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About the Journal

During the past 50 years, journals in the field of instructional design have been responsive to the changing needs of both scholars and to a lesser degree, the practitioner. We have seen an evolution of AVCR to ECTJ, the emergence of JID, and finally the merging of ECTJ and JID to form ETR&D. ETR&D is a widely recognized, scholarly journal in our field that maintains rigorous standards for publications.

During the past 50 years, we have also witnessed a change in the field due in part to the success of instructional design in business and other nonschool environments. The number of instructional designers working outside the university has dramatically increased. Of particular importance is the rise in the number of instructional designers with doctorates who consider themselves practitioners, but not necessarily scholars. This growing group of designers might be best described as reflective practitioners who can make a significant contribution to the knowledge of our field.

This growth and success in the application of instructional design has also changed the field. From the early days of the field until the mid-1980's, the theory and practice of instructional design was almost exclusively influenced by the academic community. With the growth of instructional designers, the theory and practice of the field is now defined by both academics and practitioners. There is a need for greater communication between the scholars and the practitioners in a scholarly journal that will support innovation and growth of our knowledge base.

ISSN: 2160-5289

Goals

The purpose of this journal is to bridge the gap between theory and practice by providing reflective practitioners a means for publishing articles related to the field. The journal establishes and maintains a scholarly standard with the appropriate rigor for articles based on design and development projects. Articles include evaluation reports (summative and formative), lessons learned, design and development approaches, as well as applied research. The articles are based on design and development projects as opposed to pure research projects and focus on lessons learned and how to improve the instructional design process. Rigor is established through articles grounded in research and theory.

A secondary goal of this journal is to encourage and nurture the development of the reflective practitioner in the field of instructional design. This journal encourages the practitioner as well as collaborations between academics and practitioners as a means of disseminating and developing new ideas in instructional design. The resulting articles inform both the study and practice of instructional design.

Philosophy

This journal will provide a peer-reviewed format for the publication of scholarly articles in the field of applied instructional design. The journal recognizes the role of the practitioner in the work environment and realizes that outside constraints may limit the data collection and analysis process in applied settings. The limitations of real-world instructional design of the practitioner can still provide valuable knowledge for the field.

Sponsoring Organization

JAID is a publication of the Association for Educational Communications and Technology (AECT).

JAID is an online open-access journal and is offered without cost to users.

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About AECT

The Association for Educational Communications and Technology (AECT) is a professional association of instructional designers, educators and professionals who provide leadership and advise policy makers in order to sustain a continuous effort to enrich teaching and learning. Seizing opportunities to raise awareness and leverage technology, our members may be found around the world in colleges and universities, in the Armed Forces and industry, in museums, libraries, and hospitals, and in the many places where educational change is underway. Our research and scholarly activity contribute to the knowledge base in the field of Learning. We are on the cutting edge of new developments and innovations in research and application.

AECT is the premier organization for those actively involved in the design of instruction and a systematic approach to learning. We provide an international forum for the exchange and dissemination of ideas for our members and for target audiences. We are the national and international voice for improvement of instruction and the most recognized association of information concerning a wide range of instructional and educational technology. We have 24 state and six International Affiliates all passionate about finding better ways to help people learn.

Since 1923, AECT has been the professional home for this field of interest and has continuously maintained a central position in the field, promoting high standards, in both scholarship and practice with nine Divisions and a Graduate Student Assembly that represent the breadth and depth of the field. Other journals sponsored by AECT include *Educational Technology Research and Development* and *TechTrends*.

The Journal of Applied Instructional Design (JAID) is a refereed online journal designed for the publication of scholarly articles in the field of applied Instructional Design. The purpose of JAID is to provide the reflective ID scholar-practitioners and researchers a means for publishing articles on the nature and practice of ID that will support the innovation and growth of our knowledge base. The journal is for practitioners, instructors, students, and researchers of instructional design.

Call for Submissions

JAID is for reflective scholar-practitioners, who through documentation of their practice in ID, make significant contributions to the knowledge of our field. Authors are invited to submit articles documenting new or revised approaches to ID; the processes of ID including in-depth documentation of analysis, design, and development, implementation and evaluation; design-based research; as well as applied research. Articles must be based on instructional design projects as opposed to pure research projects and focus on documented processes, lessons learned, and how to improve the overall process of ID. Articles must be grounded in research and theory connecting the intellectual foundations of the ID field and how these foundations shape its practice.

The journal will establish and maintain a scholarly standard with the appropriate rigor for articles based on design and development projects. A secondary goal of this journal is to encourage and nurture the development of the reflective practitioner in the field of ID. This journal encourages the practitioner as well as collaborations between academics and practitioners as a means of disseminating and developing new ideas in ID. The resulting articles should inform both the study and practice of ID.

Submit an Article

Article Types

JAID currently accepts submissions of three article types.

Instructional Design Practice

This is an applied journal serving a practicing community. Our focus is on what practitioners are doing in authentic contexts and their observed results. These articles cover topics of broad concern to instructional design practitioners. The articles should represent issues of practical importance to working designers.

Research Studies on Applied Instructional Design

JAID is interested in publishing empirical studies exploring the application of instructional design principles in applied settings. Quantitative and qualitative studies are welcome.

Instructional Design/Performance Design Position Papers

JAID also accepts position papers that attempt to bridge theory and practice. Examples may include conceptual frameworks and new ideas facing the instructional design community. The paper must also provide enough information to allow the replication of the innovation or continuation of the research in other settings. Position papers must be based in the context of a theoretical framework. Efficacy data is strongly preferred, but not always required, contingent upon the potential generalizability or value of the innovation.

Submission Guidelines

The journal will focus on in-depth applications of the ID process and publish a variety of articles including case studies of the ID process; application articles that go beyond a mere how-to approach that provide implementation insights, guidance and evaluation of a process; evaluation articles that focus on the viability of a product or process; applied research resulting from evaluation of materials, studies of project implementation, articles on ways to improve the ID process from the perspective of the practitioner, and short essays that provide a scholarly debate of relevant issues related to the application of ID and relevant book reviews. When applicable, articles should include supplementary materials including examples of ID products, evaluation instruments, media files, and design artifacts.

The articles in the journal will be from the perspective of the scholar-practitioner rather than from the researcher. However, the manuscripts must demonstrate scholarly rigor appropriate to applied manuscripts.

Articles, including tables or figures, must follow APA 7th edition formatting and be submitted in a word or doc format using at least 12-point New Times Roman font. Each article must have an abstract (75-100 words) and a list of keywords. While there is some flexibility in the length of an article, 4,000 to 5,000 words is a best-guess estimate. If in doubt, contact the editor prior to submitting the article. Identifying information must only be located on the cover page including contact information for the first author.

You may contact the editors via email, if you have further questions.

Contact the Editor

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Decision Making and Problem-Solving: Implications for Learning Design

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Instrument Design | Decision-making | Instructional Strategies

THE JOURNAL OF APPLIED INSTRUCTIONAL DESIGN

Educators are increasingly applying problem-solving through instructional strategies, such as inquiry-based learning. An important aspect of problem-solving includes the decision-making process and the rationale for learners' choices. Although prior theories and models indeed yield important insight in other areas of problem-solving (e.g. - scaffolding, argumentation, reflection), the decision-making process has only been implicitly referenced within learning design. To better understand the role of decision-making and apply it towards design, the article reviews the theoretical basis of the following overarching frameworks: normative, descriptive, prescriptive, and case-based decision-making theory (CBDT). For each approach, an example is included that instantiates the theory within learning design. The article concludes with a discussion of how decision-making theory aligns with existing theories that are foundational to problem-solving, along with implications for future learning design.

Introduction

Practitioners in various domains are often faced with ill-structured problems. For example, teachers devise lesson plans that consider learners' prior knowledge, curriculum guidelines, and classroom management strategies. Similarly, engineers must develop products that meet safety standards, yet achieve project guidelines that meet client needs. Given the types of problems that practitioners face in everyday decision-making, educators have increasingly begun to adopt inquiry-based learning, which better exposes learners to the types of issues faced within a domain (Hung et al., 2019; Koehler & Vilarinho-Pereira, 2021). This instructional approach includes multiple changes to the educational experience when compared to the teacher-centric classroom approach (Reigeluth & Carr-Chellman, 2009). As opposed to a didactic strategy to instruction, students take ownership of their learning and generate questions among their peers, while teachers serve as facilitators (Lazonder & Harmsen, 2016; Loyens & Rikers, 2011; Savery, 2009). The central focus of these strategies also includes ill-structured cases that are similar to the types of problems practitioners face. The complexity of these problems often consists of interconnected variables (latent, salient) and multiple perspectives,

so there is rarely a single predetermined solution that satisfies all options (Ifenthaler, 2014). Additionally, these problems are challenging because they include multiple criteria for evaluation (Jonassen, 2011b; Ju & Choi, 2017), which makes it challenging to definitively determine when a 'right' answer has been achieved.

There are a number of skillsets needed for problem-solving instructional strategies, such as the inquiry process (Glazewski & Hmelo-Silver, 2018), collaboration (Koehler & Vilarinho-Pereira, 2021), and argumentation (Noroozi et al., 2017). Another important element of problem-solving includes decision-making; that is, the process by which individuals make choices as they resolve the ill-structured case. Understanding decision-making is important because individuals engage in a myriad of choices throughout the problem representation and solution generation phases of problem-solving (Ge et al., 2016). Moreover, learners must engage in multiple and interconnected decisions as they select evidence and determine causal chains during various stages of problem-solving (Shin & Jeong, 2021). The decision-making process is also closely linked with failure and the iterative choices needed to overcome errors in the problem-solving cycles (Schank et al., 1999; Sinha & Kapur, 2021). As such, decision-making is key for learners' agency as they engage in self-directed learning and take ownership of ill-structured cases.

Despite its importance, the field of learning design only minimally addresses theories and models specifically associated with decision-making. The decision-making processes required for inquiry-based learning necessitates a more in-depth analysis because it is foundational to problem-solving as individuals weigh evidence, make strategic choices amidst an array of variables, and causal reasoning. In addition, an advanced understanding of this skill set would allow educators to develop systems that leverage specific decision-making strategies within design. Based on this gap, we survey broad decision-making paradigms (normative, descriptive, and prescriptive), along with case-based decision-making theory (Gilboa & Schmeidler, 1995; Kolodner, 1991). For each category, we then proffer an example that instantiates the theory. Finally, the article concludes with implications for practice.

Literature Review

Inquiry-based learning is an instructional strategy that affords learners with agency as they solve ill-structured problems. Although variations exist (problem-based learning, project-based learning, case-based instruction), the strategy often situates a contextual case to the learners that is representative of the domain (Lazonder & Harmsen, 2016; Loyens & Rikers, 2011). When compared with teacher-centric approaches where the instructor acts as the 'sage on the stage' (Reigeluth & Carr-Chellman, 2009), students in inquiry-based learning engage in a variety of learning actions in the problem representation and solution generation stage. The former necessitates learners define the problem, identify variables, and determine the underlying causal mechanisms of the issue (Delahunty et al., 2020; Ertmer & Koehler, 2018). Solution generation requires learners propose a way to resolve the issue, along with supporting evidence (Ge et al., 2016). This latter stage also includes how learners test out a solution and iterate based on the degree to which their approach meets its goals. As learners engage in these tasks, they must remedy knowledge gaps and work with their peers to reconcile different perspectives. Beyond just retention of facts, learners also engage in information seeking (Belland et al., 2020), question generation (Olney et al., 2012), causal reasoning (Giabbanelli & Tawfik, 2020; Shin & Jeong, 2021), argumentation (Ju & Choi, 2017; Noroozi & Hatami, 2019), and other higher-order thinking skills.

Another important aspect of inquiry-based learning also includes decision-making, which describes the choices learners select as they understand the problem and move towards its resolution. To that end, various theories and models that explicate the nuances of problem-solving have implicitly referenced decision-making. When describing the solution generation stage, Jonassen (1997) asserts that learners' "resulting mental model of the problem will support the learner's decision and justify the chosen solution" (p. 81). Ge et al. (2016) proposed a conceptual model of self-regulated learning in ill-structured problem-solving in which "students not only must make informed decisions and select the most viable against alternative solutions, but also must support their decisions with defensible and cogent arguments" (p. 4). In terms of encountered failure during problem-solving, Kapur (2008) explains how students must "decide on the criteria for decision making or general parameters for solutions" (p. 391) during criteria development.

Indeed, these foundation theories and models of problem-solving highlight the importance of decision-making in various aspects of inquiry-based learning.

Despite its importance, very little understanding is known within the learning design field about the specific decision-making processes inherent within problem-solving. Instead, there is a large body of literature dedicated to strategic approaches to self-directed learning (Xie et al., 2019), collaboration (Radkowitsch et al., 2020), and others. However, specific attention is needed towards decision-making to understand how learners seek out information, weigh evidence, and make choices as they engage in problem-solving. A review of theories argues for three distinct overarching theoretical paradigms of decision-making (Schwartz & Bergus, 2008): normative, descriptive, and prescriptive. There is also a related body of literature around case-based decision-making theory (Gilboa & Schmeidler, 1995), which describes how prior experiences are used to inform choices for new problems. Below we define the theory and related literature, along with a design example that instantiates the decision-making approach.

Table 1

Outline of Decision-Making Theories and Constructs

Theory	Definition	Constructs
Normative Decision Making	Provides choices of action for making the best decisions (Gati et al., 2020)	Subjective utility: the value of the outcome Probability: the degree that the selected action will lead to a certain outcome
Descriptive Decision Making	Focuses on how decisions are made in real-life rather than prescribing procedures for optimal decision making (Divekar et al., 2012)	Satisficing: individuals attempt to maximize their choices First option: individuals will likely choose the first option that satisfices their desire
Prescriptive Decision Making	Concerned with providing aids to make the best decisions (Divekar et al., 2012).	Pragmatic value: the realistic value of the decision being made DA: past knowledge PDA: Available future knowledge
Case-Based Decision Making	Learners recall previous cases that are similar to the current case and select the solution that has had the most success in the past (Gilboa & Schmediler, 1995; Pape & Kurtz, 2013)	memory (M): a set of cases $q \in Q$: the problem $a \in A$): possible act chosen in the problem ($r \in R$): Resulting consequence

Normative Decision-Making

Normative decision-making theoretical foundations

Normative decision-making describes how learners make choices based on the following: (a) perceived subjective utility and (b) probability (Gati & Kulcsár, 2021). The former focuses on the values of each outcome, especially in terms of how the individual assesses expected benefits and costs associated with one's goals and preferences. Alternatively, probability describes the degree to which individuals perceive that a selected action will lead to a specific outcome. Hence, a key assumption - and potential criticism - of normative decision-making is that individuals are logically consistent as they make choices under the constraints of rationality, which has been called into question.

Another important element of normative decision-making includes 'compensatory models'; that is, how the benefits of an alternative outweigh the disadvantages. The most common compensatory model described in the literature is multi-attribute utility theory (MAUT), which is used to account for decision-making amidst multiple criteria (Jansen, 2011). MAUT thus aligns well with ill-structured problem-solving because it assumes that choices are made amongst a variety of competing alternatives. In a conservation example, one might select a green energy alternative to reduce carbon emissions, but it may be disruptive to the existing energy sources (e.g., fossil fuels) and raise costs in the short term. In the context of medicine, a surgery might ultimately resolve an issue, but it poses a risk for post-procedure infections and other complications. As individuals consider each alternative, MAUT is a way of "measuring the decision-maker's values separately for a set of influential attributes and by weighting these by the relative importance of these attributes as perceived by the decision-maker" (Jansen, 2011, p. 101). MAUT component of normative decision-making specifically argues individuals progress in the following five steps (Von Winterfeldt & Edwards, 1993):

1. Individuals explicate the various alternatives and salient attributes associated with each choice.
2. Each alternative is evaluated separately based on each attribute in terms of the following: complete (all essential aspects are addressed), operational (attributes can be meaningfully used), decomposable (deconstructing aspects of evaluation as to simplify evaluation process), non-redundant (remove duplicates of aspects), and minimal (keep a number of attributes focused and central to the problem).
3. Individuals assign relative weights to each attribute
4. Individuals sum the aggregate weight to evaluate each alternative.
5. Individuals make a final choice.

Rather than pursue a less than optimal selection, MAUT argues that "they [individuals] strive to choose the most beneficial alternative and obtain all information relevant to the decision, and they are capable of considering all possible outcomes of the choice, estimating the value of each alternative and aggregating these values into a composite variable" (Gati et al., 2019, p. 123). Another characteristic is how individuals select the factors and assess the degree to which they can be compensated. Some individuals (e.g., expert, novice) may weigh a specific factor differently, even if the other aspects align with their desired outcomes. Given that individuals are not always rational and consistent in decision-making, some argue that the normative decision-making model is not truly representative of how individuals actually engage in everyday problem-solving (Gati et al., 2019; Jansen, 2011; Schwartz & Bergus, 2008).

Normative decision-making theoretical application

Normative decision-making approaches applied to learning design make choices and probabilities salient to the learner, such as in the case of learner dashboards (Valle et al., 2021) or heuristics. Arguably, the most common application of decision-making in learning technologies for inquiry-based learning includes simulations, which situate individuals within an authentic context and posit a series of choices, and allow them to model choices (Liu et al., 2021). Systems that especially exhibit normative decision-making often consist of the following: (a) encourages learners to consider what is currently known about the phenomena vs. what knowledge the decision-makers lack, (b) makes probability associated with a choice clear, and (c) observes the outcomes of the decision.

One example of normative decision-making applied to design includes *The Wildlife Module/Wildfire Explorer* project developed by Concord Consortium. In this environment, learners are tasked with lowering wildfire risk in terms of fires and other natural hazards (see Figure 1). The decision-making is especially focused on choices around terrain and weather conditions, which add to or limit the amount of risk that is posed to each town. As learners make decisions, the interface allows individuals to manipulate variables and thus observe how certain choices will result in higher benefits relative to others. For instance, reducing the amount of brush in the area will better prevent wildfire when compared with cutting fire lines. In another instance, they explore how dry terrain and 30 mile per hour (MPH) winds would increase the potential wildfire risk of an area. The learning environment thus instantiates aspects of normative decision-making as learners select the parameters and discern its effects on the wildfire within the region.

Figure 1

Wildlife Module/Wildfire Explorer as Applying Normative Decision-Making

Estimating risk

Wildfires become natural hazards when they bring fire and smoke to regions where people live. In this activity, we will investigate risk using the Wildfire Explorer model.

Below is a snapshot of the Wildfire Explorer. Three towns are located on the map, two are in the mountains and one is in the plains. The wind is blowing to the northeast and the fire has started at the spark.

Is it possible to estimate the level of risk to each town given the initial conditions?

Question #5

If the conditions stay as they are, which town is at a highest risk of being impacted by this fire?

- ○ Skyview
- ○ Evensville
- ○ Happy Valley

Question #6

Explain your answer.

Please type your answer here.

