise, creativity, and experience of IDs is coupled with constant learning and experimenting that can be catalyzed with some form of scholarship of learning design. Thus, there is urgency to foster an endeavor for IDs to lead through research.

In research on course design, educational technologies and innovative instructional methods are at the center of IDs’ work. Yet, many IDs find it challenging to do research for reasons including time and resource limitations (Linder & Dello Stritto, 2017). Linder and Dello Stritto posit that IDs are critical in designing better learning experiences and supporting faculty in their teaching. As social and technological changes are shaping the educational landscape, IDs are in a position to develop new understanding of the impact on learning and teaching (Sims & Kozalka, 2008). In the case of COVID-19 and the rapid transition to remote teaching, IDs became “sherpas of online learning teams, experts in how to teach and design a course” (Decherner & Levander, 2020, para. 5) and have been paramount and critical to supporting the abrupt transition. Looking further, the role of IDs is evolving offering new endeavors that can help transform the design of educational experiences and contribute to individual design projects as well as to the design fields as a whole

(Yanchar & Hawley, 2014). Thus, these are reasonable aspects to foreground the practice of research for IDs and point to how existing views of scholarship often fails to recognize IDs' as knowledge contributors.

If IDs are already avid consumers of research, then promoting and supporting involvement in the scholarship of learning design would help look more closely and critically at the innovations that IDs create in more systematic ways to improve student learning and address educational changes. This chapter provides strategies and examples for IDs to become scholars in learning design in higher education.

The Competencies of an Instructional Designer

Leading through research requires to look at the connection between the competencies of IDs and the need for them to conduct research. The role of IDs is evolving requiring them to have a combination of multiple competencies. Overall, these competencies have been defined as the expected knowledge, skills, or attitudes that one must possess to effectively perform the job tasks (Richey, Fields, & Foxon, 2001). Research efforts have identified three specific and interrelated competencies: (1) knowledge, (2) skills, and (3) abilities (Martin & Ritzhaupt, 2014; Ritzhaupt et al., 2010), which have several implications for the work of IDs as researchers.

According to Ritzhaupt et al. (2010) the knowledge domain refers to "an organized body of information usually of a factual or procedural nature" (p. 427). In this domain, Martin & Ritzhaupt (2014) identified research-based competencies that include foundations of instructional design theories and models, learning theories, instructional design methodologies and processes. Additional research efforts indicated that IDs should have a working understanding of performance improvement interventions (Fox & Klein, 2003). Equipped with this body of knowledge, IDs go beyond the application of theoretical and conceptual principles to design learning experiences and to critically analyze the context in which design happens. IDs help make sense of learning theory and research to advance its practical applications.

At the skills domain, Ritzhaupt et al., 2010 consider skills as the "adept manual, verbal or mental manipulation of things" (p.427). In this domain, skills range from problem-solving to organization. Specifically, Martin & Ritzhaupt (2014) include collaboration and teamwork, problem-solving, decision-making, project management, uses of technology applications, and soft skills. Related research has identified additional skills such as cultural sensitivity (Fox & Klein, 2003) and analytical and conflict resolution (IBSTPI, 2012). This repertoire of skills that IDs need to develop, refine, and solidify overtime makes IDs ready for the challenge of an evolving educational landscape that requires change agents in learning design and technology.

The abilities domain refers to the "capacity to perform an observable activity" (Ritzhaupt et al., 2010). The research-based capacities that IDs need include creating effective instructional artifacts, working well within a team, working well with a variety of stakeholders, meeting deadlines (Ritzhaupt et al., 2010), and demonstrating empathy (Vann, 2017). Other abilities required relate to identifying and resolving legal and ethical dilemmas (Brigance, 2011). In addition, IDs are expected to lead not only educational technology and course development projects, but also the way into the future of learning innovation (Brigance, 2011; Fein & Watte, 2018; Shaw, 2012).

IDs already harness their creativity, navigate complex environments, take on challenges presented by ill-structured problems, and incorporate diversity of perspectives. As the competencies show, the ID field, as no other, interrelates multiple domains of knowledge, skills, and ability that can transform teaching and learning. This transformation can be enhanced by IDs' involvement in research which, at the same time, can expand the body of knowledge and insights in learning design and technology with perspectives from the field of practice.