Example of Normative Decision-Making

Question #24

Look at the graphic to the right.

Why would developing a "defensible zone", an area with sparse trees and vegetation, help prevent wildfires from burning property? Use the Fire Triangle in your answer.

Please type your answer here.

Make your property less susceptible to wildfires by removing dead trees and other vegetation, keeping shrubs and trees spaced far apart, and keeping vegetation well trimmed.
California Fire Resources

Question #25

What other ways could a wildfire be contained, extinguished, or slowed down? Check all that apply.

- ☐ Meeting a natural barrier such as a lake or river
- ☐ Meeting an area that was previously burnt
- ☐ Rain falling on the fire
- ☐ Being sprayed with water or fire retardant

Descriptive Decision-Making

Descriptive decision-making theoretical foundations

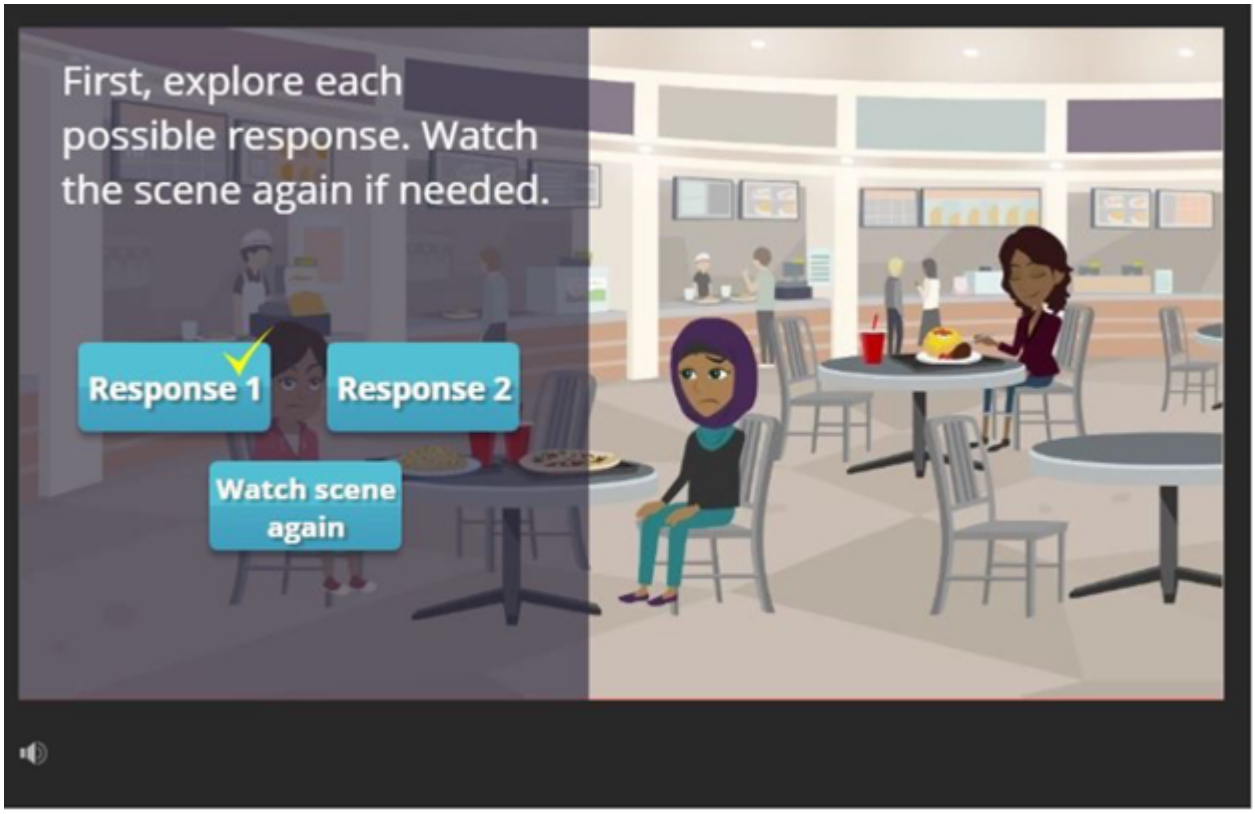
Whereas the normative decision-making approaches assume individuals make rational decisions that maximize choices, descriptive decision-making illustrates the gap between optimal decision-making and how people actually make choices (Gati et al., 2019). Although it is sometimes criticized for the lack of clarity, there are some elements of descriptive decision-making that have emerged. One key component includes satisficing, which posits that individuals attempt to make decisions based on how choices are maximized and meet specific goals. As outlined in the seminal work by Simon (1972), individuals aspire to engage in complex rational selections; however, humans have limited cognitive resources available to process the information available during decision-making. Because choices for ill-structured problems often have competing alternatives, individuals settle for decisions that meet some kind of determined threshold for acceptance in light of a given set of defined criteria. The theory further argues individuals will likely choose the first option that satisfices the desire; so while the final selection may be satisficing, it may not necessarily be the best and most rational decision (Gati et al., 2019). This is especially true in ill-structured problems that include multiple perspectives and constraints that make an ideal solution difficult. Rather, individuals instead strive for a viable choice that can be justified in light of multiple criteria and constraints.

Descriptive decision-making theoretical application

One example includes the EstemEquity project (Gish-Lieberman et al., 2021), which is a learning environment designed to address attrition rates for women of color in STEM through mentorship strategies aimed at building self-efficacy. Because the dynamics of mentorship can be difficult, the system relies heavily on decision-making and reflection upon choice outcomes (see Figure 2). The first steps of a scenario outline a common mentor/mentee challenge, such as a mentee frustrated because she feels as though the mentor is not listening to her underlying problem as she navigates higher education in pursuit of her STEM career. The learning environment then poses two choices that would resolve the issue. Although no single solution will fully remedy the ill-structured mentorship challenge, they must make value judgments about the criteria for success and the degree to which their decision meets the requirements. Based on the goals, the learning environment provides feedback as to how the choice satisfices given their determined threshold of optimal mentor and mentee relationships.

Figure 2

EstemEquity as Applying Descriptive Decision-Making



Example of Descriptive Decision-Making

Prescriptive Decision-Making

Prescriptive decision-making theoretical foundations

The aforementioned approaches highlight how individuals engage in sense-making as they make a selection among latent and salient variables. To better support ideal decision-making, the prescriptive approach is concerned with providing overt aids to make the best decisions (Divekar et al., 2012). Moreover, prescriptive decision-making "bridges the gap between descriptive observations of the way people make choices and normative guidelines for how they should make choices" (Keller, 1989, p. 260). Prescriptive decision-making thus provides explicit guidelines for making better decisions while taking into consideration human limitations. For example, physicians may use a heuristic that outlines a specific medication based on symptoms and patient characteristics (e.g., height, weight, age). Similarly, a mental health counselor may select a certain intervention approach when a client presents certain behavioral characteristics. In doing so, prescriptive decision-making outlines a series of "if-then" scenarios and details the ideal choice; that is, the pragmatic benefit of the decision to be made given a set of certain circumstances (Gati et al., 2019).

There are multiple challenges and benefits to the prescriptive approach to decision-making. In terms of the former, some question the degree to which a single set of heuristics can be applied across multiple ill-structured problems with varying degrees of nuance. That said, the prescriptive approach has gained traction in the 'big data' era, which compiles a considerable amount of information to make it actionable for the individual. An emerging subset of the field includes prescriptive analytics, especially in the business domain (Lepenioti et al., 2020). Beyond just presenting information, prescriptive analytics distinguishes itself because it provides the optimal solution based on input and data-mining strategies from various sources (Poornima & Pushpalatha, 2020). As theorists and practitioners look to align analytics with prescriptive decision-making, Frazzetto et al., (2019) argues:

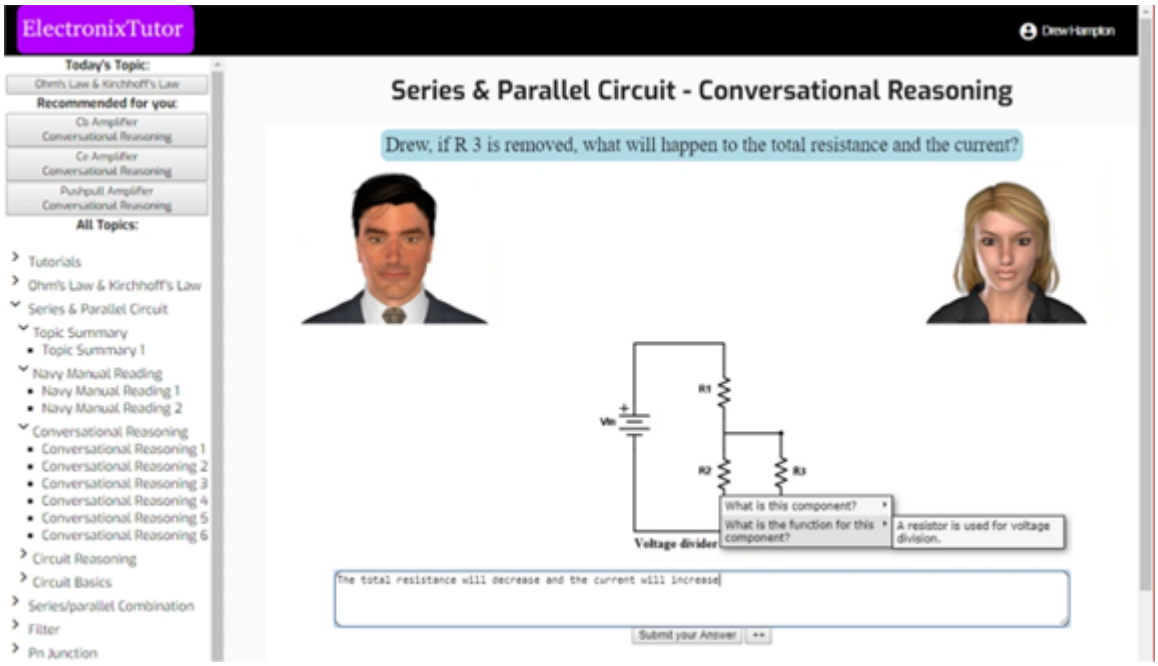
> *If the past has been understood (descriptive analytics; 'DA'), and predictions about the future are available (predictive analytics; 'PDA'), then it is possible to actively suggest (prescribe) a best option for adapting and shaping the plans according to the predicted future (p. 5).*

Prescriptive decision-making theoretical application

Prescriptive decision-making approaches arguably are most used in adaptive tutoring systems, which outline a series of "if-then" steps based on learners' interactions. ElectronixTutor is an adaptive system that helps learners understand electrical engineering principles within a higher educational context (see Figure 3). Rather than allowing the learner to navigate as desired or make ad-hoc selections, the recommender system leverages user input from completed lessons to prescribe the optimal lesson choice that best furthers their electrical engineering knowledge. For example, after successful completion on the "Series and Parallel Circuit" (the "if"), the system prescribes that the learner advance to the next "Amplifier" lessons (the "then") because the system has determined that as the next stage of the learning trajectory. When a learner inputs the correct decision, they are prompted with the optimal selection the system deems as best advances their learning. Alternatively, a wrong selection constrains the choices for the learner and reduces the complexity of the process to a few select decisions. In doing so, the adaptive system implements artificial intelligence to prescribe the optimal path the learner should take based on the previous input from the learner (Hampton & Graesser, 2019).

Figure 3

Autotutor as Applying Prescriptive Decision-Making



Example of Prescriptive Decision-Making

Case-Based Decision-Making Theory

Case-based decision-making theoretical foundations

The literature suggests case-based decision-making theory (CBDMT) is another problem-solving approach individuals employ within domain practice (Gilboa & Schmeidler, 1995). The premise behind CBDMT is that individuals recall previous experiences which are similar to the extant issue and select the solution that yielded a successful resolution (Huang & Pape, 2020; Pape & Kurtz, 2013). These cases are often referred to as 'repeated choice problems' whereby individuals see available actions as similar between the new problem and prior experiences (Ossadnik et al., 2013). According to the theory, memory is a set of cases that consists of the following constructs: problem, a potential act chosen in the problem, and ensuing consequence. Specifically, "the memory contains the information required by the decision-maker to evaluate an act, which is specific to the problem" (Ossadnik et al., 2013, p. 213). A key element in a case-based approach to decision-making includes the problem features, the assigned weights of said features, and observed consequences as a reference point for the new problem (Bleichrodt et al., 2017).

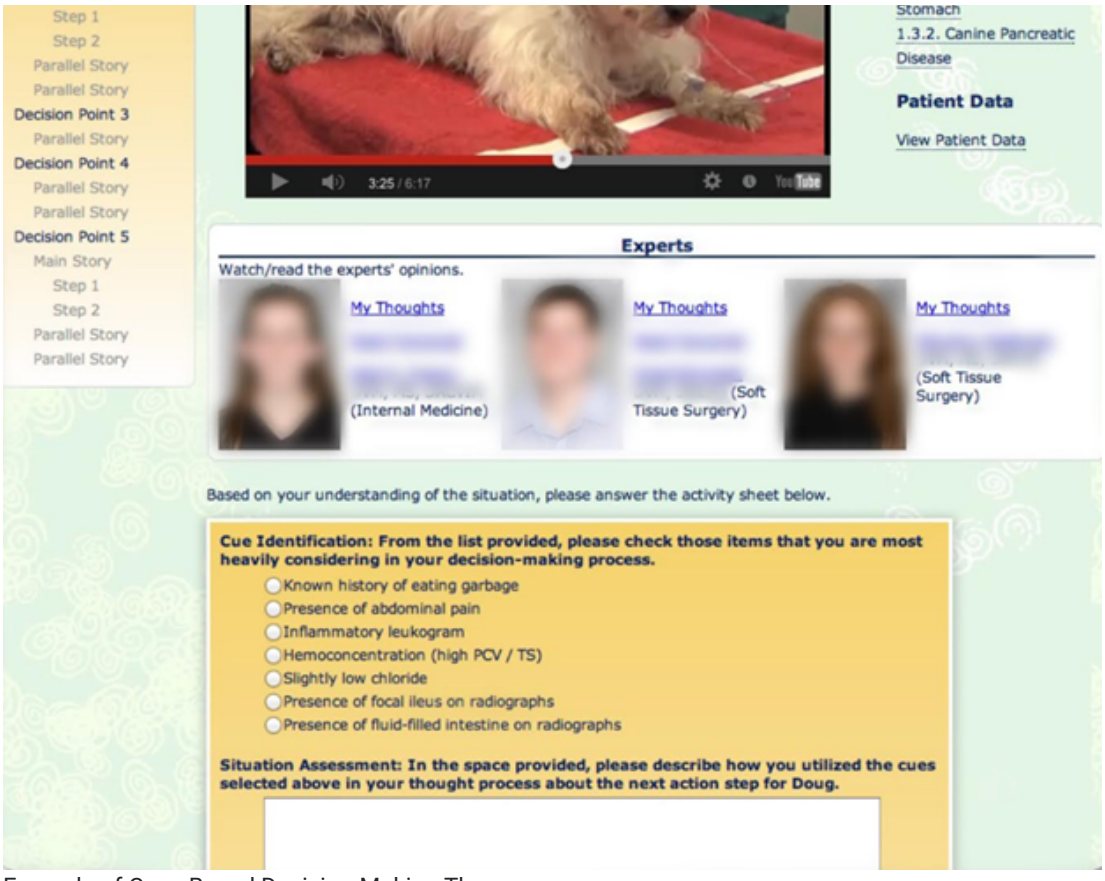
The CBDMT approach is similar to the normative approach to decision-making in that it describes how learners make a summative approach to decision-making; however, it differs in that it explicates how one leverages prior experience to calculate these values. Moreover, the value of a case for decision-making is evaluated through a comparison of related acts of other known issues when the new problem is assessed by the individual. Specifically, Gilboa and Schmeidler (1995) propose: “Each act is evaluated by the sum of the utility levels that resulted from using this act in past cases, each weighted by the similarity of that past case to the problem at hand” (p. 605). In this instance, utility refers to the benefits of the decision being made and the forecasting of outcomes (Grosskopf et al., 2015; Lovallo et al., 2012). The individual compares the new case to a previous case and then selects the decision with the highest utility outcome. As one gains expertise, CBDMT proffers one can “combine variations in memory with variations in sets of choice alternatives, leading to generalized versions” (Bleichrodt et al., 2017, p. 127)

Case-based decision-making theoretical application

Because novices lack prior experiences, one might argue it may be difficult to apply CBDMT in learning design. However, the most often applied approach is by leveraging narratives as a form of vicarious experience (Jonassen, 2011a). In one example by Rong et al. (2020), veterinary students are asked to solve ill-structured problems about how to treat animals that go through various procedures. As part of the main problem to solve, learners must take into consideration the animal’s medical history, height, weight, and a variety of other characteristics. To engender learners’ problem-solving, the case profiles multiple decision points, and later asks the learners to make their own choice and justify its selection. Decision-making is supported through expert cases, which serve as vicarious memory and encourage the learners to transfer the lessons learned towards the main problem to solve (Figure 4). In doing so, the exemplars serve as key decision-making aids as novices navigate the complexity of the ill-structured problem.

Figure 4

Video Exemplars as Applying Case-Based Decision-Making Theory



Example of Case-Based Decision-Making Theory

Discussion and Implications for Design

Theorists of education have often discussed ways to foster various elements of ill-structured problem-solving, including problem representation (Ge et al., 2016), information-seeking (Glazewski & Hmelo-Silver, 2018), question generation (Olney et al., 2012), and others. While this has undoubtedly advanced the field of learning design, we argue decision-making is an equally foundational aspect of problem-solving that requires further attention. Despite its importance, there is very little discourse as to the nuances of decision-making within learning design and how each perspective impacts the problem-solving process. A further explication of these approaches would allow educators and designers to better support learners as they engage in inquiry-based learning and similar instructional strategies that engender complex problemsolving. To address this gap, this article introduces and discusses the application of the following decision-making paradigms: normative, descriptive, prescriptive, and CBDMT.

The above theoretical paradigms have implications for how these theories align with other design approaches of learning systems. In many instances, scaffolds are designed to support specific aspects of problem solving. Some systems are designed to support the collaborative process that occurs during inquiry-based learning (Noroozi et al., 2017), while other scaffolds outline the argumentation process (Malogianni et al., 2021). Alternatively, learning environments may embed prior narratives to model how practitioners solve problems (Tawfik et al., 2020). While each of these theories supports a critical aspect of problem solving, there are opportunities to further refine these learning systems by more directly supporting the decision-making process. For example, one way to align these design strategies and normative decision-making theories would be to outline the different choices and probabilities of expected outcomes. A learning system might embed supports that outline alternative perspectives or reflection questions, but could also include scaffolds that explicate optimal solution paths as it applies a prescriptive decision-making approach. In doing so, designers can simultaneously support various aspects of ill-structured problem solving.

There are also implications as it relates to the expert-novice continuum, which is often cited as a critical component of problem-solving (Jonassen, 2011a; Kim & Hannafin, 2008). Indeed, a body of rich literature has described differences as experts and novices identify variables within ill-structured problems (Jacobson, 2001; Wolff et al., 2021) and define the problem-space within contexts (Ertmer & Koehler, 2018; Hmelo-Silver, 2013). Whereas many post-hoc artifacts have documented outcomes that describe how novices grow during inquiry-based learning (e.g., concept map, argumentation scores), less is known about *in situ* decision-making processes and germane design strategies novice learners engage in when they are given problem-solving cases. For example, it may be that novices might benefit more from a prescriptive decision-making design strategy given the inherent complexity and challenges of cognitive load presented within an inquiry-based learning module. Alternatively, one might argue simulation learning environments designed for normative decision-making would make the variables more explicit, and thus better aid learners in their choice selection when presented with a case. The simulation approach often employed for normative decision-making might also allow for iterative decision-making, which may be especially advantageous for novices that are newly exposed to the domain. A further understanding of these decision-making approaches allows educators and designers to better support learners and develop systems that emphasize this higher-order learning skillset.

As learners engage in information-seeking during problem-solving, it follows that a choice is made based on the synthetization of multiple different sources (Glazewski & Hmelo-Silver, 2018). Future explorations around information seeking and decision-making would yield important insights for problem solving in multiple respects. For instance, the normative decision-making approach argues individuals assign values to various attributes and use this assessment to make a selection. As learners engage in inquiry-based learning, designers can use understanding of normative approaches to determine how individuals search for information to satisfice an opinion, use this to assess the probability of an action, and the resulting choice. From a descriptive decision-making approach, learners weigh various information sources as they seek out an answer that satisfices. Finally, a case-based decision-making theory approach may find learners search for information and related weights for the following: problem ($q \in Q$), a potential act chosen in the problem ($a \in A$), and ensuing consequence ($r \in R$). Although the design of inquiry-based learning environments often overlooks the intersection of information-seeking approaches and decision-making, a better understanding of the role of theory would aid designers as they construct learning environments that support this aspect of problem solving.

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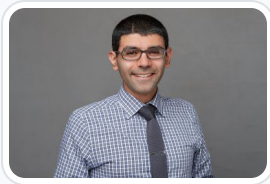

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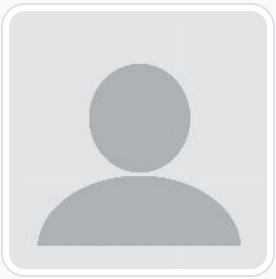

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The Disruption to the Practice of Instructional Design During COVID-19

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Online Learning | Learning Theory | Education | Instrument Design | Curriculum Design | Instructional Technology | COVID-19

THE JOURNAL OF APPLIED INSTRUCTIONAL DESIGN

A thematic analysis of interviews conducted with 33 instructional designers revealed impacts to instructional design practice during COVID-19 including: differentiating emergency remote teaching from well-designed instruction, the increasing visibility of the instructional design role, challenges with social connections, increasing workloads, and additional challenges related to time, access, resources, and remote learning. Findings suggest the role of instructional designers will be more visible post-pandemic, with participants viewing the future of instructional design as full of emerging opportunities.

Introduction

This article details the experiences of practicing instructional designers (IDs) during the rapid shift from largely in-person to largely on-online experiences during the COVID-19 pandemic. Authors additionally spend time proposing implications for practice so that the lessons learned can be applied and further research can continue with this paper as a catalyst. The research methods, findings, and discussion are outlined below.

With the vast changes the pandemic has had on the role and practice of instructional designers, it is important to examine the perspectives of instructional designers working in the field. The article explores instructional designers' perceptions of the impacts to and changes in the practice of instructional design in a time where practitioners found themselves rapidly moving content online in suddenly very visible roles in their organizations.

Guiding Research Question

Practicing instructional designers were asked to reflect on the following question related to their experiences during the COVID-19 pandemic:

1. How do instructional designers perceive the instructional design process has been disrupted by COVID-19?

Supporting Literature

The COVID-19 pandemic drastically altered the lives of individuals - disrupting personal relationships, work, education, the economy, how people spent their time, and both physical and mental health (Kessel et al., 2021). COVID-19 resulted in an unprecedented move to online learning, and in the shift to emergency remote teaching (ERT) within the public and private sectors, instructional designers, who were already situated at the intersection of teaching and learning online (Bessette, 2020), suddenly found themselves working quickly to figure out how to best support their stakeholders in a rapidly changing learning environment (Xie et al., 2021; Whittle et al., 2020). Prusko and Kilgore (2020) noted that during the pandemic, stories of "compassion fatigue" were common in the workplace, and this was no different for instructional designers, who had to help instructors move their courses online while listening to instructor frustrations, working long hours, and feeling overworked under the tremendous pressure of ensuring both academic and business continuity for their organizations.

While the role of instructional designers has not always been understood, the shift to online learning during the pandemic made the importance of instructional design very visible (Pilbeam, 2020; Prusko & Kilgore, 2020). Hodges et al. (2020) point out the important differences between ERT and carefully planned online learning; the former lacking in the careful planning usually given to online courses and programs which, when well designed, create learning experiences that are as effective as learning in a face-to-face environment. During the pandemic, instructional designers were building relationships in their communities, gathering and organizing resources, designing and delivering workshops to help their constituents learn how to teach with technology, providing support and advocating for their profession (Xie et al., 2021); however, they did not have the time to carefully design learning experiences in the same manner they normally would when given a regular course development cycle, which could take months (Hodges et al., 2020). Educators are starting to reflect on the impact of the COVID-19 crisis on education, and have recognized that more online teaching may become part of the new normal (García-Morales et al., 2021). With digital education expected to be a regular part of the instructional landscape, instructional designers, who were "acknowledged as a necessity" (Maloney & Kim, 2020, para. 5) during the pandemic, will continue to be in demand as digital learning partners within their organizations, in both higher education and corporations, to successfully create and support the delivery of online instruction as it becomes a regular part of how teaching and training is delivered.

Methodology

Participants

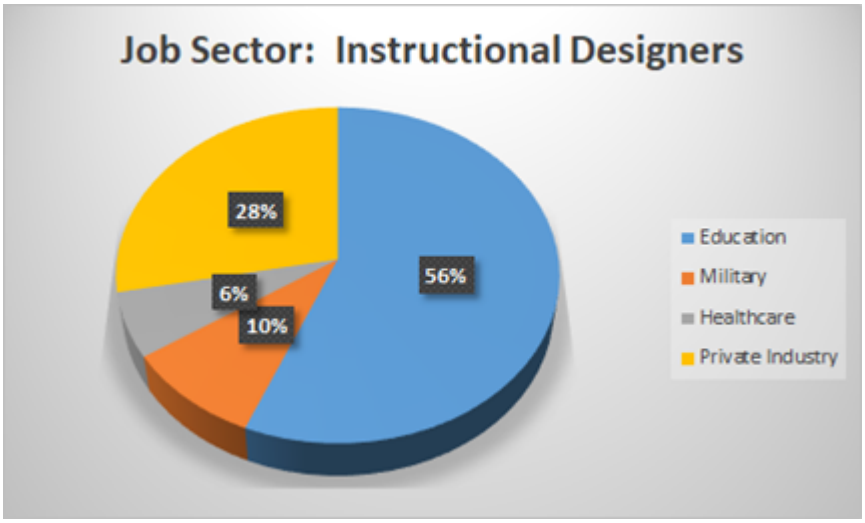
Graduate students at a large Research I University taking an Introduction to Instructional Systems Design course are asked to interview an instructional design practitioner as part of their final course project, thus participants in this study were selected by students, based on their contacts and networks, for the interview. The instructor then ensures that interviewees are currently practicing instructional designers. The 33 instructional designers interviewed, selected through a convenience sampling method, represented multiple job sectors, including higher education, healthcare, military and private industry. Interviewees consent to the interview with the understanding that a meta-analysis of themes from these interviews may be used for research purposes, and as part of the interview process, interviewees sign an interview consent form acknowledging that their responses may be used for research purposes.

Participants' Work Context

The 33 instructional designers interviewed represent multiple sectors of practice (see Figure 1 below). While the majority (56%) are practicing in educational settings (higher education public, private and community colleges), another 28% work in private industry in settings ranging from manufacturing to consulting firms, with representation from the healthcare industry and the military as well.

Figure 1

Job Sectors Represented by the Instructional Designers Interviewed



Pie chart depicting the job sectors represented by instructional designers interviewed in this study.

Data Collection Procedures

Students are given a standard set of questions (Appendix A) to ask during the interview, and as part of the interview process, students submit both a final paper and presentation comparing the theories learned in class to the practice of instructional design; students also submit their interview notes as an additional resource to supplement the interview. Several of the questions during the interviews conducted between March and June 2021 were directly related to the experience of instructional designers practicing during the COVID-19 pandemic, and responses were combined to answer the research question posed for this article. After vetting the interviews to ensure that all interviewees were unique, and that the interviewee addressed how the practice of instructional design was impacted by the pandemic experience, 33 interviews were deemed usable for the analysis.

Data Analysis

As this research is grounded in interview data, we applied a qualitative research approach (Creswell & Creswell, 2018) to analyze the interviewees' experiences as instructional designers practicing in a pandemic, and used inductive reasoning from the interview components, which included a combination of student papers, interview notes and presentations. We specifically examined the interviewees' responses to the pandemic related questions. Dividing into two teams, the authors reviewed the interview components relevant to pandemic related questions to ensure we had a shared understanding of the themes and observations emerging from the interview data and developed our codes collectively. An analysis template was created in Google Sheets, with participant types and data coded during a first pass of analyzing the data with each author primarily responsible for part of one semester's dataset, and all authors responsible for double checking themes and codes that emerged from each semester's data. While interviews can vary in how they unfold, interviewers asked specific questions to gather data in a purposeful manner, with themes for this paper emerging under the umbrella of specific questions related to the experiences of instructional designers during COVID-19.

Results

The research question addressed was: "*How do instructional designers perceive the instructional design process has been disrupted by COVID-19*?" In analyzing the responses, clear impacts were noted for the ID profession, challenges were documented that arose during the crisis, and opportunities were also observed.

Major Category 1: Pandemic Impacts

The interviews revealed a number of immediate impacts to the way training and instruction was designed, delivered and supported in an emergency remote instructional situation, the role of the ID, disruptions to social connections and the workload of instructional designers during the pandemic.

Impacts when Emergency Remote Teaching (ERT) is equated with Online Instruction

The most obvious instructional impact during the pandemic was the rapid and unexpected shift in modalities from in-person to fully online instruction, both synchronously and asynchronously, across educational and business/training environments. One participant felt this shift would create a future expectation of increased online learning availability, ". . . this shift is now going to force the university into providing more online offerings, because this has now become the student expectation." The same participant also cautioned, ". . . that there is a huge difference between providing . . . meaningful online learning experiences and offering online courses in response to a crisis or disaster." There has been much discussion among instructional designers around the worry that instructors and learners forced into ERT during the pandemic might increase negative feelings about online teaching and learning (Hodges et al., 2020). Those who were resistant to online instruction may use their experiences during the pandemic as one participant in this study noted to "believe that is all online learning has to offer." The same concern has been shared by designers around the students' experience of learning online during the pandemic. One participant shared, "In the same vein, students who experienced online courses during the COVID-19 pandemic may broadly attribute negative experiences to all online courses, when they know that just as with face-to-face courses, one course experience does not define all course experiences in that modality."

Impacts on the Role of the ID

Instructional designers mentioned there was a large shift in their role during COVID-19. They had to approach their role differently under challenging time constraints, with a sudden and vast shift in the amount of ID work needing to be completed. As one interview participant observed: "Suddenly, IDs became very popular; their uniquely positioned skillset that comprises the knowledge of technology to support distance learning and the knowledge of effective pedagogy for successful learning outcomes." Another participant noted that the pandemic meant that IDs that may have not worked together before began collaborating "to assist with the increase in requests and centralize support, and various groups have come together as a support network." Further, IDs had to let go of old models and embrace more agile models, with participants mentioning in their interviews how they had to rapidly pull online instruction together, not always systematically following their preferred ID model. IDs also had to prioritize differently which projects would get done; as one participant noted: "This sudden change in learning environments caused some things to have to get prioritized over others, and some items had to be placed on the back burner."

Social Connection Impacts

Some negative impacts to social connections were mentioned around the lack of being able to read body language and interpret tone of voice, both in designing and delivering instruction. One participant offered "that less in-person contact keeps learners and facilitators from building social connections with one another and that online instruction does not allow facilitators and learners to read one another's body language and tone of voice." One participant who was new on the job had never met his team in person, stating he missed the casual conversations that happen in the hallways or at the "watercooler" that would have helped him feel more a part of the work culture. In contrast, some positive impacts to social connections were also reported around increased access to stakeholders; as mentioned by a participant, "the pandemic has increased the acceptance of virtual meetings, often held on a video conference platform such as Zoom. While technology like this has made it easier to connect with stakeholders, it may also be a crutch for the future of collaboration." Positive impacts to internal social connections were depicted by a participant as "their team and faculty adapted to virtual development meetings, gave each other grace, and accomplished goals as intended. Notable changes included rapport was built more quickly, as both faculty and IDs took time to check in on each other's mental

and physical health during meetings and discussions touched on family members or what was observed from each other's backgrounds or home surroundings."

Workload Impacts

As with social connections, workload was discussed by participants in both a positive and negative light. Some participants mentioned using the time they would have taken traveling back and forth to work each day as extra time they could dedicate to getting work done. With travel halted, they "actually had more time to focus on instructional design work." Some negative impacts mentioned were around increased workload such as helping with increased training needs. One designer working in a higher education context emphasized:

> *that more time is needed to acclimate faculty who are new to some of the software and hardware programs that they need to use to meet and work seamlessly. They must accommodate varying schedules and occasionally had to elongate development times due to instructors' competing priorities. They were always exploring ways to modify, improve, and update their processes to ensure they can meet the needs of students and instructors. Rapid design and agile models have been considered in the past and they are currently being explored. As noted previously, the challenge is the time commitment.*

Participants reported that clients expected training to be designed and delivered online very quickly. One participant mentioned, "we have received a lot more requests for eLearning. We have also done a good deal of rapid design to get the volume of information needed by our learners out to them quickly."

Major Category 2: Pandemic Challenges

The interviews revealed a number of challenges faced by instructional designers that flowed from the impacts of instructional delivery changes under extreme time pressures and increasing workloads. Instructional designers found themselves overwhelmed with support requests with a lack of time to design instruction carefully, challenges for both themselves and their learners in accessing technology, resource and staffing challenges, and the challenges of both IDs and SMEs and instructors and students only being able to meet from a distance.

Time Challenges

Clearly, the instructional design professionals in this study saw challenges around time to be some of the most impactful, with one participant noting that "my time would be the thing most disrupted by the pandemic, meeting the needs quickly to get online." Time (or lack thereof) played a role in their ID work in a variety of ways, including taking shortcuts on applying all aspects of ID models such as ADDIE. The incredibly quick shift to online learning was overwhelming at first. One instructional designer explained how they were working furiously to transition their own courses in the graduate school to online modules while helping others to do the same, and struggling to find the time to do so. Others noted that they were caught in a crunch as the needs for online learning development increased when at the same time the urgency for getting them completed increased. As one ID noted, "clients wanted much more training on a more rapid timeline." One instructional designer in higher education emphasized that more time was needed to acclimate faculty who were new to the software and hardware needed to do their work, stating: "We had to accommodate varying schedules and occasionally had to elongate development times due to instructors' competing priorities." In many cases, IDs also had to update their own skills. The need to find ways to modify, improve, and update their processes to rapidly meet the needs of students and instructors was a constant issue, and rapid design and agile models gained more attention from designers as they struggled to manage their time with all of the demands placed upon them (Czeropski & Pembrook, 2017).

Access and Communication Challenges

Instructional designers, especially those involved in education, often had frustrating issues with access and therefore, were concerned not only with their ability to work with SMEs, but with instructional equity for their learners. One participant noted that his biggest challenge was around the inequity of internet availability and consistency, stating that "some students live in rural areas that do not have access to sufficient internet speed to be able to use online

instruction." This meant that students not only had issues accessing course material, but also challenges in accessing their instructors. Access issues such as these lead to issues of equity as often the students affected are already maneuvering disadvantages and the pandemic acted to magnify these. Through no fault of their own, some students had bigger hurdles to leap in order to succeed (Nguyen et al., 2020). Instructional designers outside of educational institutions also experienced challenges with access and communication. Participants noted that the social distancing and group gathering rules made it difficult not only for the learner, but for the design process, as access to the SMEs needed to create course content was impacted. As mentioned by one interview participant who was reflecting on the challenge of working with others to design courses: "Due to COVID, the ability to build these strong, personal connections has become difficult. This has in turn caused overall communication and getting people on board with certain project ideas more difficult."

Resource Challenges

During the pandemic, access to adequate resources came up as a challenge with instructional designers. Some institutions and businesses were ready when the crisis hit and had all of the technological tools needed in place for employees to do their jobs even with the pandemic shifting instruction online. Others had to acquire tools (software and hardware) and sometimes knowledge (requiring financial resources for training) to do their work at a distance, often competing with other needs. Some participants noted they were able to get additional resources if articulating the need to their company; one interviewee stating "they can find that budget if you can explain well and they sense the importance." Even when getting money for needed resources, nationwide computing shortages (Caine, 2021) added to the problems as even obtaining needed resources to work remotely became challenging with supply chain issues.

Staffing Challenges

The needs brought on by the pandemic were so swift that there was not enough time to get people in place to do the work. IDs noted that they often had to collaborate with other units to complete work and build an adequate support network. While some employers were able to hire to meet increased demands on IDs, others suffered staffing reductions. The pandemic hit some businesses hard and the work stoppages in one sector affected others. Sectors such as restaurant and travel were some of the hardest hit, with one participant stating "a major impact of the pandemic on the office has been the reduction in staff, from a team of seven down to a team of four. There is no timeline for when the office can expect to be fully staffed again in the future." Staff changes also translated to issues with onboarding. As a new employee, one designer was "thrown into a strong culture while never meeting his team members in person," noting that joining a new team "was a difficult task socially, however professionally, they were able to complete tasks and continue to communicate effectively." Virtual onboarding needs have caused businesses to alter their onboarding processes (Prince, 2021).

Challenges of Working and Learning at a Distance

Businesses that continued work during the pandemic saw massive increases in training needs (Lohr, 2020). As one participant put it "events like a deadly virus actually prove there are even greater needs for training as the new way of work, like working from home without the supervision of leaders, reveals cracks in the foundation, aka, training needs." But the challenges associated with needing to be apart from one another were apparent. A designer for the military noted that it was difficult to complete large-scale operations due to restrictions of both group size and proximity. Another noted the difficulties this situation created when working with SMEs, with one participant observing "it is the job of the ID to guide the instructional project based on the identified learning outcomes, in cooperation with an SME. If all three participants are unable to meet in person, there may be a disconnect between the goals of the client and the understanding of the ID and SME." Distance affected learning, too, as there were impacts on the social connections of learners, as discussed earlier.