Fostering a Research Endeavour for IDs

The work of IDs is multifaceted. IDs engage in the conventional dynamics of learning design and the application of theoretical principles which includes conducting needs analysis, finding research-based evidence, managing projects, building partnerships with SMEs, testing tools, investigating best practices, peer-reviewing course design projects,

reviewing content and learning materials and investigating trends and emerging technologies. IDs also practice critical reflection for a retrospective examination of the design process to unveil challenges, assumptions, and taken-for-granted actions (Chatterjee et al., 2018). In addition, IDs oftentimes complete unconventional activities oriented towards administrative tasks. These activities range from preparing budgets and financial documentation to training SMEs and maintenance of web content (Schwier & Wilson, 2010). More recently, IDs' work and responsibilities are evolving to position IDs as leaders of digital transformation (Decherney & Levander, 2020). Many IDs' work intersects with other fields such as user-interface design (UX), learning sciences, data science, emerging technologies (e.g., virtual reality, artificial intelligence), and information assurance. Yet, the application of theoretical principles to the design process restricts the work of ID to a product-oriented emphasis (Gibbons, 2014). Gibbons underscores the importance of research to give us "the additional theory and data we need to make an effective application to individual cases that still respect the operational principles of the high-level theory" (p.76). Pivotal to this point, IDs can bridge theory and the product of its application as well as critically examine the intersection of the instructional design work with other disciplines.

If we consider roles and responsibilities along with competencies, IDs can make important contributions through a systematic process of empirical research to examine teaching in learning in a variety of contexts and modes. To do design work, IDs engage in a systematic design process similarly to what academic researchers do. Table 1 provides an example of some common ID tasks and their connections to research tasks.

Table 1.

Connecting ID tasks to research tasks

Example of ID tasks	Example of research tasks
Conducting needs analysis: IDs collect data by conducting consultations with SMEs, surveying users or students, interviewing stakeholders, or performing document analyses of syllabi and curriculum plans.	Conducting a review of the literature to identify gaps.
Researching the literature: IDs immerse themselves in the literature to identify practices and evidence to support design decisions, apply theoretical insights, and generate innovative design ideas.	Surveying the literature to have solid foundation of the topic/gap for further empirical investigation
Managing projects and teams: IDs design workflows and documents to initiate, develop, monitor, and evaluate an instructional design project. IDs also plan tasks and set milestones to accomplish them.	Managing a research agenda with multiple projects and collaborators, and other responsibilities (e.g., service, teaching)
Showcasing projects: IDs share their work in local or global spaces such as teaching and learning events within their institutions, professional conferences, to inform the audience about trends and strategies in learning design and technology.	Presenting studies at conferences (e.g., posters, roundtables), research symposiums
Evaluating a tool: IDs often test the affordances of new tools and evaluate their use for effective learning. This work can involve surveying students, SMEs, and other stakeholders.	Conducting piloting studies for the implementation of educational technologies
Reviewing course projects: IDs often perform reviews of instructional design projects to ensure the quality of the project. Through this	Peer review of journal manuscripts, conferences proposals, grant applications

process IDs offer feedback to improve the project.	
Piloting design projects: IDs often perform pilot tests of course design and usability projects to determine the feasibility of a model or tool. This work can be an evaluation study for decision-making or effectiveness of the implementation.	Conducting pilot studies for establishing the research grounds
Communicating with stakeholders: IDs work closely with SMEs, multimedia experts, and program developers, which requires listening skills, higher levels of tolerance for ambiguity, attention to words and body language, empathy, and ability to receive and provide feedback. This communication is critical to building a relationship with the stakeholder and convey messages effectively in different formats (e.g., email, online meetings, face-to-face consultations).	Communicating with research team and other collaborators. Communicating research findings in varied formats (e.g., journal manuscripts, conference presentations, white papers, blogs) and to diverse audiences (e.g., students, scholars, funding agencies)

Note. The connections provided in the table are broad and some tasks align more closely than others. This table is for illustrative purposes only to indicate that IDs conduct some form of research tasks to design learning experiences. Many learning designers are active academic researchers while others are intrigued by such an endeavor but have not had the support or the space to participate in research projects.

Best Practices for Leading through Research

This section provides best practices that facilitate the development and empowerment of IDs as active researchers by connecting their daily design experiences, reflections, and active curiosity to research practices.

At a Conceptual and Theoretical Level

Through the observations of the learning design work and its multiple outcomes (e.g., product, process, relationship with SMEs, outcomes for students, tools, media) IDs have a broader landscape for contributing to the field at theoretical and conceptual levels. Use of concrete experiences, survey of the literature, and critical reflective practice offer a foundation for mobilizing events that take place in the learning design process toward ideas that challenge the status quo of traditional practices. Practices that need deeper examination through a new lens. For example, IDs can prepare a response manuscript on a topic that holds traditional views (e.g., traditional research methods, assessment practices, large class sizes), a description of the current status of an ID competency (e.g., ethical considerations, accessibility of emerging technologies), a critical or analytical manuscript (e.g., the transforming role of experiential learning, proctoring exams), a white paper or best practice (e.g., creating effective slide presentations), or a revision of surveys and rubrics (e.g., faculty competencies to teach online).