Implications for Practice

The findings of this study suggested that COVID-19 significantly impacted the current work of instructional designers. During the pandemic, interviews with IDs revealed a number of immediate impacts to the way training and instruction was designed, delivered and supported while recognizing the increasingly visible role of the instructional designer. Challenges such as increasing workloads, the need to leverage more technology and the need to design at scale for flexible and online instruction were recognized during the pandemic. The pandemic also presented IDs with opportunities that can positively shape the future of this increasingly visible profession; opportunities to collaborate with stakeholders to design truly engaging instruction in a variety of settings, from higher education to corporate environments.

Implications for Practice 1: Considering the Flexibility of Instructional Design Models

All of the practitioners interviewed for this study followed an instructional design model, with ADDIE, or some version of it, being the most commonly used. Several of the instructional designers interviewed mentioned being more agile and flexible in their applications of ID models during the pandemic, and while they expect to continue to follow ID models in the future, several interviewees noted the need to be more flexible when applying ID models to practice. In additional to a strong foundation in learning theory and instructional design models, instructional designers also need excellent communication and other soft skills (diplomacy, persuasion, emotional intelligence) to work with a variety of other subject matter experts (SMEs) (Ritzhaupt & Kumar, 2015), and several practitioners mentioned the necessity of applying any ID model within a framework of collaboration and empathy.

Implications for Practice 2: The Increasing Visibility of the Instructional Design Profession

That the visibility of the practice of instructional design has forever changed was a consistent theme from the interviewees. What may have felt, as one of the interviewees described, as “invisible labor that happens behind closed doors,” is now strikingly visible. Perhaps the work of IDs had indeed not been well-understood (Pilbeam, 2020; Prusko & Kilgore, 2020); however, the shift to online instruction during the pandemic, with the often poorly designed remote emergency teaching and training those individuals experienced, has clearly raised the visibility of the need for a solid ID process to design hybrid and online instruction.

Implications for Practice 3: Clearly Differentiating Emergency Remote Teaching (ERT) from Online Instruction

The online design and instructional experience quickly gained by instructors during the pandemic is quite different from following an intentional design process where the work has been planned well in advance with carefully crafted activities, measurements and the learning experience in mind. Because of the negative experiences that many had especially early on in the pandemic as recipients of educational or training experiences delivered with last minute planning, there remains a need for practitioners to clearly articulate for all stakeholders the difference between ERT, and courses and experiences designed with an appropriate amount of time. With that said, there have been some very valuable lessons learned for those designing and instructing during ERT times, and it is important to ensure those lessons learned do not fade away. Instructional designers worked hard during the pandemic to make remote work feasible, creating efficiencies when meeting with SMEs and often adding in more checkpoints within the ID process. They learned to flex ID models when needed and to be more iterative in order to respond to the scale of the need. While high-quality online instruction takes time and resources to support the design, delivery, and evaluation of courses, and requires revision for continual improvement, IDs made it work during the pandemic.

Recommendations for Future Research

Instructional design practice during the pandemic created some unique challenges and opportunities that lead to practices and approaches that require long-term consideration.

Instructional Design Models

While ADDIE was the model most often relied on by the instructional designers interviewed, the practice of applying ID models during the COVID-19 pandemic was impacted significantly by the pressures of time, and while many IDs kept their ID frameworks as a touchstone, the interviews suggested that more agile approaches were being used in actual pandemic practice. Practitioners were embracing newer ID models out of necessity, and a question for ID practitioners remains: when the dust settles from the pandemic, what will be the ID model followed? The pandemic experience necessitated the application of agile practices, the embrace of newer ID models and/or a very non-linear application of existing models. Future research needs to consider what instructional design models fit the new era of instructional design and ask; is it time to retire, re-embrace or revise ADDIE? And as many ID practitioners experienced when dealing with exhausted stakeholders during the stress of the pandemic, should future ID models be grounded within the context of empathy?

Create Standardized Intake Forms for ID Assistance for Instructors

Instructional designers during the pandemic had to assist an extraordinary amount of people in an incredibly short amount of time with limited resources. Some interviewees mentioned creating checklists or handing out guides for SMEs they worked with to help move along the intake process for creating instruction. Future research could look more closely into how practitioners could create guided help for non-ID practitioners; creating forms or templates that guide others to give their ID input in a way that makes the IDs work more efficiently. If IDs had questions in advance for people to respond to within their contexts that could help them get ahead in the actual instructional design process, it might assist IDs in managing a heavier workload. During COVID-19, instructional designers were asked to do “all the things;” maybe future expectations of SMEs would help them do more of the front end of the ID process, a process that many SMEs came to appreciate more during the pandemic.

Resilience Ready IDs

Some interviewees noted that “it didn’t affect me” or their organizations when the pandemic hit, indicating that they did not feel the impact within their training and teaching space. Why was that the case? An interesting research question would be to dig deeper into why some interviewees and/or organizations did not seem as impacted. Is it because they were already fully online? Were they simply already technology savvy with a solid fluency in the practice of instructional design to the extent that big changes did not impact them? Were they already well resourced? Were the practitioners simply very resilient individuals? Did they have detailed academic or business continuity plans? Understanding who was more “ready” for a disaster such as the pandemic and why might help inform training for practitioners and groundwork for organizations that could ensure they are ready for any future tectonic plate shift in how learning is done by and for their organization.

Expanding the Conversation

While a few of the interviewees practice within multi-national companies, the majority of interviewees were physically located in the southeast region of the United States. Additionally, none of the interviewees for this study are practitioners in the K-12 instructional/curriculum design space. Future research could include a more geographically diverse sampling of instructional design practitioners, include K-12 practitioners, and consider any additional unique needs and challenges that arose for instructional designers who were creating materials for multi-lingual learners during the pandemic.

Conclusion

While what instructional designers do each day may not have been understood pre-pandemic, those interviewed for this study agreed that the rapid shift to online teaching and training during the pandemic made the importance of good instructional design very visible (Pilbeam, 2020; Prusko & Kilgore, 2020). Moving forward, interviewees believed that more job opportunities will exist for instructional designers across many different organizations as the value of well-designed education and training became increasingly understood during the pandemic. Clearly, the rapid shift to online learning made the importance of carefully designed instruction visible and the role of the instructional designer valued.

The future of instructional design is evolving. Traditional ID models will continue to flex as instructional designers are asked to work on multiple current projects across a myriad of learning environments (face-to-face, hybrid, hyflex and online). Both educational and business environments will increasingly leverage the role of the instructional designer in creating meaningful learning environments that are very different from the emergency remote teaching environments that learners experienced early on during the pandemic. Pandemic lessons learned will be applied, and the future is promising for instructional designers as a key partner in organizational success.

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Expanding Online Professional Learning in the Post-COVID Era: The Potential of the Universal Design for Learning Framework

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Teaching and learning in higher education have dramatically changed during the COVID-19 pandemic. The global health crisis has forced faculty to experiment with virtual teaching in a short amount of time, and students were compelled to learn online. While online instruction during COVID-19 is considered contingent-based virtual instruction, it would be most likely that online courses would be part of the instruction modalities in the post-COVID era. In this article, we document the process of creating an asynchronous online course swiftly, guided by the Universal Design for Learning (UDL) framework. It sheds light on the value of the UDL to expedite the scale-up of online professional learning while sustaining student interaction and engagement.

Introduction

The COVID-19 pandemic led higher education to establish virtual classrooms quickly. In the wake of the global health crisis and the need to continue learning, emergent online instruction created the opportunity to shift higher education from in-person classrooms to a boundless digital realm (Adedoyin & Soykan, 2020; Hodges et al., 2020; Zimmerman, 2020). The shift may continue. A recent survey of students who took emergent virtual instruction during the pandemic indicated they would more likely choose fully online courses or blend them with in-person classes in future semesters (McKenzie, 2021). This situation requires a critical assessment of how to best utilize remote instruction methods without sacrificing learning quality in online education. Indeed, concerns were raised that the rapid transition to online teaching in 2020 would acquiesce to tailored learning outcomes and diminished course quality compared to in-person instruction (Adedoyin & Soykan, 2020; Johnson et al., 2020). With the outlook of online learning being part of

instructional modalities after the pandemic, some universities have started to seriously consider the mission to restore learning and refine online education (Lockee, 2021; McKenzie, 2021).

Prior research suggests that online learning success is associated with instructional design. In many cases, instructors perform in an automatic, intuitive manner and do not know and cannot verbalize accurately what they do or how they do it, which underscores the need to plan and design learning in a more thoughtfully structured way (Hannum, 2012). Despite the criticism against the rigid and time-consuming processes (Gordon & Zemke, 2002, Hannum, 2005, 2012), the traditional instructional design approach is valuable for instructors who are new to online teaching. It has also been instrumental in creating "emergency teaching" during the pandemic. Acknowledging emergency teaching is far from well-designed online learning (Hodges et al., 2020), scholars have explored how the instructional design process can support students in adapting to emergency virtual learning (Biwer et al., 2021, Green et al., 2020) and what the current pandemic online learning experiment means for the future (Weir, 2021). Research indicates the power of instructional design processes that could uplift the quality of online education.

This article aims to explore if the learning design approach can swiftly create an online course without losing student interaction and engagement. Universal Design for Learning (UDL) is a research-based learning design framework that underscores teaching and learning to meet diverse students' needs. It aims to support a broad range of learners who engage in learning and achieve mastery in different ways through multiple means of engagement, multiple means of representation, and multiple means of action/expression (Evmenova, 2018; Meyer et al., 2014). The principles promote flexibility in learning, drawing on an analytics-based understanding of learners to support student learning.

Relying on a case of applying the UDL principles to an upper-level environmental policy course, we offer evidence that this approach led to greater student interactions and high-level engagement in learning materials during the entire semester. The findings provide a deeper understanding of when to alter assignment delivery mode by following the UDL principles. The case also offers insight into refining and expanding online learning in higher education, facing high-level uncertainty after the pandemic. As online learning is capable of much more than emergent virtual instruction during the pandemic, higher education may consider the UDL more proactively to integrate online education as part of instructional modalities while expediting the pace of developing online and blended courses.

Supporting Literature

Universal Design for Learning

Universal Design for Learning (UDL) is a scientifically-based framework for developing curricula that support a broad range of learners. It admits learner diversity as a function of human variability since learners would engage in learning and achieve mastery in different ways (Evmenova, 2018; Meyer et al., 2014). The framework was introduced by the Center for Applied Special Technology (CAST) in the 1990s (Edyburn, 2013), and it underscores the need to design courses that are accessible to students with and without special needs (Rao et al., 2015). UDL forms a redundancy effect and allows for clarity and easier comprehension of instruction (Rose et al., 2005).

Implementation of UDL is hinged upon three principles. The first principle is to use multiple means of engagement. To do so, teachers would need to motivate students, foster collaboration and community, and facilitate personal skills and strategies for self-regulation in online courses. During the pandemic, research finds that students are mostly less motivated compared to the situation before the crisis started, implying the potential benefit of the UDL-based learning environments (Biwer et al., 2021; Son et al., 2020). Second, UDL relies on multiple means of representation. That means teachers present learning content with various formats like text, audio, or video. Additional simulations, interactive websites, or synchronous sessions can elicit greater representation (Evemenova, 2018). The third principle is multiple means of action/expression. Under this principle, teachers need to allow students to demonstrate what they know in multiple ways (CAST, 2018; Rose & Meyer, 2002). As such, students would obtain options to take part in discussions using text, video, etc. Assignments and projects would end under flexible schedules and students can receive feedback

on their assignments multiple times. These three principles enrich any learning environment and ensure the success of all learners.

Implementing UDL is possible in in-person, hybrid, or online learning environments, and online learning can particularly maximize the flexibility of forming UDL-based courses with greater creativity. Various assistive and instructional technologies have made it easier and more efficient to create the redundancy effect by multiple means of engagement, representation of content, and action/expression (Dell et al., 2015). Studies show that videos and narrated presentations (King-Sears et al., 2015), video games (e.g., Marino et al., 2014), and computer-based reading programs (Hall et al., 2015) are exemplary tools to facilitate UDL-based course development. Technologies also help teachers establish flexible assessments in recognition of variability in students' abilities, needs, and preferences (Robinson & Wizer, 2016).

The UDL implementation can also be accelerated by modeling guidelines and checkpoints and when teachers are trained to thoughtfully integrate UDL methods in their lesson designs. Nine guidelines and thirty-one checkpoints were developed with the aid of research-based best educational practices (CAST, 2011; Israel et al., 2014; refer to Appendix 1). Evmenova (2018) suggested that those practices and checkpoints are instrumental in creating UDL-based learning environments in asynchronous online courses, emphasizing the role that faculty training plays in incorporating UDL principles into lesson plans.

UDL is centered around flexibility. Flexibility learning design can sustain students' motivation for learning throughout the entire learning stage. Prior research indicates that students' learning intents are different. These differences usually lead to student preferences for engaging in surface or deep learning through course activities and learning tasks (Johnson et al., 2017; Maina et al., 2012). When enhancing flexibility in learning environments, students can focus on how students approach their learning and what they prefer to know and understand in the subject area (Means et al., 2009). To this end, instructors can ask students to share their feedback about the course assignments or rely on learning analytic mechanisms for necessary modifications. Those approaches would enable instructors to capture student learning strategies, tactics, preferred practices, or patterns systematically and to utilize data and information constructively. For instance, web-based learning analytics allows instructors to understand students' online behavior patterns like posting frequencies or lengths of their posts and use the information in planning, designing, and encouraging online discussions and peer interactions.

Instructional Design Process

Context and Learner Analysis

This section will explain the process of converting the environmental policy course from face-to-face to its asynchronous online delivery, relying on the UDL framework. The course was delivered to a public university in the mid-Atlantic region of the United States. The university has a diverse student body and culture from highly engaging and vibrant student communities. The university is committed to impactful, transformative learning experiences concerning online learning and teaching. During the COVID-19 crisis, the university leadership has committed to offering emergency-based online courses with the full support of the in-house instructional designer team. Since students come from 130 countries and 50 states, the diverse demographic data seem to hint at the potentially hidden demands for high-quality online education during the post-Covid period.

The environmental policy course is required for environmental science and environmental studies students. With the rapidly rising interest in climate change and sustainability, the course draws students from diverse academic disciplines, including communication, engineering, management, etc. The course provides an overview of various environmental policy and sustainability issues, covering biodiversity loss, climate change, pollution, energy transition, and environmental justice.

The in-person course has utilized an active learning pedagogical approach in which students are empowered to do more than just listen to learn as well as engage in reading, writing, and discussing the problem-solving tasks (Bonwell &

Eison, 1991). As part of the active learning strategy, a role-playing activity was included to have students contemplate the true notion of environmental justice. The activity mirrored real-world politics, inducing deep learning of structural injustice and policies designed to address the issue systematically. Student feedback indicates the active learning approach, including in-class discussions and the role-play simulation, as a vital element of learning.

The course conversion to online platforms was planned and offered in 2016. Thirty-six students registered for the first asynchronous online course. Students were primarily full-time between 20-29 years old. One of the third students majored in environmental science and sustainability studies (66.7%). Students also came from public and international affairs (22.2%), global affairs (5%), and other majors (5%). Female students (69.4%) were more than two-thirds of male students (30.6%).

The following sections present the information on the instructional design process with the ADDIE Model. The ADDIE approach was used since it allowed for a more organized workload for both instructors and learners (Allen & Sites, 2012). The sections of the Design, Development, and Evaluation phases were described in order.

Design

Multiple means of engagement

The course was offered on the asynchronous online platform Blackboard Learning Management System (LMS). Facilitation in online courses is the central strategy to motivate students and engage them in deep learning (Evmenova, 2018). In the first half (seven weeks) of the online course, the design approach relied on an individual/reflection mode where everyone has access to each one's assignments. Under this individual/reflection mode, individual reflection was prioritized over group discussions. This way made it easier for the instructor to track each student's learning progress. Feedback or comments on students' reflections was a primary facilitation tactic, and online discussions were also added to give students a sense of the learning community. Establishing a collaborative community of inquiry is known to be essential for building social presence, which refers to the ability to perceive others in an online environment as “real.” Prior research has shown that when social presence is combined with appropriate teaching presence such as instructional design, facility of the course and activities, and direct instruction, the result can be a high level of cognitive presence learning to fruitful critical inquiry (Garrison et al., 2000; Garrison, 2017)

Survey to provide options for sustaining efforts and persistence

Multiple means of engagement provide options for sustaining effort and persistence. Fostering collaboration and community is a strategy to sustain students' motivations in online courses. Teachers are encouraged to incorporate technology in the UDL design cycle to enrich any learning environment and ensure the success of all learners (Castleberry & Evers, 2010, Coyne et al., 2012, Lock et al., 2016; Rao & Meo, 2016).

Relying on the UDL principle, an online survey was executed at the end of the semester. The survey intended to identify whether students were content with the first learning design strategy. The survey was optional, and students were asked to share overall satisfaction with the online course delivery mode. Students were also asked to indicate their preference toward individual/reflection versus group/discussion mode in assignments and online discussions. The survey could inform any demands for small variations of learning tactics during the remaining half of the course. In particular, it could provide a confirmed perspective on how to experiment with the role-playing activity and its corresponding assignment, the stakeholder position paper. Students wrote individual stakeholder papers per stakeholder roles assigned in the in-person format. The papers were instrumental in preparing actual class hearings. The role-playing and stakeholder position paper could be virtually designed in two options: (1) Assignment Type I - Individual/Refection and (2) Assignment Type 2 - Group/Discussion. Table 1 outlines the two assignment options for student interactions.

Table 2

Assignment Options for the Stakeholder Position Paper Delivery

	Assignment Format		
Individual vs. Group Work	Reflection vs. Discussion	Final Assignment Combination	
Assignment Type 1	Individual	Reflection	Individual/Reflection
Assignment Type 2	Group	Discussion	Group/Discussion

* Individual/Reflection versus Group/Discussion

Twenty-five students (69.4%) completed the mid-term survey. Out of twenty-five students, 22 students (88%) indicated that they liked the first half of the fully asynchronous online course. Almost all students (96%) indicated that the course helped them learn about environmental policy. When we asked how we could improve the course later in the second half, 14 students (56%) said no further course improvements were needed. Other remaining students (44%) suggested slight reductions in required readings and enhanced peer-to-peer interactions. Some students suggested required comments on peers' reflection posts that they completed during the first half of the course since peer commenting on online discussions could provide opportunities for more interactions with their classmates. They seemed to miss more real interactions they could have had in traditional in-person instruction.