At a Practical Level

At this level, IDs can engage in evaluation, design cases, and research studies. Some IDs already perform evaluation (Seeto & Herrington, 2006) as well research studies (Cox & Osguthorpe, 2003; Rowley et al., 2002) as part for their work as IDs. While evaluation and research use similar methodologies to gather data, these activities are distinct and contribute to the ID field in different ways. According to Fitzpatrick et al. (2011), evaluation and research share similar methodological approaches but differ in the purpose, use, generalizability of findings, and preparation. An evaluation study aims to make judgments and identify the worth of what is being evaluated. While an evaluation study may not necessarily qualify as a research study to contribute to build theory, it informs the decision-making process in a project at a local context. An evaluation study will employ methodological variation and different perspectives whereas a research study aims to contribute to knowledge and theory. Researchers are usually trained in a discipline, focus on

similar or derived problems, and employ less methodological variation. In contrast, a design case refers to descriptive narratives of a learning artifact, environment, or experience that is expected to support learning.

As IDs engage in the process of exploration of design strategies and tools, it is possible to present research possibilities to SMEs to examine pedagogical or technical issues while the course is being designed and implemented. For IDs to engage in any form of research at a practical level, IDs can partner with SMEs who demonstrate an interest in scholarship of teaching, learning, and design. Some practices follow on how IDs can leverage opportunities for evaluation, research, or design cases.

Evaluation studies

IDs can create projects to evaluate the instructional design choices and their effectiveness on the learning experience. This can be done by connecting with SMEs that demonstrate interest in improving not only the design of instruction but also their own teaching practices. An ID can invite the SME to consider the evaluation of a project in more systematic ways and help the SMS identify the purpose and intended use of the evaluation, develop a plan for accomplishable tasks for each member of the team, and create or survey the literature to find data collection instruments (e.g., surveys, interviews, usability testing protocols). In addition, the ID can search for scholarly venues where the evaluation project can be disseminated.

Research studies

IDs can focus on the Scholarship of Teaching and Learning (SoTL) which supports “our individual and professional roles, our practical responsibilities to our students and our institutions, and our social and political obligations to those that support and take responsibility for higher education” (Schulman, 2000, p. 6). IDs can participate in SoTL by collaborating with SMEs to conduct classroom-based and design-based research aimed to improve teaching practices and student learning. IDs can partner with SMEs that are interested in examining broader topics of mutual interest that connect to the design of learning experiences. Among these, an ID can collaborate on replicating an instructional intervention, applying a new design principle, examining in depth the dynamics of learning and teaching, applying innovative research methodologies, examining the intersection of learning deign and other disciplines. Another approach for engaging in SoTL can include design-based research to develop interventions to solve education problems. IDs have the competencies for analysis, design, development, and implementation of educational practices. Certainly, conducting design-based research as a systematic and flexible methodology will allow IDs to improve those practices in specific settings within a collaborative and iterative process.

Design cases

As IDs, do we not produce a variety of learning design artifacts informed by research and best practices? IDs’ work has plenty of design cases that can showcase innovative designs, teaching and learning principles in action, alternative assessments, new models for inclusive design, development of digital tools, student support mechanisms, and teamwork with SMEs to name a few. Connect with SMEs to closely examine how the design was conceptualized, the problems and challenges the design intends to resolve, the stories behind its creation, the phases of the design and implementation, and the learning through its process and artifact. Once the focus is clear, begin outlining what is important to share about the design case and then move forward to telling the story of the learning artifact. Identify venues (e.g., conferences, practitioner journals, professional development) where the design case can be disseminated for other IDs, SMEs, and stakeholders. While a design case does not require a rigorous implementation of an empirical research study, it is a viable option to disseminate innovations in learning design and technology.

At a Reach-out Level

IDs can lead through research by engaging in service and professional activities that offer IDs other opportunities to explore the scholarship of teaching and learning.

Serving the Profession

IDs can volunteer to become reviewers or to serve as officers in professional organizations. Being a reviewer for conference proposals, peer-reviewed journals, or funding proposals, can be a very rewarding and enlightening experience for IDs to further a path to leading through research. For example, by reviewing journal manuscripts or conference proposals, IDs can develop a critical perspective to observe the arguments, question the findings, analyze the methods used, deconstruct complex perspectives, and focus not only on the so what but on the then what of the arguments. As reviewers, IDs have the opportunity to learn the latest about current topics, gain inspiration for further research, and explore similar approaches from a different framework. Professional organizations and journals usually reach out to their communities for volunteers. This is an opportunity to introduce IDs not only to the latest research but also to alternative ways to fulfil professional development goals. In addition, IDs can serve in professional organizations, many of which have research divisions (e.g., AECT, QM). These venues expand the role of IDs to lead learning design and technology initiatives and exercise their management and leadership skills. In addition, volunteering in professional organizations can expand IDs' networks and the possibilities to explore research interests at a broader level.

Building an ID Research Network

Building a research network happens in many ways. IDs connect with other ID colleagues and scholars at professional conferences or through social media platforms who are interested in conducting research. IDs can approach colleagues and be curious about their work, share scholarly interests, discuss current trends in the field, explore collaboration for developing conference proposals, lead webinars, and propose collaborative research. In addition, IDs can build a professional network by promoting and participating in an ID research community where critical conversations about established and exploratory research approaches relate to SoTL, learning design, and technology. IDs can also initiate a research community or special-interest group with other IDs that allow them to explore common interests in more local contexts. (see Resources for Getting Started section for ideas).

IDs can determine their own research community's organization and identify the goals to accomplish, as well as to establish processes to discuss overarching topics of interests, methodology training, and human-subjects training. In ID research networks and communities promote deliberate critical thinking to serve as avenues for collaborative learning and innovation. Additionally, through research networks, explore options for developing or honing research skills collaboratively. For instance, Quality Matters and OLC offer research workshops oriented towards research in learning design. For more advanced research topics, the American Educational Research Association (AERA) offers sessions on research methods.

Resources for Getting Started

This section provides a list of a few useful resources to help the readers with a starting point to enter the research arena.

Peer-reviewed Journals

· Journal of Applied Instructional Design

· British Journal of Educational Technology

· International Journal of Designs for Learning

· International Journal of E-Learning and Distance Education

· Journal of Scholarship of Teaching and Learning

· TechTrends

· Journal of the Learning Sciences

· Campus Virtuales (Revista Iberoamericana de Tecnología Educativa)

· Em foco (Revista Científica em Educação a Distância)

Professional Organizations

· International Society for Performance Improvement (ISPI)

· Association for Educational Communications & Technology (AECT)

· Western Interstate Commission for Higher Education (WICHE)

· Online Learning Consortium (OLC)

· EDUCAUSE

· Quality Matters Instructional Design Association (QM IDA)

· Instructional Technology Council (ITC)

· European Association for Research on Learning and Instruction (EARLI)

· Association for the Advancement of Computing in Education (AACE)

· Instructional Design and E-Learning Professionals (LinkedIn Group)

Research Approaches

· AERA Virtual Research Learning Series (2021)

· Research Methods in Learning Design and Technology (Romero-Hall, 2020)

· Design-based Research (Website of ID – The University of Georgia, 2006)

· The Students' Guide to Learning Design and Research (Kimmons & Caskurlu, 2020)

· Foundations of Learning and Instructional Design Technology (West, 2018)

Research Communities

· Reach out to a local network and organize a research community

· Meet regularly with colleagues and explore the latest trends in learning design and technology

· Organize a reading club to review seminal works and examine perspectives or spark innovation

· Contribute to a collaborative document with research resources (e.g., workshops, webinars, courses)

· Use social media to find collaborators

· Complete training for human-subjects research

Implications for IDs Leading through Research

Research has mostly been the responsibility of academic researchers as the producers of knowledge and generators of theory. With the evolving landscape of learning design and technology, IDs' roles and responsibilities are evolving

(Ritzhaupt et al., 2020) and IDs are becoming leaders of digital transformation (Decherney & Levander, 2020). This positions IDs in unique situations to contribute to the SoTL through research efforts that are critical to improving student learning (Klein et al., 2005). Supporting IDs with initiatives to conduct research is necessary for bringing to the forefront their expert voices in the field and to facilitate their navigation across the continuum of professional development from practitioners to scholars (IrlBeck, 2011). As researchers and IDs in learning design and technology, we need to: (1) recognize the critical role of IDs in the innovation of teaching, learning, design, and technology, (2) leverage the research that IDs are already doing to inform their practice, (3) offer a mix of professional development and experience in research, (4) recognize pioneering work to help train faculty and develop rapid-response instructional practices (especially in light of the covid-19 crisis), (5) acknowledge IDs' potential to conduct research to inform the new landscape of learning design. This chapter underscores the need to open opportunities for IDs to actively engage in research to advance the field of instructional design and to influence new designs of learning experiences.