Development

Relying on students' feedback, we decided to choose a Group/Discussion mode, Assignment Type 2, for stakeholder position paper assignment and online-based Environmental Justice (EJ) case hearing (Table 1). We adopted the collaborative format because fostering collaboration and community is a critical element for enhancing engagement in the UDL-based environments and establishing social presence (Evmenova, 2018; Garrison et al., 2000; Garrison, 2017). While not all students wanted more interactions, still nearly half of students preferred more interactions. Additionally, this discussion-based approach would be closer to the in-person delivery format, fostering students' better understanding of the environmental justice-related complexities and the need to consider diverse stakeholder perspectives. The EJ case was discussing whether or not to locate pollution facilities in a minority community where disproportionate health burdens were observed.

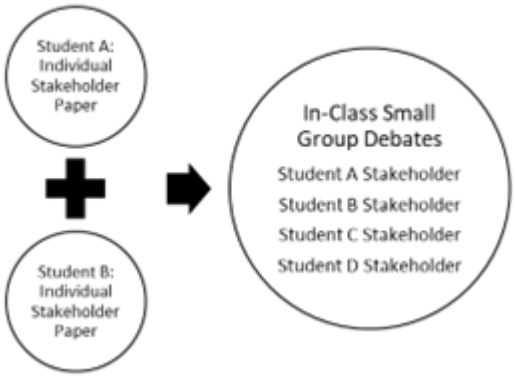
We also added one online discussion where students responded to instructional question prompts. Therefore, the second half of the course converted into a fully collaborative design, including several collaborative assignments (i.e., collaborative paper writing, peer reviews, and online discussion).

Reformatting Stakeholder Paper

The environmental justice case-based stakeholder position paper provided a unique opportunity to experience real-world politics in placing pollution facilities in communities of color or low income. Students in the in-person mode were randomly assigned to one stakeholder and asked to write an individualistic position paper. Students then convened in class to discuss and debate the case in groups, representing assigned stakeholders. The individual stakeholder position paper served as a vehicle for students to organize their ideas before the hearing.

Figure 1

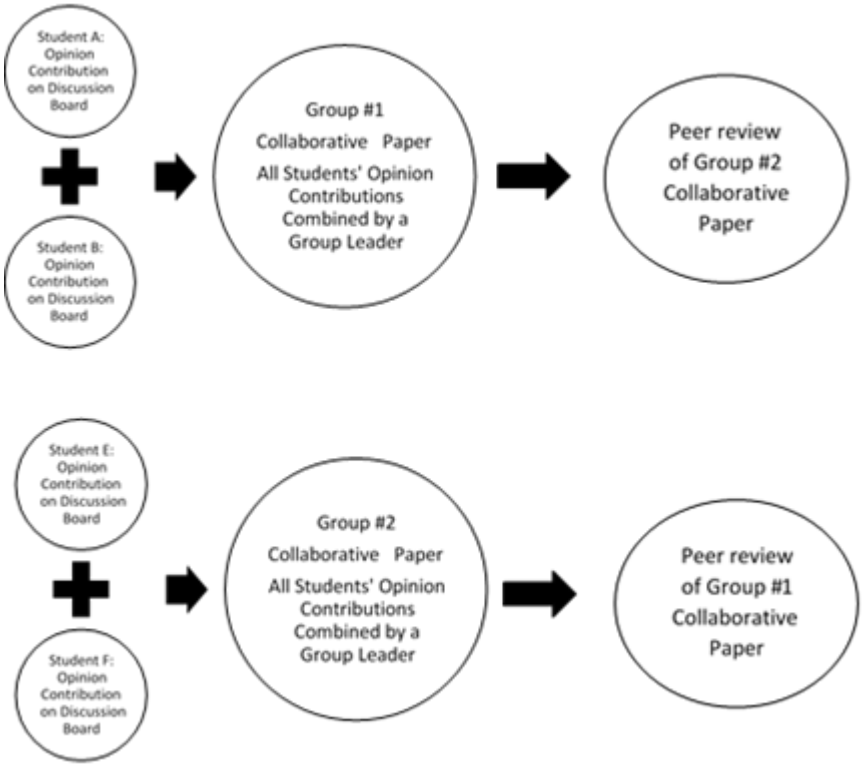
Stakeholder Position Paper Assignment Design in Face-to-Face Class



Students were similarly assigned into stakeholder groups in redesigning the assignment in the online mode. They were then asked to post position-based opinions, advocating their assigned roles. On a discussion forum, six groups were created. Students were then invited to post their contributions to their group discussion threads. After all students in a group shared their opinions, a group member volunteered to develop the group's collaborative position paper by synthesizing information. Group-based position papers were posted on the Discussion Board, and all students can access other groups' papers. Each group participated in further peer-review discussions to provide critique and comments on other groups' stakeholder papers.

Figure 2

Stakeholder Position Paper Re-Design for Asynchronous Online Delivery



Evaluation

Student Participation, Interaction, and Engagement

We used the Blackboard learning analytics to explore students' interaction and engagement levels after group and discussion-based assignments, and a collaborative design approach was taken in the second half. The Blackboard learning analytics data provides critical information about students' online behavior on technology-enhanced platforms (Becker, 2013; Harindranathan & Folkestead, 2019). We tracked students' participation, levels of interaction, and engagement.

We examined the number of hours students spent online during the first half of the course when the individual/reflection mode was used to measure students' participation. Then, we compared the numbers with the hours they spent in the second half of the group/discussion mode. The results revealed that students were more active during the second half and spent more time (n=711.23) when compared with the first half (n=546.76). Each student spent more time reading other students' posts and the course content during the second half of the course. Table 3 shows the total and average time students spent online. The table also indicates which weekdays were more and less active.

Table 3

Amount of Time Students Spent Online (n=36)

	Total Time	Average Time	Highest Active Day	Lowest Active Day
Week 1-7	546.76 hrs	14.78 hrs	Tuesday: 266.77 hrs	Saturday: 18.57 hrs
Week 8-14	711.23 hrs	19.22 hrs	Tuesday: 278.19 hrs	Saturday: 41.45 hrs

* Time calculation is in hours.

Following Kim et al. (2016), we also measured students' level of interaction by analyzing the frequency of their posts on discussion boards (Kim et al., 2016). The level of engagement was analyzed by the length of students' posts on the discussion board (Kim et al., 2016). We compared the data for interaction and engagement before and after the midterm survey by running descriptive statistics.

We also examined differences between students' interactions and engagement in online discussions, collaborative group paper writing, and peer reviews. There were two online discussions, the first discussion was in the 3rd week, and the second discussion was in the 11th week. Both online discussion board activities required students to respond to prompts and comment on peers' posts. The collaborative stakeholder position paper is another design element for group-based discussion.

Figure 3 below shows the combined average results for two online discussions, the average for peer reviews, and the collaborative paper writing. The results revealed that there was a difference between the two online discussions. The average number of posts per student in the second online discussion was higher than the first one (see Figure 3). In addition, the results revealed that students posted more during their discussions on writing a collaborative stakeholder position paper than they did during the peer review. Also, students interacted more when they worked in small groups with collaborative and creative tasks such as writing a paper (see Figure 3).

Figure 3

Students' Interaction Level by the Type of Assignments in the Course (n=36)

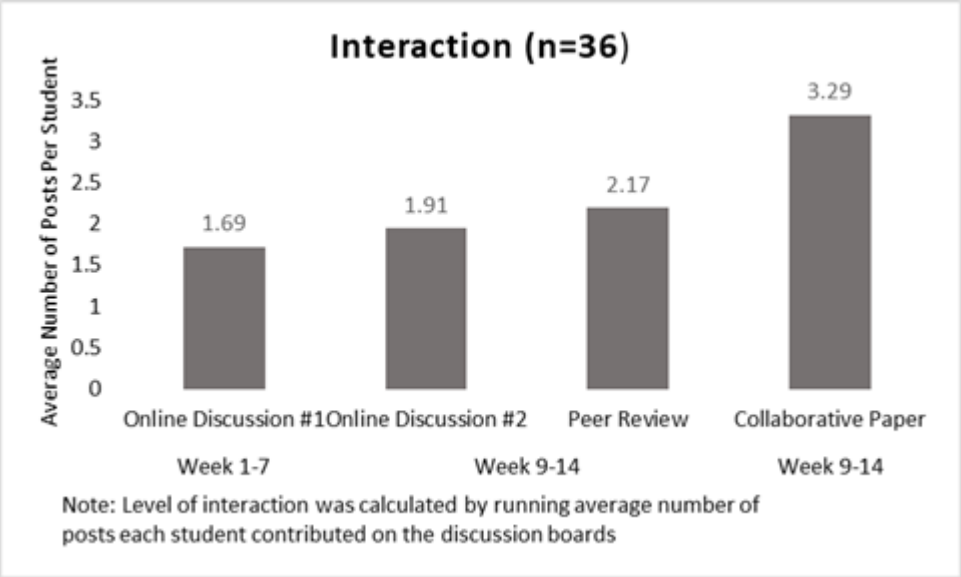
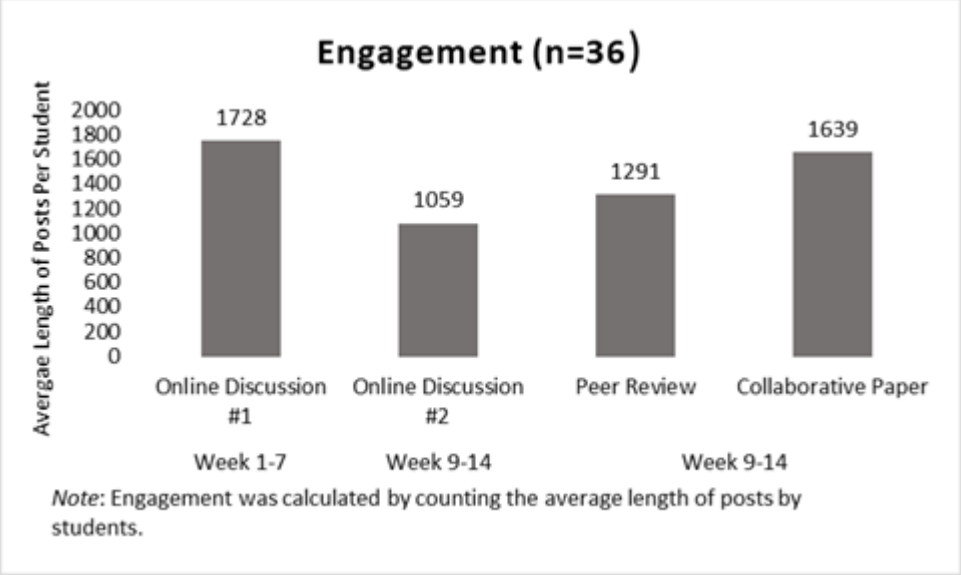


Figure 4 below shows the differences in student engagement across two online discussions, peer review activity and collaborative paper discussions, and the lengths of each student's posts were measured. The results revealed that students were more engaged in the first online discussion with the average number of words per student (n=1,728) than in the second online discussion (n=1,059). The decreased engagement may relate to additional collaborative activities during the second half of the course, such as stakeholder paper discussions. We compared differences between students' levels of engagement in online discussions, peer review activities, and collaborative paper discussions. We found that students' engagement levels increased in collaborative paper discussions (n=1,639), indicating that the UDL approach helped sustain student engagement throughout the semester.

Figure 4

Students' Level of Engagement by the Type of Activity in the Course (n=36)



Course Evaluation

As part of faculty performance evaluation, the university conducts student evaluations to measure the course quality and teaching effectiveness at the end of each semester. Students participate in the survey voluntarily and anonymously. The course evaluation survey allowed us to assess students' satisfaction with the course quality and teaching

effectiveness. Twenty-three students (63.8%) completed the institutional course evaluation survey. The survey contained 16 questions using a 1-5 Likert scale regarding course organization and planning, communication and faculty/student interaction, assignments, exams, grading, course delivery, and overall course and teaching rating. The survey also asked to answer the two open-ended questions. The questions are, "what aspects of the course and how it was taught helped you learn?" and "what modifications do you suggest if the course is taught next time?"

The evaluation analysis revealed that students rated teaching effectiveness (*M*=4.64; *SD*=0.65) and course quality (*M*=4.43; *SD*=0.79), reflecting students' overall satisfaction with the course. The high evaluation scores combined with the analysis of Learning Management Analytics indicated the course conversion from a face-to-face to an asynchronous online course was successful. Students shared their satisfaction with assignment types, indicating that assignments generally helped them learn the materials (*M*= 4.68; *SD*=0.57). Concerning the instructor's facilitation role, students answered that the course instructor encouraged students to be actively involved in the material through discussion (*M*=4.78; *SD*=0.52). Students also stated that course requirements and expectations were clear (*M*=4.87; *SD*=0.34), the course was well organized (*M*=4.91; *SD*=0.29), and the grading policy was clear (*M*=4.78; *SD*=0.42). Some students shared their qualitative comments about the online delivery mode. For instance, one student said:

> *I enjoyed the independence of this course. The material allowed me to either explore the topic further or do what I needed for the course. However, it kept students interested in the topic fully emerged. I had a great experience and learned a lot in this class.*

Another student noted that *"this semester is the first time I have taken an online class, and I surprisingly enjoyed it."* Students' positive feedback evidenced that the UDL approach would make it easier for inexperienced instructors to convert a face-to-face course to an asynchronous online one. Students could benefit from the approach.

Discussion

We explored the practical case of applying a UDL framework to build an interactive asynchronous online course on environmental policy for undergraduate students. The UDL's multiple means of engagement guidelines helped create a learning environment to respect students' diverse learning styles. The case provides a confirmation that the ULD approach can be instrumental in creating a fully online course from an in-person one, disregarding the concern of low interaction and engagement.

Our case contributes to the growing field of instructional design in three ways. First, this case overview evidences the value of UDL techniques in asynchronous online courses. Despite the rise of online learning in higher education, faculty resistance is still high due to the overall learning quality concerns, potentially downplaying the positive aspects of online learning and teaching (Allen & Seaman, 2013; Keengwe & Kidd, 2010; Lloyd et al., 2012). Emergent virtual instruction during the pandemic has also augmented concerns over the overall quality of online learning (Adedoyin & Soykan, 2020; Hodges et al., 2020).

Against this sentiment, some scholars suggested that better learning outcomes in asynchronous online courses could be possible in courses with a high faculty teaching presence and social presence, and peer collaboration, as opposed to a student learning independently by watching videos or reading materials (Arbaugh & Benbunan-Fich, 2006; Arbaugh et al., 2010; Daspit & D'Souza, 2012; Garrison et al., 2000; Garrison 2017). Consistent with this research line, our findings indicate that students prefer more frequent and meaningful interactions, and a UDL approach could help student expectations for online courses be met. Flexibility in the design approach could allow different assignment formats, group cooperative or individual reflective, to be interchangeably altered to ensure learning outcomes are accomplished regardless of course delivery mode, face-to-face or online (Braun, 2008; Rovai & Jordan, 2004; Topper, 2007; Dickinson & Gronseth, 2020).

Second, this case sheds light on the varying degrees of student interactions, which need to be factored in for online course design. Both individual discussions and group work can foster student interactions. However, discussion-oriented collaborative assignments may facilitate more significant and purposeful student interactions than the other

types of assignment formats (Table 3). The UDL approach can make it easier to engineer high-quality student interaction in asynchronous online courses. Instructors would then be more beneficial if they had a more advanced understanding of online course design, such as learning elements development and modification beyond the simple course architecture set-up. Due to the disciplinary nature, some advanced practicum courses in political science, public policy, and international affairs may need such understanding to a greater degree. If the highest student interactions are woven into asynchronous online courses' well-designed architecture, subject-specific learning outcomes such as collaborative learning skills could be more likely invigorated (Bowen, 2013; Emerson & Gerlak, 2016). The benefits of a UDL could then be reaped more substantially in those disciplines where student interaction is essential to be taken in place regardless of the course delivery format, either in-person or online.

Practical Implication

Adding to the instructional practice contributions, this case adds a practical tip for implementing the UDL approach. As an illustrative suggestion, Table 3 shows how instructors can apply the UDL approach in their courses. The instructional mode change can be portrayed with a two-by-two matrix with the two factors, student engagement level and student preference for peer-to-peer interactions. Instructors can form the four different assignment modes when the student engagement factor is crossed with student preference for peer-to-peer interactions. As a rule of thumb, if students favor more interactions and their engagement level remains high, instructors can choose group-based, discussion-focused assignments. Conversely, when students' preference for peer-to-peer interactions is low, and students are engaged in discussion activities at a low capacity, instructors can adopt individual-based, reflection-oriented assignments. Table 4 shows four possible assignment types in the UDL learning environments.

Table 4

*Instructor's Choice for Assignment Mode**

		Student engagement level	
Low	High		
Student preference for peer-to-peer interactions	Low	Individual/Reflection	Group/Reflection
	High	Individual/Discussion	Group/Discussion

***** Depending on Student Engagement Level and Student Preference over Peer-to-Peer Interactions

Limitations of the design approach

However, it should be acknowledged that the benefits of a UDL could not be universally applicable for all online course conversions and designs. Some faculty may assume that the UDL approach could improve the overall course quality at a minimum, and indeed, changes would not matter ultimately. Some others also argue that the UDL approach creates unnecessary steps requiring substantial time and resources for the instructional mode change. Future examination would benefit from investigating such claims in empirical settings.

Also, the implementation of the UDL in this case study was limited to exploring the roles of representation and action/expression on students' satisfaction in the online course delivery. Future studies can expand how representation and action strategies can be changed when the courses are converted from in-person to online.

Limitations of the research

In addition, researchers and practitioners may investigate how flexibility in changing assignment formats per student engagement level and student preference for peer-to-peer interactions can affect students' learning performance. We encourage some questions that address, but are not limited to, the following specific questions: To what extent does it cause the satisfaction of learning? Or does it create havoc due to restructuring the primary assignments in the middle of the course?

Also, it would be interesting to know if enhanced student interactions and engagement are qualitatively different in synchronous and asynchronous discussion. It seems natural to accept verbal conversation that happens in a face-to-face or synchronous online course is substantively different from written conversations in an asynchronous online mode (Kilpatrick et al., 2021). However, it could also be possible to observe students' careful approaches to lay out their own perspectives and more constructively consider others' perspectives when flexibility of action and representation is given in an asynchronous online course. By answering those questions in an experimental setting, one can gain a more nuanced understanding of the UDL framework, which can foster designing online courses in consideration of quality.

Conclusion

Learning and teaching in higher education have dramatically changed over the past year during the COVID-19 pandemic. The global health crisis has forced faculty to experiment with virtual teaching in a short amount of time without full preparation, and adequate training (Johnson et al., 2020; Lockee, 2021; McKenzie, 2021), and students were compelled to learn purely online or in a hybrid format of courses. Even though online courses during COVID-19 are close to contingent-based virtual instruction (Adedoyin & Soykan, 2020), it is most likely that online courses will be part of the instruction modalities in higher education during the post-COVID era (McKenzie, 2021). This facet emphasizes the need to reflect and consider how to refine online courses and expand them in a timely manner.