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Embedding Effective Instruction in Educational Technology Professional Development Programs

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Higher Education | Instructional Designers | Professional Development

Instructional designers face a complex task of creating contextually relevant and meaningful professional development opportunities that meet campus-wide and departmental professional development needs for faculty who have multiple demands on their time. This chapter discusses principles of effective teaching with technology and provides a specific example of how proven instructional strategies and technology integration are embedded in a course supporting faculty in the use of a new learning management system.

Introduction

Instructional designers face a complex task of creating contextually relevant and meaningful professional development opportunities that meet campus-wide and departmental professional development needs for faculty who have multiple demands on their time. Although the need to learn about technology is a common motivator for faculty seeking professional development, a tool-centric approach is neither efficient nor effective in helping faculty integrate technology into their teaching practice (Schlager & Fusco, 2003). Embedding effective instructional strategies into technology-focused professional development provides an efficient and effective way to improve faculty members' teaching skills and technology proficiency (Koehler et al., 2014; Lane, 2013; Mwanga-Zake, 2008), whether they are teaching online, hybrid, or in a technology enhanced face-to-face environment. Moreover, as the number and type of instructional technologies continues to grow, faculty's need for assistance in understanding how those technologies enhance student learning increases (Kreber & Kanuka, 2006; Ouellett, 2010; Picciano, 2006). This chapter discusses principles of effective teaching with technology and provides a specific example of how proven instructional strategies and technology integration are embedded in a course supporting faculty in the use of a new learning management system.

Characteristics of Quality Professional Development

University faculty come to institutions as experts in their respective fields, but often have limited understanding of effective pedagogical theories and practices (Schmidt et al., 2016; Meskill & Anthony, 2007). University professional development programs, often housed in a central teaching center, offer faculty the opportunity to expand understanding of universally accepted effective teaching and learning principles and methodologies, and to apply those within the context of their respective disciplines and experiences (Birman et al., 2000; McQuiggan, 2011; Otto, 2014). In addition, bringing faculty from diverse backgrounds and experiences together in structured professional development programs

not only improves teaching but also helps faculty feel more connected with their colleagues and less isolated in their work (Eib & Miller, 2006).

While university professional development often takes the form of a one-time workshop, there are more effective practices that will provide a greater impact on the faculty's teaching skills. According to Garet et al. (2001), the following features are important for faculty professional development:

1. A focus on content knowledge and an understanding of how students learn that content. Professional development focused on the teaching of content is more valuable than presentation of abstract and decontextualized presentations of tools or strategies.
2. A sense of coherence with the work environment (e.g., norms and standards) and with other learning and development opportunities. Professional development is more effective if it is designed as an ongoing process rather than a series of discrete, disconnected topics.
3. An emphasis on active learning rather than lecture or other forms of passive instruction.
4. An opportunity for collective participation where instructors discuss ideas and collaborate with colleagues.
5. Sufficient duration to allow the active learning and collaborative activities to occur. Duration includes both the total number of contact hours spent participating in professional development activities and the time span (e.g., multiple sessions spanning a month or a semester) of the professional development opportunity.

At the university where we work, faculty professional development workshops and courses on technology tools are designed with these best practices in mind. Instruction on new tools is presented in the context of effective teaching practice featuring active learning. That is, the focus of these professional development programs is the student's learning experience (Wei et al., 2009). These practices are also modeled in the design of the training itself. This results in a rich and cohesive opportunity to experience the integration of educational technologies into a course that learners experience from both the instructor and the student perspective.

Modeling Sound Pedagogy in a Faculty Professional Development Course

A significant portion of professional development opportunities requested by faculty in higher education involve adoption and implementation of educational technologies, primarily learning management systems (LMS) and student response systems (SRS). With the LMS being a critical technology resource on most higher education campuses, it is no wonder that faculty need support in how to use it effectively. Both of these technologies offer opportunities to embed effective teaching theories and strategies into professional development courses, thereby modeling effective teaching and technology integration strategies such as organization, clarity, structure, variety, feedback, engagement, questioning strategies, and memory strategies, while also introducing faculty to the "nuts and bolts" of using the tools.

Professional development courses designed to model the concepts they seek to impart have been shown to enhance faculty skills and attitudes. For example, Borup and Evmenova (2019) used modeling, among other strategies, to enhance faculty skills in and attitudes towards online teaching. Their faculty participants were tasked with designing engaging learning activities for students, and were supported through instructor feedback and small group peer interaction delivered through a LMS. The participants in this study reported that the opportunity to experience an example of good online course design and teaching practice was an important source of increased skill and confidence. Borup and Evmenova (2019) conclude that "the important ingredient is not putting professional development materials online; rather, it is modeling best practices" (p. 15).

As an illustrative example, we describe a campus-wide professional development program for university faculty that incorporates these best practices while preparing faculty for the implementation of a new LMS. This instruction focuses not on the technical features of the system, but rather on proven instructional strategies and how the features of the LMS can support those strategies. This focus on pedagogy allows faculty to master the technical features in a realistic, relevant, and coherent context, which is opportune given that students consistently identify the LMS as one of the most

important instructional technologies supporting their academic success (Brooks, 2016; Dahlstrom,Walker, & Dziuban, 2013).

Context of the Professional Development Course

The example presented here occurs in the context of a state land grant university in the south-central region of the United States. The university has a student population of approximately 25,000 and offers 200 undergraduate majors, 79 master's degree programs, and 45 doctoral programs (About OSU, n.d.). The professional development opportunity described in this example is offered through a centralized campus center that supports the campus-wide LMS, provides technology and multimedia services to support teaching and learning, and offers training and consultation to support innovative, student-centered instruction.

The professional development course described in this example is a six-week, fully online course called Preparing Online Instructors (POI). This program assists faculty in developing high quality online courses while using the LMS as the foundation of the course. It is an online course with both synchronous and asynchronous components, including weekly deadlines for assignments, content presentations and instructional events, participant and instructor interactions through the LMS features, and feedback loops to support participant mastery of both content and technology. Covering a variety of topics that support the primary goal of student engagement, the class is designed to be a hands-on living laboratory in which the 25-35 participants learn from current research, as well as each other, to discover what works and what does not work in quality online instruction. Rather than organizing lessons based on specific instructional technology tools, the course is organized around pedagogical themes. In this example, the program is designed around the design and implementation of an online course. Figure 1 shows syllabus language used to set realistic expectations for the content of the course.

Figure 1

Prerequisite language from course syllabus (Ringsmuth, 2020)

Course Prerequisites:

This course focuses on pedagogical design and implementation of online instruction; therefore, it is NOT a computer applications or Canvas training course. While there will be some demonstrations on how to use Canvas, it is expected that you are to be familiar with the basics of how to use Canvas before taking this course. To successfully complete this course you are expected to already have a basic level of computer skills including file management and use of Microsoft Office applications, and have a basic level of skill at using the Internet to find information and communicate.

Samplee language from course syllabus

Research has shown that effective professional development must be designed around relevant and meaningful concepts (Adams, 2005; Mouza, 2009; Samarawickrema et al., 2010). Figure 2 shows the statement provided in the course syllabi identifying for faculty the content focus of the program. While we do not use technical language associated with learning design, we use language that faculty associate with teaching.

Figure 2

Purpose language from course syllabus (Ringsmuth, 2020)

Course Information:

The purpose of this course is to provide faculty with the knowledge and skills necessary to effectively teach in an online environment. Key areas of focus include Course Organization, Content, Activities, Interaction, Management, and Assessment.

Sample language from course syllabus

The course is organized around two important themes within the topics of Interaction and Assessment: (1) how to provide students with timely, useful feedback to help them adjust and improve their own understanding and performance, and (2) how to monitor student comprehension while teaching, using this information to make adjustments when needed. These two themes are important because they contribute to building a Community of Inquiry. The Community of Inquiry framework (Garrison et al., 1999; Garrison et al., 2010) describes how critical thinking and learning are supported in online environments through the creation of three types of presence. Teaching presence includes all of the activities performed by the instructor or the instructional designer including not only the day-to-day facilitation of the course, but also the course design. Social presence is the perception among students that they are interacting with real people, even in asynchronous discussion boards where they do not see each others' faces or hear each other's' voices. Teaching and social presence support cognitive presence, a process of inquiry that ideally includes "definition of a problem or task; exploration for relevant information/knowledge; making sense of and integrating ideas; and, finally, testing plausible solutions" (Garrison et al., 2010, p. 32). An important aspect of teaching presence is "ensuring that the community reaches the intended learning outcomes by diagnosing needs and providing timely information and direction" (Garrison et al., 2010, p. 32). Thus, monitoring student comprehension is necessary to diagnose needs and adjust accordingly. Feedback from the instructor provides direction to learners, as well as information they can use to reflect on their own learning and modify learning strategies if needed. Technology tools, in this case the features of the new LMS and SRS, also known as "clickers," are commonly used by faculty to monitor student comprehension and provide feedback.