This case informs the value of the approach by applying a UDL framework to designing an asynchronous course online. In questioning and preparing a "new normal" for courses and program delivery in higher education, the UDL approach could lift students' experience in online courses regardless of discipline. UDL allows planning flexibility in the curricular design, recognizing that learners are varied in their learning preferences and capabilities, motivational characteristics, and environmental constraints (Dickinson & Gronseth, 2020). It also recognizes that program and course developments are under time and budget pressures, and entirely fixed learning modules and formative evaluation methods would not be necessary (Costly & Lange, 2018, Kilpatric et al., 2021). Rather, the UDL approach can foster community and collaboration, making online learning more conducive beyond information transmission (Evmenova, 2018; Garrison et al., 2000; Garrison, 2017).

The pandemic seems to edge toward its end, but higher education leadership still faces uncertainties of course delivery mode and may wonder about how to move forward with online education. The UDL framework can be more extensively employed to ensure the various means of engagement, representation, and action and expression in fully online courses or blended courses. Doing so can expand the benefits of higher education to the unreached student population and scale up online professional learning in the post-pandemic era.

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Appendix 1

UDL Principles, Guidelines, Checkpoints with the Focus of Flexibility in Engagement, Representation, and Action/Expression

Principles	Guidelines	Exemplary Checkpoints
Multiple Means of Engagement	Provide options for recruiting interest	● Optimize individual choice and autonomy ● Minimize threats and distractions
	Provide options for sustaining effort and persistence	● Heighten salience of goals and objectives ● Foster collaboration and community
	Provide options for self - regulation	● Promote expectations and beliefs that optimize motivation ● Develop self-assessment and reflection
Multiple Means of Representation	Provide options for perception	● Offer ways of customizing the display of information ● Offer alternatives for auditory or visual information
	Provide options for language, mathematical expressions, symbols	● Clarify vocabulary and symbols ● Illustrate through multiple media
	Provide options for comprehension	● Activate or supply background knowledge ● Guide information processing, visualization, manipulation
	Provide options for physical action	● Vary the methods for response and navigation ● Optimize access to tools and assistive technologies
Multiple Means of Action/Expression	Provide options for expression and communication	● Use multiple means for communication ● Blend fluencies with graduated levels of support
	Pride options for executive function	● Guide appropriate goal setting ● Enhance capacity for monitoring progress

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Developing a Quality Assurance Approach for an Online Professional Military Education Institution

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With the increasing demand for online learning, higher education institutions are heightening their focus on assuring online course quality (Allen & Seaman, 2015). However, they lack consensus on what constitutes assuring quality in online courses (Vlachopoulos, 2016), which is challenging for institutions seeking to develop quality assurance approaches. This paper describes how a specific institution, the US Air Force's eSchool of Graduate Professional Military Education (eSchool), developed and implemented an evaluative instrument to assure course design quality within its unique context. This example provides a valuable perspective for those developing quality assurance processes and resources for their online programs.

Introduction

Online learning has grown exponentially over the past several decades, with higher education institutions dedicating significant resources to expand and promote their online learning options (Allen & Seaman, 2015). The COVID-19 pandemic has further intensified the need for online learning options that provide similar quality experiences for remote and on-campus students (Means & Neisler, 2021). As the demand for online learning opportunities increases, higher education institutions are heightening their focus on assuring online course quality, which has been linked to student satisfaction, engagement, and achievement of outcomes (Murray et al., 2012). However, there is a lack of consensus on what constitutes "quality" and "assuring quality" in online courses (Vlachopoulos, 2016), which can be challenging for institutions seeking to develop a quality assurance approach for their online courses. This paper presents a detailed example of how a specific institution, the US Air Force's eSchool of Graduate Professional Military Education (eSchool), developed and implemented an approach to assure course design quality within its distinct institutional context using a Course Design Quality Checklist (CDQC). This example provides a valuable perspective for institutions seeking to

develop quality assurance processes and resources for their online programs, particularly those who have unique characteristics and needs.

First, the article describes the eSchool's institutional context to provide background for the problem being addressed, namely the need to improve course design quality and devise an approach for quality assurance. Next, the process for addressing this problem is described, including the methodology for developing the CDQC and an overview of its content. Finally, the article reviews some of the lessons from this experience that can help inform other institutions seeking to develop a quality assurance approach to improve the quality of their online courses.

Background and Introduction to the Problem

Established in 2016, the eSchool is a fully online, graduate-level institution that provides Officer Professional Military Education (OPME) courses for thousands of airmen across the globe. As of 2022, the eSchool is responsible for over 90 online courses that reside within four fully online programs, one of which is a fully accredited master's program. While all the courses in these programs are asynchronous, the majority are self-paced and the rest are facilitated by adjunct instructors.

Prior to the eSchool's establishment, distance learning (DL) OPME programs resided within their requisite resident institutions (e.g., Air War College DL resided in the Air War College resident college). Upon opening, the eSchool inherited many of the existing online courses from the DL programs. These courses offered opportunities for improvement across multiple areas of course design, including instructional alignment, learner engagement, and the use of multimedia and technology.

Solution: Develop a Quality Assurance Approach

Designing, maintaining, and revising asynchronous online courses requires considerable instructional design expertise because all of the content must be fully developed, functional, and available online at all times (Grant, 2021). Thus, the eSchool has a dedicated instructional design and development department, whose members work collaboratively with faculty members to develop and optimize courses for an online delivery format. As an instructional designer in this department, I spearheaded this project with one of my colleagues.

My colleague and I had long been aware of the areas for improvement in many of the school's courses. Furthermore, we knew that failing to apply quality standards to online course design can negatively affect student engagement, learning, and performance outcomes (Baldwin, Chin, & Hsu, 2018; Parscale et al., 2015). However, it was challenging to improve these areas without a set of quality design standards and a formal quality assurance process to implement them. Thus, we began devising an approach to help address these issues within the parameters of our institutional context.

Determining the Purpose

In accordance with the principles of backwards design, we decided to begin with the end in mind (Wiggins & McTighe, 2005). Therefore, before planning our specific approach, we needed to establish the institution's overall goals and purpose for assuring quality in its courses. We would then determine what types of activities and products to develop to achieve the purpose.

To help determine the purpose, we identified gaps between the current and desired states of our online course quality (see Table 1). This exercise forced us to narrow down and clearly articulate what the main existing problems were and what specific outcomes we would like to achieve. First, we selected the three most prominent aspects of our current state that we wanted to address with a quality assurance approach. Then, we envisioned our desired states for each of these aspects. Finally, we examined the differences between the current and desired states to identify gaps and determine our purpose. Ultimately, this process indicated we needed a dual-purposed approach that could be used to both evaluate existing courses and integrate design best practices into new course design efforts by: (a) providing

standards and processes for evaluating and improving existing courses, and (b) providing standards and processes for designing and developing new courses.

In both cases, the goal was to improve course quality, which would help cultivate a culture of continuous improvement.

Table 1

Identifying Gaps between Current and Desired State: eSchool Example

Current State	Desired State
Areas for improvement in multiple areas of course design.	All courses meet course design quality standards.
Potential for student engagement not fully realized, due to greater percentage of passive vs. active learning elements.	Increased student engagement in courses that meet course design quality standards.
Need for products and processes to assure quality of course design.	Institution implements processes and products that cultivate culture of continuous improvement.

Operationalizing the Purpose

Next, we created an action-oriented plan for addressing the identified gaps and achieving the institution's purpose. An effective way to do this was to create a logic model (see Table 2). Logic models help to visualize the processes and resources required to move from the current state to the desired state (Loberti & Dewsbury, 2018). We started by listing statements describing the desired state in the Long-Term Outcomes column. Next, we determined what activities would be conducted to achieve the desired state and what their outputs, or products, would be. This was an iterative process, in which we brainstormed numerous potential activities and outputs and then narrowed them to a final few. Once our activities and outputs were finalized, we listed the inputs, or resources, that would be needed to conduct the activities and produce the outputs. We completed the model by listing short and intermediate-term outcomes leading up to the long-term outcomes.

We used the completed logic model as a guide to develop more detailed plans for each activity, including instructions and schedules. This paper focuses on our efforts for the first activity – developing an evaluative instrument to inform new course design and to evaluate and improve existing course design quality and its associated output and outcomes.

Table 2

Example Logic Model

Inputs	Activities	Outputs	Outcomes		
Short-Term	Intermediate	Long-Term			
What resources do you need to conduct the activities and achieve the desired outcomes?	What activities will you conduct to achieve the outcomes?	What products will the activities produce?	What immediate changes will occur?	What mid-term changes will occur that lead up to long-term changes?	What changes do you hope will occur and be sustained in the long-term?
Instructional design professionals (IDs) Faculty members Institutional leadership Existing courses Time (work hours)	Develop evaluative instrument to inform design of new courses and measure and improve design quality of existing courses Develop and implement process for applying evaluative instrument to evaluate existing courses	Evaluative instrument for informing design of new courses and measuring and improving design quality of existing courses Process for applying evaluative instrument to existing courses Results from applying evaluative	IDs start using evaluative instrument to inform design of new courses IDs use evaluative instrument to evaluate an increasing number of existing courses IDs work with faculty to revise existing courses based on evaluation results	Institutional adoption of evaluative instrument to design new courses IDs continue evaluating existing courses and work with faculty to revise existing courses on a continual basis Positive student feedback regarding experiences in courses that meet course design quality standards	All courses meet course design quality standards Increased student engagement in courses that meet course design quality standards Institution implements processes and products that cultivate culture of continuous improvement.

Inputs	Activities	Outputs	Outcomes	
Collaborative communication tools (e.g., email, collaborative notebook, video conferencing)		instrument to existing courses		

As the first step towards achieving these outcomes we decided to either adopt or create an instrument with criteria that would both inform the design of new courses and evaluate the quality of our existing courses. Initially, we considered adopting a pre-built evaluative instrument. However, after examining numerous instruments from various academic institutions and professional organizations, we determined that no single prebuilt instrument met all of our specific needs. Instead, we needed a tool that was more tailored to our unique context, which resulted in our CDQC.

Methodology

To develop our instrument, we used a methodology similar to McGahan et al. (2015), whose case study from the University of Nebraska at Kearney (UNK) "[provides] a roadmap for institutions that are developing an [evaluation] instrument of their own" (p 126). UNK developed a custom online course quality checklist after determining that none of the prebuilt evaluation instruments they had reviewed met their specific needs. Instead, they used the prebuilt instruments, grounded in research-based course design principles, to inform the development of evaluative categories and criteria for the UNK checklist.

Prebuilt Instruments Overview

We also used prebuilt evaluative instruments to inform the development of our tailored checklist. We selected these instruments based on five criteria established by Baldwin, Ching, and Hsu (2018), who reviewed a series of national and statewide online course evaluation instruments. According to their criteria, a qualifying instrument needed to:

1. Evaluate design of higher education online courses,
2. Support student success,
3. Have national or statewide influence,
4. Be published after 2006, and
5. Be currently in use.

Using these criteria, we identified six qualifying instruments. While each of these instruments made valuable contributions to our final checklist, none was sufficient by itself. Instead, we analyzed, synthesized, and tailored criteria from each of the six instruments to develop our own checklist.

Quality Matters Higher Ed. Course Design Rubric Standards, 6th ed

The QM Rubric is widely used across higher education institutions to help design and evaluate online and hybrid courses. It is comprehensive, with eight sections comprised of 42 research-based standards, each with extensive annotations. The rubric emphasizes instructional alignment throughout all of its sections (Quality Matters, 2022). While the QM Rubric is renowned and emphasizes instructional alignment, it ultimately did not meet our needs. First, QM requires a paid subscription to access the annotated standards, which was beyond our budgetary constraints. Second, the rubric focuses too much on instructor facilitated interactions, and most of our courses are self-paced.

Open SUNY Center for Online Teaching Excellence Quality Review Scorecard

The Open SUNY Center for Online Teaching Excellence Quality Review Scorecard (OSCQR) rubric was developed to help faculty members design high-quality online courses. Its six sections, comprised of 50 standards, emphasize course design and accessibility elements (Online Learning Consortium, 2022). Although the OSCQR focuses on course design, as well as its openly licensed and customizable format, it did not meet our needs. Primarily, the OSCQR places a higher

emphasis on technical and logistical course design elements than we wanted. Additionally, it infused accessibility criteria throughout the rubric, while we wanted to address it in a single section.

Illinois Online Network's Quality Online Course Initiative Rubric

The primary purpose of the Illinois Online Network's Quality Online Course Initiative Rubric (QOCI) rubric is to "help colleges and universities to improve accountability of their online courses" (University of Illinois Springfield, 2022) by providing course design guidelines and evaluative criteria. The tool is comprehensive, with seven sections and 97 criteria that cover all aspects of course design (University of Illinois Springfield, 2022). The QOCI rubric provides comprehensive treatment of online course design, as well as the option to access both a full rubric and a condensed checklist version. However, it contains numerous criteria that are too specific and do not apply to our institution. For example, the QOCI includes a criterion for an assignment due date calendar. Because eSchool courses are developed from Canvas Blueprints, we do not set specific due dates in Canvas (e.g., the course instructions state that an assignment is due on Thursday of Week 3, but do not provide the calendar date). Thus, we would not incorporate a criterion for an assignment calendar.

California Virtual Campus-Online Education Initiative Online Course Design Rubric

The California Virtual Campus-Online Education Initiative Online Course Design Rubric (CVC-OEI) rubric was developed to help instructional designers and faculty members design and evaluate online courses. In particular, it is intended for faculty members to use when peer-reviewing courses. Almost 70% of 44 criteria, which are divided into four sections, focus on content presentation and accessibility (California Virtual Campus Online Network of Educators, 2022). The CVC-OEI provides clear, detailed descriptions for the criteria in the CVC-OEI rubric. However, the criteria emphasize the technical and logistical elements of course design more than instructional alignment - a greater focus for us. Additionally, the CVC-OEI includes numerous criteria that apply to instructor facilitated courses where the majority of eSchool courses are self-paced.

Canvas Course Evaluation Checklist

The purpose of Canvas Course Evaluation Checklist is to help educators with a varying range of course design experience to develop courses in the Canvas LMS. The checklist, which has four sections and 39 criteria, is not intended to be comprehensive. Rather, it is "starting point for institutions to make a copy and customize it to meet their individualized needs" (Instructure, 2022). Because the Canvas checklist is not intended to be comprehensive, we did not consider adopting it for our institution. Instead, we incorporated some of the more useful criteria into our final checklist.

California State University Quality Learning and Teaching Evaluation Rubric, 2nd ed.

The Quality Learning and Teaching (QLT) rubric was developed to help faculty members design and deliver online courses. It has 10 sections with 57 criteria with a heavy emphasis on instructor roles and responsibilities (California State University, 2022). While the QLT rubric is thorough and provides examples for each criterion, it did not meet our needs. In particular, many of the criteria evaluate instructor performanceThe instructor provides information about being a successful learner/student" (California State University, 2022). However, because most of the eSchool's courses are self-paced and do not have instructors, these criteria would not apply. Furthermore, even for the school's instructor-facilitated courses, we wanted to use the checklist for evaluating course design, not instructor performance.

Qualitative Analysis

We then used a qualitative analysis approach to analyze and synthesize criteria from the six instruments (Thomas, 2006). First, we reviewed the evaluative categories and specific criteria for each instrument, noting similarities and differences. Next, we imported them to Nvivo, a qualitative analysis software, where we coded them to identify common concepts and themes. We chose not to start with a predetermined set of codes instead of creating them as we read through the criteria. We organized the resulting codes into seven categories: Layout and Organization, Instructional Content and Materials, Assessment, Accessibility and Usability, Communication and Interaction, Support, and Technology.

Determining Checklist Criteria

After completing the analysis, we engaged in several intense rounds of selecting the codes and categories from our analysis to incorporate as criteria in our checklist. We also developed additional criteria for course design elements entirely unique to our institution and, therefore, not addressed in any prebuilt instrument. To make these decisions, we considered the various facets of our unique institutional context, including characteristics related to the course delivery format and design elements.

We considered several characteristics related to our course delivery format (see Table 3). First, many of the criteria from analysis addressed aspects of hybrid or flipped courses, as well as synchronous online activities. eSchool courses are all fully online and asynchronous, therefore, these criteria did not apply to our checklist. Second, many of the criteria focused on instructor roles and interactions. However, the majority of our courses are self-paced. Because the self-paced courses do not have instructor involvement, they support limited types of course interaction. Thus, our checklist criteria did not emphasize student- instructor interaction.

Table 3

Implications of Course Delivery Format Characteristics

Characteristic	Implication
Fully Online	Criteria needed to reflect a fully online institution, with no references to in-class activities or flipped-classroom/hybrid approaches.
Asynchronous	Criteria needed to focus on asynchronous interactions between students and students and instructors, with no references to synchronous interactions and software requirements.
Mostly Self-Paced	Criteria needed to emphasize student: content and student: student interactions and include an optional section for student: instructor interactions.

We also considered characteristics related to our course design (see Table 4). All of our courses are designed, developed, and maintained by instructional designers and faculty members who are subject matter experts, not the individual course instructors. Thus, our courses have more standardized elements than institutions where individual course instructors design their own courses (Herron et al., 2012). Our checklist criteria needed to incorporate these standardized elements, such as the inclusion, layout, and organization of specific course pages. Our courses also have several elements that are not identical across courses but must follow the same parameters. For example, we have specific guidelines for writing course outcomes and course descriptions that needed to be included in the checklist criteria.

Table 4

Implications of Course Design Characteristics

Characteristic	Implication
Standardized Course Elements	Criteria needed to address course elements that were standardized across courses, such as the layout and organization of the course Home Page, Syllabus Page, and Lesson Pages.
Semi-Structured Course Elements	Criteria needed to address semi-structured course design elements, such as the Course and Lesson Outcomes, Course and Lesson Descriptions, and Narratives.

Determining Checklist Format

Most of the evaluative instruments that my colleague and I reviewed used scoring scales to evaluate criteria. However, we selected a simple checklist format for several reasons related to our unique institutional context. Foremost, while the eSchool has an academic mission, it is a military institution. Self-assessment checklists are an integral part of the Air Force Inspection System, which is familiar to many of our faculty members. Secondly, a checklist system providing only “Yes”, “No”, and “Not Applicable” (Y/N/NA) options for each criterion eliminates much of the subjectivity involved in ranking criteria on a numeric scale. A Y/N/NA selection immediately and clearly indicates whether a standard has been

fully satisfied; partial satisfaction is considered as a failure to meet that standard. The checklist allots substantial space for commentary in each section of the checklist allowing the reviewer to elaborate on why specific standards were not met and provide recommendations for improvements. Overall, the format helps to objectively mediate discussions for planning the “way ahead” when discussing CDQC results with the faculty members who manage the courses, especially as they may have limited course design experience (Baldwin, Ching, & Friesen, 2018).