Using Technology Tools to Monitor Student Comprehension

To teach faculty how to use the tools to monitor student comprehension, the professional development session is conducted with the tools. Those tools are simultaneously used to monitor the understandings of the faculty participants as they engage in the instruction. Modeling how the tools can be used in class activities allows faculty to experience these activities from the student perspective. Features of the LMS, such as polling, quizzes, asynchronous discussion boards and synchronous chat, can also be used to check for student understanding in both face-to-face and online classes. These tools are also embedded in the professional development course. Faculty attendees log in to the LMS, either the desktop version or the mobile app, and respond to polls or take quizzes during the session. Faculty attendees also learn how to design effective prompts to be used in the asynchronous discussion forum in the LMS. A well-designed prompt leads students to provide extensive and nuanced responses to questions, achieve higher level thought processes through discussion or debate with classmates, and demonstrate their knowledge and understanding. Finally, faculty attendees learn how to use the video capability of the LMS to engage students and allow for alternative kinds of student products that support nontraditional styles of teaching and assessment, particularly in online and hybrid courses. Using a variety of student combinations (solo, pairs, small groups) and responses (from one-minute reports to 20-minute presentations), faculty can use the video tool to assess student learning in a more personal manner.

An SRS is another tool that can be used to monitor student comprehension. For example, when faculty sign into the SRS they are presented with a quiz containing one-to-three questions about the previous session's material. Use of the SRS during synchronous online sessions, where instructors post questions (either planned in advance or developed ad hoc during class) is also used to check for understanding. Attendees can then see the result for the whole class, and the instructor can review any topics that appear to have caused confusion or misunderstanding. This process has a two-

fold purpose: it helps faculty attendees master the content, and it allows them to see a model of instructors using the feedback from the SRS to adjust their teaching in the moment.

Using Technology Tools to Provide Feedback

The same tools used to help faculty gauge student understanding can also provide students with timely, useful feedback about their own learning. In the Preparing Online Instructors (POI) course, the LMS is used as the primary teaching platform. Faculty are provided feedback using the many features available. A sample of strategies presented includes the following:

● Post grades to the gradebook as soon as possible. This gives students a sense of completion and alerts them when they need to revisit a concept. This early feedback is particularly important when the assignment or assessment is a precursor to a larger assessment, such as a midterm exam. In the POI course, faculty participants must submit products such as syllabi, discussion questions, and other artifacts demonstrating their understanding of the presented concepts. POI instructors work hard to ensure that participants are provided feedback on those products quickly, usually within 48 – 72 hours

● Provide qualitative feedback using tools provided in the LMS. For example, written feedback can be sent to students through email, as an attachment in the gradebook, or on the LMS dashboard. Use features that make the feedback easy for students to access. Because the course is taught in Canvas, the POI instructors provide written feedback directly in the documents submitted as well as through the LMS dashboard Feedback feature. Faculty participants are asked to set up their Canvas notifications so that they receive notice of the feedback in real time.

● Interact with students on the asynchronous discussion forums. This is where instructors can encourage engagement and provide feedback or clarification. Online course success is dependent in part on effective communication between the instructor and students (Moore, 1989). Faculty participants are told at the beginning of the program how the instructor will interact in the course and communicate with them. Below is the communication in the POI syllabus describing for participants how the instructor will engage with them:

You can expect me to provide a quality learning experience that respects the many obligations you already have in your life. I will communicate often, respond quickly, and actively participate throughout the course. You can expect to see me on the discussion board throughout the week, offering my own thoughts and opinions while respecting the contributions from everyone in class (Ringsmuth, 2020, p. 3).

● Use the LMS “news” or “announcements” feature to provide information on how the class did on an exam, clarify comments from a class or presentation, notify students that you have added information to the LMS, remind them of exams, and encourage them to keep on top of the class assignments. The announcements feature is more immediate than an email, and also allows posting images or a short video rather than plain text. The following link is an example of a video posted as a weekly announcement provided to keep POI faculty participants engaged and on track: Simon Ringsmuth's Weekly Check-in Video.

● Use the video function to create short presentations clarifying or reteaching concepts indicated in polls, quizzes, or discussions, to be sources of misunderstanding. The POI instructor often creates short instructional videos to help faculty participants learn concepts and see their application. As an example, this link takes you to a short video focused on the process of developing effective assignments in online courses: https://edtechbooks.org/-wBvP

● Ask students questions during instruction as a way to assess their understanding (Fisher, & Frey, 2014). This practice is common in face-to-face courses but can also be used very effectively in synchronous or asynchronous online courses. Some LMSs include polling tools, but a student response system (SRS) can also be used. Polling not only allows faculty to adjust their teaching in response to students’ misconceptions or confusion, but also allows students to see, in real time, how well they are comprehending the material being presented. Faculty are taught how to use the SRS to create short quizzes that are targeted to measure understanding, but at the same time are not overly burdensome for

students. For example, since most students will complete polls using a tablet or phone, short answer questions may be fine but longer responses should be avoided.

Although the POI course provides ample opportunity for faculty to explore and practice using technology tools, the course is never tool-centric. Instead, the focus remains on good teaching practice and the desire of faculty to provide experiences that facilitate student learning. In doing so, we follow the best practices proposed by Garet et al. (2001). By focusing on teaching with and through technology tools, rather than on the tools themselves, we allow faculty attendees to focus on conveying content knowledge in their fields and supporting students' learning of that content. Because of this close connection to the subject matter expertise and teaching practice of faculty, the course has a sense of coherence with the faculty attendees' daily work. They are not learning about technology as an add-on to their work, but rather as a set of integrated tools and strategies that can make their work more effective and rewarding. Active and collaborative strategies are used during synchronous and asynchronous class activities, which not only engages faculty during the session but also provides them an opportunity to see the strategies modeled so they can use them with their own students. Finally, the six-week course, which typically demands five to eight hours a week of faculty time, provides sufficient opportunities for faculty to reflect, try new strategies in their classroom, and return to the next session with additional questions.

Assessment and Feedback as Critical Components of Faculty Development

Effective professional development programs are multi-faceted and should include assessment and feedback (Hattie & Timperley, 2007). The opportunity for faculty to apply the knowledge and skills taught is critical to ensuring successful generalization in their specific learning environments. In the six-week course, faculty are asked to create teaching products including a syllabus, sample questions for guided discussions, graphic organizers, online course activities with assessment rubrics, and abbreviated assessments. Those products are reviewed by both the program instructors and course peers to provide participants with constructive feedback about application of the program content and skills. This process is not graded, but rather the process focuses on identifying the strengths and areas of improvement to help participants develop self-reflection skills. Another positive by-product of this process is that peer support networks are created. That is, the faculty in these programs become familiar and comfortable with sharing their teaching work with each other. Thus, the Community of Inquiry extends to our faculty participants while demonstrating how important this is for students in online courses (Garrison et al., 2010).

Implications for Instructional Design Practice

Feedback from faculty who have participated in the POI course is positive. In both formal course evaluations and informal discussions, faculty reported that the course helps develop a foundational understanding of teaching and learning and connect theory to practice. That is, by embedding effective teaching theory in instructional technology training, participants learn the "why" of teaching with technology and not just the "how" (Dysart, & Weckerle, 2015). This foundational understanding expands the ability to make teaching decisions far beyond simply using a feature in an LMS or SRS. Faculty are able to assess the effectiveness of their teaching and make adjustments to reach their instructional goals. Further, because faculty clearly see the purpose and relevance of the course design and activities, they become more invested in the process and outcome (Scott et al., 2016).

Based on our experience, the recommendations below can serve as a guide for instructional designers creating engaging professional development opportunities for faculty:

1.) Structure the course around a manageable set of pedagogically-sound themes.

In the example described, the two themes were Using Technology Tools to Monitor Student Comprehension and Using Technology Tools to Provide Feedback. Unlike a course centered around a collection of technology tools, a course centered on themes relates directly to the day-to-day responsibilities of faculty (Schmidt et al., 2016). This connection

activates prior knowledge and provides coherence and relevance, thus increasing the chance they will apply what they have learned (McQuiggan, 2011; Otto, 2014).

2.) Model the practices you want faculty to learn.

In the example described, the six-week online course engages faculty in an active learning process using technology tools to support the learning activities. Faculty are able to see the instructor modeling both the teaching strategy and the integration of the tool to support that strategy. In addition, they are able to experience these activities and tools from the student perspective (Wei et al., 2009). This rich experience increases their ability and confidence to incorporate these strategies and tools into their own teaching (Horvitz et al., 2014).

3.) Design a coherent course that unfolds over time, rather than a series of discrete workshops.

While the lunch-hour workshop still has its place in faculty development, there are many benefits to offering professional development opportunities over a longer time span (Reeves, 2012). Faculty have the opportunity to implement the tools and strategies they learn, and then return to class to discuss their experience with instructors and peers, sharing stories when something works well and seeking advice and help if a lesson does not go as planned.

Following these guidelines will facilitate faculty professional development that models best practices by creating a course that is coherent and practical, steeped in active learning and collaboration, and of sufficient timespan and duration to support faculty in their efforts to implement effective teaching strategies using a variety of appropriate technologies. This can enhance faculty confidence in their ability to incorporate new technologies into effective teaching strategies to the benefit of students.

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