CDQC Overview

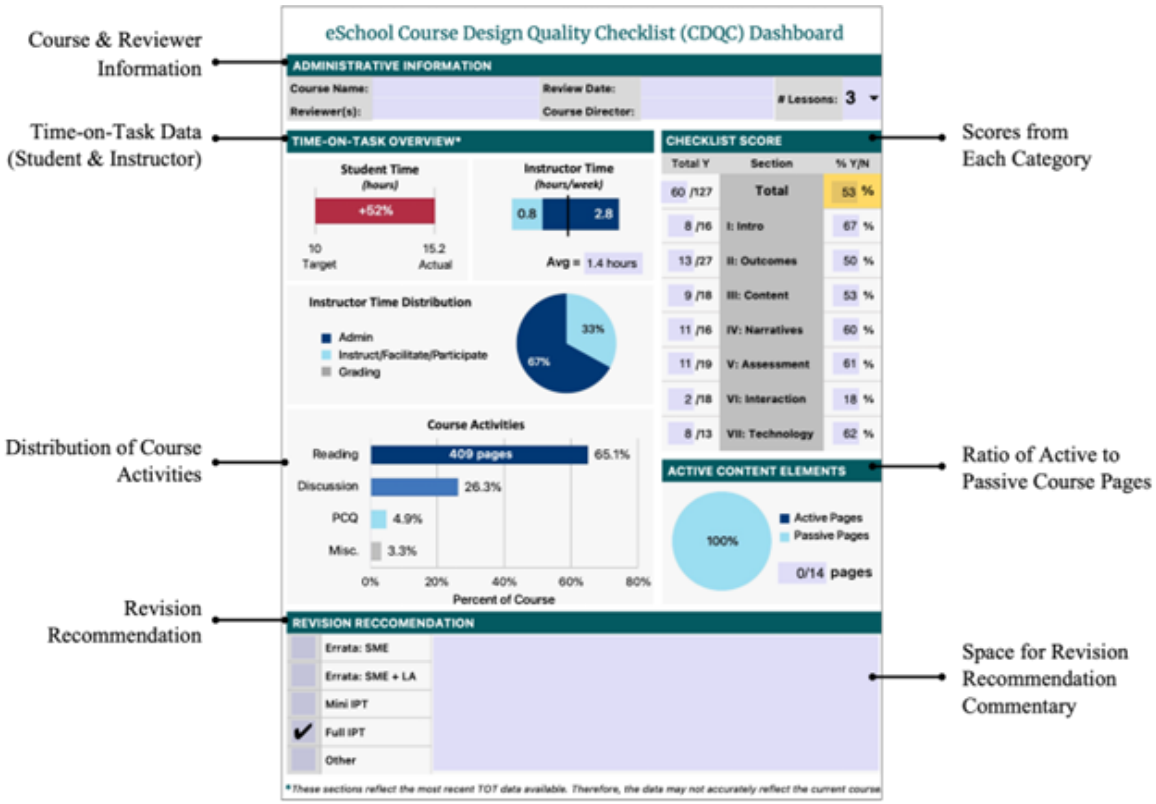
The CDQC has three sections, including a course dashboard page, a course alignment page, and the checklist pages.

Dashboard Section

Because the checklist itself is lengthy, we needed an efficient way to convey the results to faculty members. To satisfy this need, we designed a highly visual Dashboard page that provides a snapshot of the checklist results, and additional information that provides important context, such as the amount of time students and instructors spend performing different types of activities in the course (see Figure 1). For example, we included a bar graph comparing the amount of time students spend in passive activities, such as reading or watching videos, versus active activities, such as discussions and projects. The graph clearly indicates imbalances between the amount of time students spend in passive versus active learning activities, which can help inform efforts to make the course more engaging for students. We also included an area for the reviewer to make recommendations on how to proceed. Overall, the Dashboard helps the reviewer to communicate the most essential information when discussing results with faculty members.

Figure 1

Dashboard Section



Graphical user interface, application

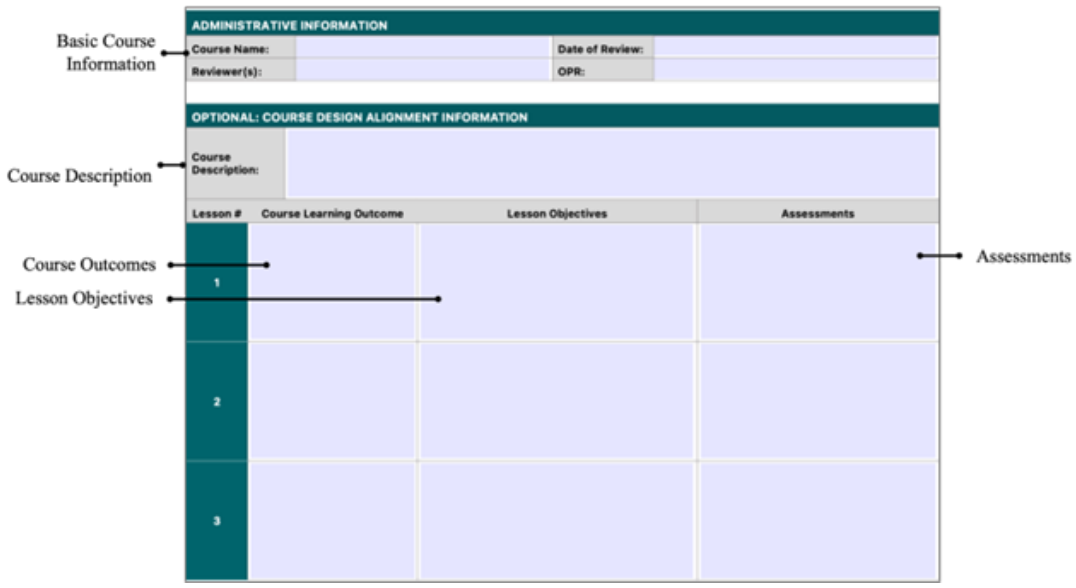
Description automatically generated

Course Alignment Section

Next, we included a section to record information relating to instructional alignment (see Figure 2). We created a table with a row for each lesson and columns for course learning outcomes, lesson objectives, and assessments. This provides an at-a-glance overview of the instructional alignment of all the course elements and helps to quickly identify misalignments. Additionally, by recording all of this information on a single page, we could reference it easily when completing the checklist.

Figure 2

Course Alignment Section



A picture containing calendar

Checklist Section

The checklist consists of seven main evaluative categories, each with multiple subcategories that contain specific criteria (see Table 5). In sum, there are 127 specific criteria. The checklist is formatted as a table, with a row for each criterion, a column for indicating whether the criteria was met (with Yes, No, and N/A options), and a column for reviewers to provide commentary explaining ratings with suggested recommendations (see Figure 3). After initial testing, we found reviewers sometimes needed more space for commentary. Thus, each category also has a larger space at the end of its criteria for additional comments and recommendations.

Table 5

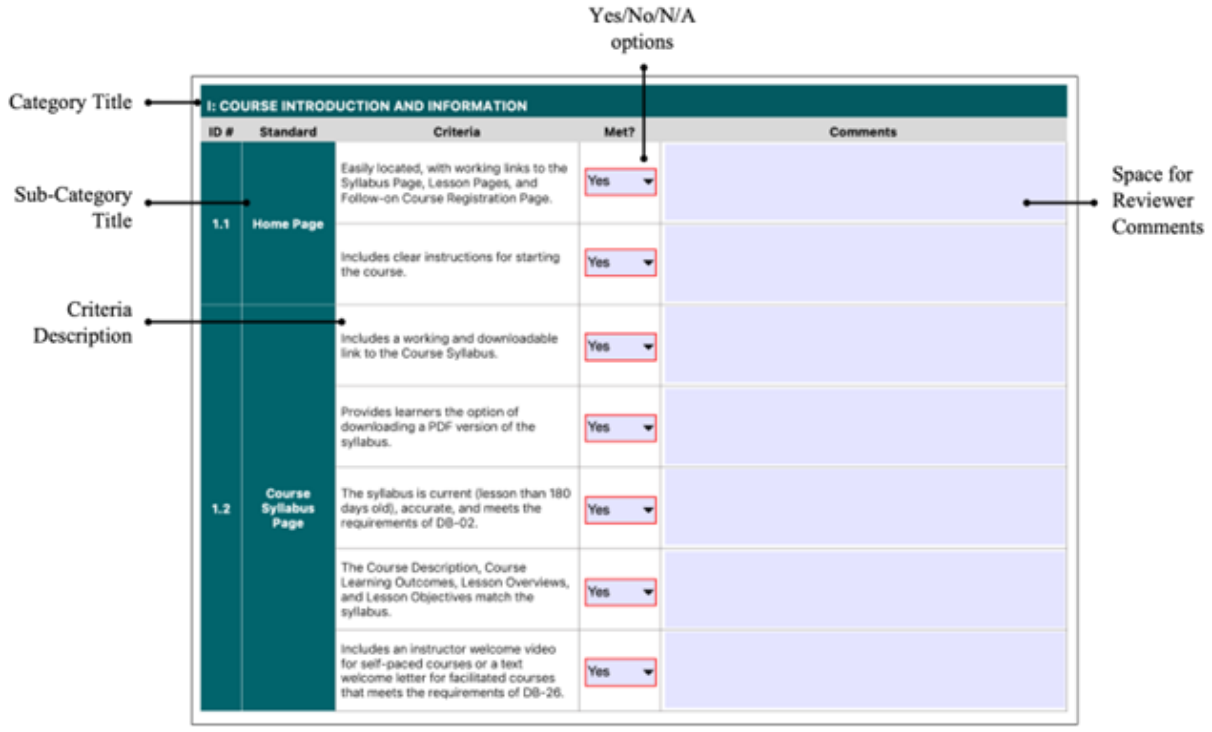
CDQC Overview

Category	Sub-Categories	Description
1. Course Introduction and Information	1.1 Home Page	Reviews the currency, accuracy, and availability of basic course information and resources.
	1.2 Course Syllabus Page	
	1.3 Learner Support Resources	
	1.4 Instructor Information*	
2. Descriptions and Outcomes	2.1 Course Description	Reviews the clarity, accuracy, and curricular alignment of course and lesson descriptions and outcomes.

Category	Sub-Categories	Description
	2.2 Lesson Descriptions	
	2.3 Course Learning Outcomes	
	2.4 Lesson Objectives	
3. Instructional Content and Materials	3.1 Sequence	Reviews the delivery, organization, and curricular alignment of instructional content and materials.
	3.2 Organization	
	3.3 Variety	
	3.4 Alignment	
	3.5 Accuracy and Currency	
	3.6 Legal	
	3.7 Accessibility	
4. Course Narratives	4.1 Content	Reviews the clarity, coherence, organization, and mechanics of the course's instructional narratives, which guide students through each lesson page and provide a conceptual framework for them to engage with assigned readings and media.
	4.2 Organization	
	4.3 Writing Style and Mechanics	
5. Assessment	5.1 Alignment	Reviews the methods, frequency, and curricular alignment of the course's assessments, as well as the quality of its grading rubrics & feedback opportunities.
	5.2 Methods	
	5.3 Frequency	
	5.4 Grades	
	5.5 Rubrics	
	5.6 Feedback	
	5.7 Instructions	
6. Community and Interaction	6.1 Learner: Learner	Reviews the frequency, type, and structure of learner interactions with each other, the content, and, for facilitated course, the instructor.
	6.2 Learner: Instructor*	
	6.3 Learner: Content	
	6.4 Group Work	
	6.5 Discussion Expectations	
7. Technology	7.1 Variety	Reviews the types, quality, and curricular alignment of technological tools and multimedia used in the course.
	7.2 Purpose and Alignment	
	7.3 Quality	
	7.4 Access	
*For facilitated courses only		

Figure 3

Checklist Section



A picture providing checklist criteria

Implementing the CDQC

Currently, we are piloting the CDQC in our design department. Our instructional designers are using it to evaluate a selection of courses from each program. We are using inter-rater reliability practices to standardize our evaluation of the criteria, fine-tune them, and provide faculty development as necessary. We are also determining the most effective way to summarize and communicate the results to faculty members in a meaningful and actionable way. Ultimately, using the CDQC affords the opportunity to ensure course evaluations and design recommendations are grounded in objective research-based standards, resulting in more engaging student learning experiences and cultivating an institutional culture of continuous improvement.

Lessons Learned and Recommendations

Based on the review of various course evaluation instruments, as well as the experience of designing a course evaluation checklist, several lessons were learned that may help institutions in efforts to assure online course design quality.

Begin with a Purpose

Instructional designers often advocate for beginning with the end in mind and this project was no exception (Wiggins & McTighe, 2005). We began our project by identifying our overall purpose for assuring quality in our online courses. To do this, we completed a gap analysis between our current and desired institutional states (see Table 1). Achieving the desired state became our purpose. Completing this step gave us direction when considering how to structure our approach. Using a logic model, we identified the specific activities and products we could develop to achieve our desired outcomes. Establishing our purpose first helped moving forward because it focused our decisions on achieving a common goal.

Take Advantage of Open Resources

The rise of open educational resources has benefitted online students and education professionals alike (Mosharraf & Taghiyareh, 2016). For those looking to develop an evaluative instrument for quality assurance, adopting or referring to openly resourced examples provides several advantages. First, it saves time and resources, which is critical for institutions like the eSchool that have a limited number of instructional designers. Developing these instruments from scratch is time consuming and involves a substantial number of resources. This is evidenced in the production processes described by the Online Learning Consortium which developed the OSCQR in conjunction with Open SUNY over a three-year period (Online Learning Consortium, 2022).

Next, using openly resourced examples can ensure that evaluative criteria are research-based and current. Institutions such as The University of Illinois Springfield, which developed the QOCI Rubric, describe their process for developing criteria that are periodically reviewed and updated to "reflect the research and best practices in online learning" (University of Illinois Springfield, 2022). Again, this is valuable for institutions that may not have the capacity to undertake extensive research processes.

The large number of examples from other institutions can be overwhelming. As when conducting literature reviews, we recommend that institutions apply selection criteria to instruments they are reviewing (Lubke et al., 2017). For example, when screening prebuilt examples for this project, we adopted criteria from Baldwin, Ching, & Hsu (2018) to narrow down our final selection. This made the process more manageable and tailored to our unique needs.

Tailor to Unique Characteristics and Needs

No two institutions have the same characteristics and needs; rather, each has a unique context influencing its approach to assuring quality. Consequently, even with the vast number of available openly resourced evaluative instruments, we did not find any that fully met our needs. We considered adopting the prebuilt instrument that met the highest number of our needs, but ultimately decided against it. In order to meet our goals of informing new course design and evaluating existing courses, we needed to have criteria specifically tailored to our unique course delivery format and design elements. Otherwise, we would have needed to develop additional guidelines for designing and evaluating certain elements. For example, because many of our courses are asynchronous and self-paced, they have a unique lesson structure. Each lesson centers around an instructional narrative, which guides students through each lesson page and provides a conceptual framework for them to engage with assigned readings and media. Thus, the narratives need to meet specific, standardized criteria in order to maintain a consistent style. By creating our own checklist, we were able to incorporate a category dedicated to narratives.

Conclusion

As higher education institutions shift more of their focus and resources to online learning, they are also placing greater scrutiny on the quality of their online courses. However, they may struggle to find clear guidance for developing a quality assurance approach, as each institution has unique contextual factors influencing its needs and capacity to assure quality in its online courses. This paper provided an example of how the eSchool developed its approach to assure course design quality within its unique institutional context by creating a tailored CDQC. By replicating or modifying this approach, institutions can work towards achieving their desired state for online courses.

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Use the FORCE to Create Sociability and Connect with Online Students

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The Covid pandemic resulted in many higher education classes shifting to online instruction in the middle of a term and many institutions stayed online at least in part for several terms. Students taking these online courses did not choose to shift their modality and many would not have chosen an online over a face-to-face class. The purpose of this study was to identify facilitation strategies that resonated with students in classes that shifted online at one higher education institution, identifying which strategies increased motivation to learn and perceived course satisfaction. Additionally, students were asked what strategies helped them connect and trust their online instructors. We present the results of three open-ended questions on a large scale cross-sectional survey (N=739). Five themes emerged: Feedback, Organization, Response time, Communication, Empathy. We discuss how instructors can use the FORCE to create sociability and connect with their online students.

Introduction

As online classes grew exponentially during the Covid pandemic, higher education instructors faced the challenge of creating and establishing connections with students. Establishing an instructor-student connection is essential to the success of online courses, particularly asynchronous courses (Martin et al., 2018). Research has demonstrated that instructor presence relates to students' success or satisfaction in online courses (Brinkerhoff & Koroghlanian, 2007; LaBarbera, 2013; Swan, 2001), enhances student motivation to learn (Baker, 2010), and reduces the sense of isolation (Banna et al., 2015; Boton & Gregory, 2015; Whiteside et al., 2017). Sheridan and Kelly (2010) also found that students valued clear course requirements, instructors who were responsive to students' needs, and providing information and feedback in a timely manner.

In this study, we focused on the experiences and perceptions of higher education students, many of whom prefer the face-to-face environment but were unable to participate in their preferred mode of delivery due to the Covid pandemic. The focus of this study was instructor facilitation, not course design. Since many courses may be designed by other instructors or instructional designers, the researchers wanted to focus on how instructors create a welcoming environment in the online environment. These students shared facilitation strategies that enhanced their learning, motivation, and connectedness to their instructor and the content in their online courses.

Literature Review

In the following section, we will introduce instructor presence, instructor connectedness and instructor social connectedness along with various research-based strategies for creating a student-instructor connection.

Instructor Presence

Research has demonstrated instructor presence influences students in affective learning, cognition, and motivation (Baker, 2010; Dennen, 2011). Instructor presence has been defined as the instructor's actions and behaviors that project themselves as a real person (Richardson et al., 2015). Garrison and colleagues (2000) stated that teaching presence happens when instructors facilitate the flow of the course content. Richardson and colleagues (2015) stated instructor presence is the intersection of social and teaching presence. There are many aspects of instructor presence, such as providing encouragement to students (Martin et al., 2018), responding to student questions in a timely manner (Whiteside et al., 2017), and involvement in online discussions (Sheridan & Kelly, 2010). Instructor presence is important since it helps to bridge the distance and students feel less isolated in online courses (Creasman, 2012).

Instructor Connectedness

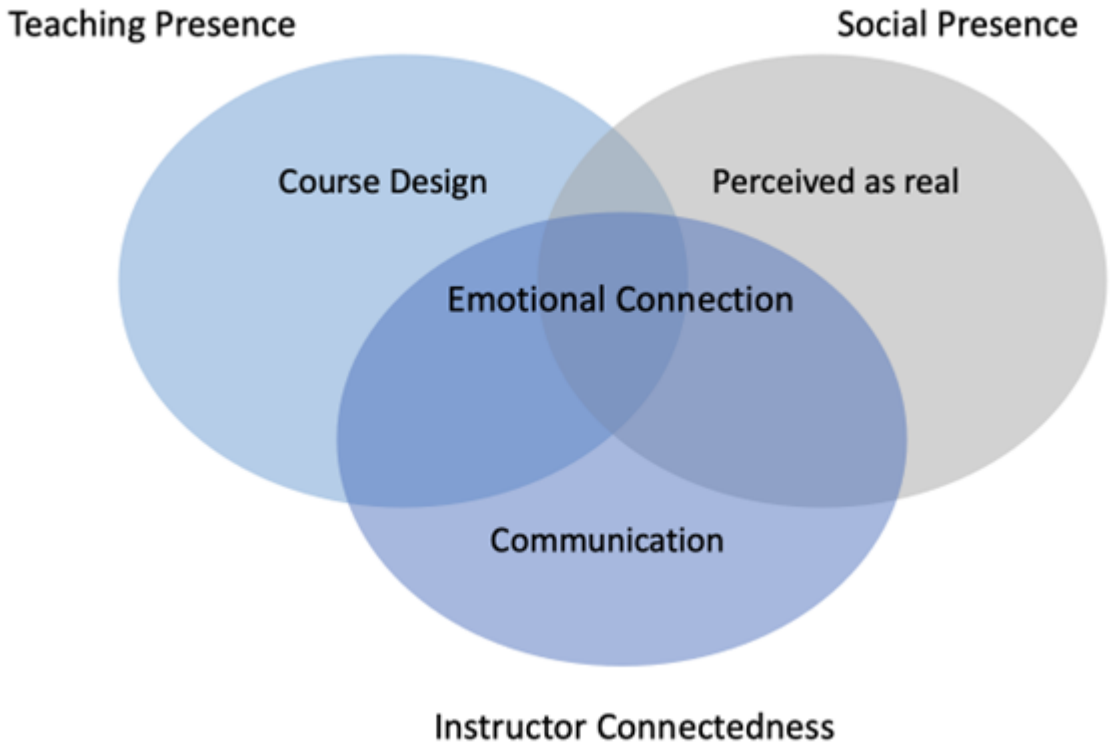
Instructor connectedness is how students perceive how connected they felt toward their instructor (Creasy et al., 2009). Research has found students who perceive a strong relationship or connect with their instructors have better learning outcomes, higher academic achievement, and increased confidence (Pianta & Stuhlman, 2004). Martin et al., (2018) found instructor connection was established through interactive visual syllabi and the use of various features in synchronous sessions to interact with students. While synchronous capabilities may be available for some instructors, in asynchronous courses, this is not a viable option.

Instructor Social Connectedness

Although many researchers interchange instructor social presence and instructor connectedness, for the purpose of this research, we define instructor social connectedness as the ability to establish an emotional connection with students through multiple means of communication. Figure 1 demonstrates the emotional connection at the intersection of social presence, teaching presence, and instructor connectedness. While social presence can be developed through course design and facilitation (Garrison et al., 2000), the connection instructors make with students is established through multiple elements including building trust and providing timely and constructive feedback (Conklin & Garrett Dikkers, 2021).

Figure 1

Instructor Social Connectedness



A Venn diagram showing how course design, social presence, and communication creates an emotional connection.

Berge (1995) developed a framework for online course facilitation, which includes the following constructs: managerial, social, pedagogical, and technical. Managerial refers to administrative responsibilities such as course organization, due dates, and pacing. Within the social construct, instructors encourage and foster meaningful relationships. The pedagogical construct refers to the facilitation of student learning and motivation. The technical construct refers to providing materials and technology to students and creating a transparent environment. Although these are separate constructs, Berge (2008) suggested there may be overlap or instructor functions could be categorized in more than one group. Martin and colleagues (2018) identified twelve facilitation strategies which were categorized into the framework identified by Berge (1995) (see Table 1).

Table 1

Facilitation strategies in online facilitation framework (Berge, 1995; as seen in Martin et al., 2018)

	Facilitation strategies
Social	Video-based instructor introduction Instructor being present in the discussion forums Ability to contact the instructor in multiple ways
Managerial	Video-based course orientation Instructors' timely responses to questions Instructors' weekly announcement to the class
Pedagogical	Instructors' timely feedback on assignments/projects Instructors' feedback using various modalities Instructors' personal response to student reflections
Technical	Instructors' use of various features in synchronous sessions to interact with students Interactive visual syllabi of the course Instructor-created content in the form of short videos or multimedia

We highlight the research literature connecting the facilitation framework with foundational ideas of instructor social presence and connectedness.

Facilitation through Direct Interaction and Multiple Means of Communication

Students value the interaction between the individual and the instructor (Conklin & Garrett Dikkers, 2020; Martin et al., 2019). It is important for online instructors to utilize multiple methods for contacting the instructor (e.g., email, phone, discussion forum, Zoom). The interaction between students and the instructor can assist with students' satisfaction and retention (King & Doefert, 1996).

An important method for communicating with students is through the use of the announcement tool in Learning Management Systems (LMS). This method for communicating with the entire course ensures students are aware the instructor is with them through the learning process. Ko and Rossen (2017) found sending regular announcements was important as they can be used to get students' attention, send encouraging messages, and provide general updates and reminders. These types of quick reminders also assist students with managing their time (Eskey & Schulte, 2010; Kelly, 2014).

Additionally, students value instructor-created videos as a form of communication. Students perceive a connection with instructors who create their own instructional videos rather than using publisher-created content (Rose, 2009). Draus and colleagues (2014) also found a positive relationship between providing instructor-created videos and students' engagement, satisfaction, and retention.

Facilitation through Connection and Sociability

Key to instructor social presence is the connection students feel with their instructor. This connectedness aligns with the idea of sociability, as discussed in leadership theory. Sociability can be defined as having "an inclination to seek out pleasant social relationships," which is demonstrated through leaders' interpersonal skills and relationships (Northouse, 2022, p. 34). Mellor et al. (2012) defined sociability as "a striving need, or preference to be in proximity to others, seeking and maintaining contact, interaction, coordination, and patterns of connection (i.e., being close and staying close to others)" (p. 131).

There are multiple methods for illuminating instructors' sociability in online courses. One method is to include reflections as an essential component of the learning process, which allow the instructor to understand how each student has digested the course concepts and at the same time provide individualized responses either with positive affirmations or with suggestions to assist with student challenges (Martin et al., 2018; Whiteside et al., 2017). Building a course culture where students are asked for their feedback and instructors implement changes based on feedback or explain to students why certain feedback doesn't result in change is another example of sociability.

Facilitation through Feedback and Awareness of Response Time

Instructor feedback is essential for the learning process and enhances students' knowledge (Badiee & Kaufman, 2014; Thiele, 2003). Feedback provides reinforcement to students' knowledge construction as well as redirection to ensure students are correctly constructing the course concepts or retaining the information correctly (Wagner, 1994). Early and continuous feedback can positively impact student retention in the class, as well (Whiteside et al., 2017).

Providing timely feedback can be challenging in an online learning environment. Martin and colleagues (2018) provided creative suggestions such as developing a resource of common questions, problems, and responses over time. Some additional methods for providing feedback can include the use of text and video (Borup et al., 2012). Finally, another method for providing feedback is to chunk the assignments so students are continually working on a large project but receiving feedback at various stages (Schuessler, 2017).

In online courses, response time to student questions (e.g., discussion forums, email) is important due to the potential isolation of students learning on their own. Research has shown that students prefer a response time between 24-48 hours, which was also a significant variable in predicting online student success (Conklin & Garrett Dikkers, 2020; Miller, 2012; Sheridan & Kelly, 2010).

Purpose and Research Questions

The purpose of this study was to identify facilitation strategies that resonated with online students, thus increasing their motivation to learn and perceived course satisfaction. Our research questions included:

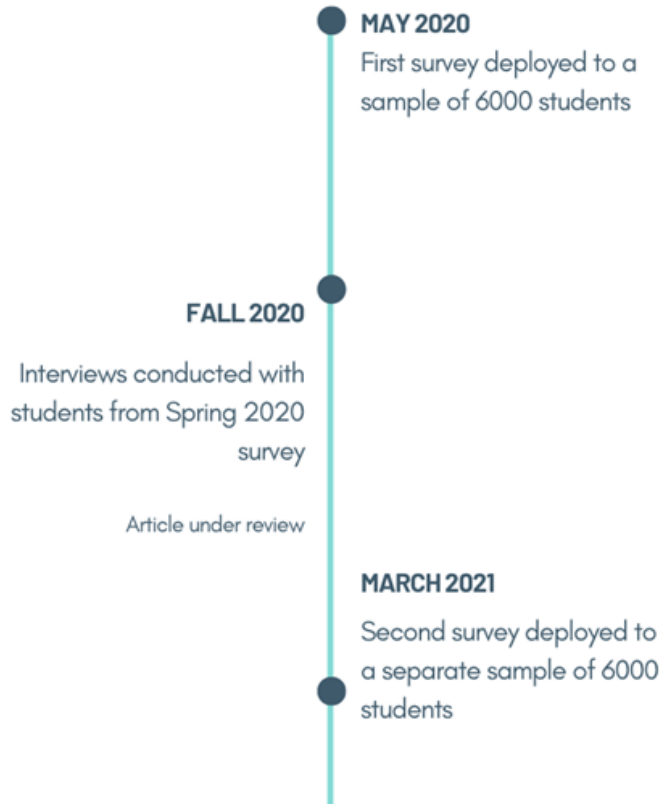
- What facilitation strategies did instructors employ during remote teaching to connect with their students?
- What facilitation strategies resonated with students?
- What recommendations can be made for faculty new to online learning or shifting face-to-face classes to an online environment to build community and connectedness in their classes?

Methods

The current study utilized a pragmatic worldview, one that is problem-centered and oriented toward real-world practice (Creswell, 2009). Researchers were seeking to understand student perceptions of connectedness in classes that shifted to remote instruction in order to impact instructional practice within the specific context of a comprehensive university in the southeastern United States of America. A cross-sectional survey design, used to make inferences about a population at a certain point in time, was utilized with a mix of open- and closed-ended questions. This provides an opportunity to generalize results to the larger student population (Sedgwick, 2014). Figure 2 provides an overview of the timeline of the research study. The institution shifted to remote instruction in March 2020. Fall semester 2020 continued to be mostly remote, with 48% of the classes asynchronous and 21% of the classes synchronous. Spring 2021 semester was a mix of online, hybrid, and F2F with 48% asynchronous and 17% synchronous.

Figure 2

Timeline of Research Study



Timeline of studies starting in May 2020 with the first survey deployed to 6000 students. Interviews conducted in Fall 2020 and the second survey deployed in March 2021.

This manuscript focuses on responses from students in the March 2021 survey. This was the third semester of impacted instruction at the institution due to the COVID-19 pandemic. The survey was sent to a representative sample of 6000 undergraduate and graduate students compiled by the institution's Office of Institutional Research. In order to determine the overall picture of the student online experience at the institution, we asked for a sample that was representative of all students. The survey was sent out using Qualtrics with three reminders to complete the survey over three weeks. There was a response rate of 12% (N=739).

The respondent demographics align with the overall student population at the institution. Respondents were overwhelmingly female; however, this matches the institution demographics for 2020-2021 with an overall undergraduate population as 65% female and 35% male. Additionally, 81% of the respondents were undergraduate, which matches the institution demographics of 81% undergraduate, 18% graduate. The students also identified courses from multiple disciplines. Most students were from the College of Arts and Sciences which encompass the social sciences, sciences, and humanities. There was also representation from all other colleges/schools in the university. See Table 2 for respondent demographics.

Table 2

Student Demographics

		Frequency (N)
Gender	Male	154
	Female	563
	Prefer not to say	5
	Non-binary	10

Student Demographics		
	Transgender	6
	Total	738
Academic classification	Freshman	106
	Sophomore	137
	Junior	180
	Senior	174
	Master's	93
	Doctorate	8
	Certificate	2
	Post-Baccalaureate	2
Age	18 – 24	579
	25 – 34	90
	35 – 44	19
	45 – 54	7
	Over 55	4

Instrument

The survey instrument contained five basic demographic questions, 19 Likert-scale questions based on Creasey and colleagues (2009) SIRS-9, and three open-ended questions. SIRS-9 provided a certain context around connectedness and anxiety. The other aspects we were researching were specific facilitation strategies not addressed in the SIRS-9 scale; therefore, we asked students to 1) identify a course they found successful keeping them connected to the instructor, content, and their peers, 2) describe what an instructor can do in a fully online course to make them feel connected, and 3) describe what helps them overall connect to or trust their instructors. The focus of this article is on the qualitative responses from the students to these open-ended questions. The SIRS-9 connectedness and anxiety data will be reported in another manuscript.

Data Analysis

Data analysis techniques included established and emergent coding of qualitative responses from the survey open-ended questions. Established codes were based on findings from Conklin and Garrett Dikkers (2020). The research team took several steps to check for the accuracy and reliability of findings. First, both researchers read through all of the open-ended responses to gain an overall sense of the data. Second, the researchers individually analyzed a sample of open-ended responses from the survey and met in a series of meetings for consensus agreement (Creswell, 2009). Throughout the coding process for all open-ended survey data, the two researchers met regularly to cross-check codes and share their analysis, another measure to establish the reliability of the research findings. The original codes connectedness, instructor responsiveness, empathic facilitation, and online learning best practices were refined based on the student responses. The emerging codes of sociability (e.g., use of humor, instructor personality), organization, feedback, and communication were added.

Results

In the following section, we present the analysis of the results along with a discussion of key findings. The pragmatic focus to understand student perceptions at a time when students were unable to participate in their preferred modality provided key data. Five large themes emerged from the open-ended questions: feedback, organization, response time, communication, empathy (FORCE). Many of these themes are intertwined. For example, many students stated they responded to timely and quality feedback. Additionally, feedback is a form of communication, but students specifically

mentioned the quality of feedback and how it guided their learning. We present each of these themes and connect them to an overarching finding related to student perceptions of instructor's sociability.

Feedback

Instructor feedback can be diagnostic, formative, or summative and is essential throughout the course "so that learners can sense how they are doing and progressing" (Lehman & Conceicao, 2010, p. 83). For the current study, we coded when students discussed the value of feedback, what types of feedback they preferred, why they needed feedback, etc. Feedback was mentioned 301 times in the survey open-ended responses. Students often mentioned 'quality' and 'timely' regarding feedback. With feedback, students also mentioned 'care' which indicates an emotional connection to the instructor when students receive timely, quality feedback. Students want to feel validated that the instructor has taken the time to review their work. The importance of feedback was stated by one student, "I really like if an instructor can honestly give me feedback about the material I have provided. It shows that they have done as much work as I have analyzing and preparing for the assignment." Another student stated, "I also love quality feedback from teachers because you can tell that they took the time to think about their response." Additionally, students alluded to the fact that personalized feedback on assignments demonstrates caring; "Any written personal feedback beyond a limited standard response makes me feel that the instructor cares personally about my success." The absence of feedback can increase tension and anxiety, as one student explained:

> *I enjoy connecting emotionally and relationally with my professors, but the highest priority is receiving timely, helpful, and consistent communication/feedback. Online professors should take the utmost care to make sure there is no confusion for students about what is going on because that leads to a lot of discouragement and stress.*

Feedback is an important learning tool as another student stated:

> *Quality of feedback is most important because I want to be able to understand exactly what I am doing wrong so I can fix it. Also, the depth of good feedback really boosts my personal morale and helps me to understand what I am doing right.*

Additionally, the feedback denotes caring and can motivate students:

> *Every assignment that is turned in is graded and responded to with words of encouragement and constructive criticism on what can be improved upon. This timely feedback helps to keep me focused and working ahead on upcoming assignments and it actually makes me feel like this instructor cares adding to that connection.*

Organization

Although we asked students for facilitation strategies that helped them feel connected to their instructor and the course content, students focused on elements of quality course design, and discussed ways in which the instructor could, should, or did organize the overall course shell, specific modules, or individual assignments in order to improve their learning experience. Designing an "intuitive, organized learning environment" has been demonstrated to impact students' perceptions of social presence in online courses (Whiteside et al., 2017, p. 181). In the current study, students mentioned some element of course organization 127 times throughout the open-ended responses. The way a course was designed and organized seems to reflect a student's first impression of the instructor and impact their learning and satisfaction in a course. For instance, one student stated:

> *An instructor can help me to feel connected and trusting of them when they are organized in their lessons and schedule for the semester, as well as provide materials that include their words, video, or voice. Additionally, when they demonstrate that they are objective in their grading. This can be done by presenting guidelines and a rubric for assignments.*

Another student stated:

> *Course design and organization impact me the most. It makes me feel like they want me to succeed by laying out the course in a way that allows me to easily see what is due each week so that I do not have to worry about missing an assignment because it is hidden on another page.*

Additionally, having an organized course with consistent due dates makes students feel at ease and allows students to plan around their schedule:

> *I respond the best with a very well organized and weekly designed course. I like when instructors set up each week with each assignment that needed to be completed and do not overwhelm students with a million things on the course at once or with no assignments and just exams.*

Showing the intersection of the elements that build instructor presence, another student stated how the "course design is a large part of how I connect with the instructor, and whether they offer multiple forms of communication." Students stated they could tell the effort the instructor put into designing the course which gave them a sense of connectedness since the students perceived the instructor cared about their content and students. Students preferred weekly modules with consistent due dates (e.g., assignments due on the same day) as one student described, "It is set up by each week so I do not feel overwhelmed with work. She explains each week in a quick short video and also includes a weekly checklist." Students largely felt course organization established expectations for communication, demonstrated planning, and created connections with the instructor.

Response Time

Response time was mentioned in combination with the students' expectations and the need for timely feedback on assignments. However, there were a number of open-ended responses to the survey where students detailed the value of a quick response time to questions and concerns, particularly when using email communication. Quick responses were essential in order to help them feel like they were on the right track with their learning and learning *in community with* their instructors.

Response time to inquiries was mentioned 115 times on the survey. One student stated that they become discouraged if they wait more than three days for a response. Particularly in remote learning, students felt a more immediate need to hear back from their instructors. Typically, in the face-to-face environment, students could talk to the instructor after class. Students alluded to being lost without a response from the instructor, whether it was a question in an email or feedback to an assignment. One student explained, "If there isn't timely responses to emails with questions about homework or course material it can be easy to fall behind."

Many students mentioned needing clarification on assignments, hence the need for a quick response from their instructors. Another student mentioned having a quick turnaround time can alleviate stress, explaining, "Also, it can be stressful, as a shy student, to constantly have to follow up with professors and feel like a nuisance, so quick responses make it easier to reach out again in the future." Instructors who respond to student inquiries in a timely manner are ones who seem more approachable to the students.

Communication

Communication in online learning takes many different forms - whole-group, one-on-one, via email, announcements, feedback, audio, and video recordings, etc. Students discussed the value of multiple methods of communication and the impact of communication with their instructor on their learning and satisfaction. Communication was specifically referenced 68 times in open-ended responses. Many students used the term *open communication*; however, they also referenced dialogue, instructors *checking in* with them, and specific methods faculty used to communicate, such as email, announcements, and discussion board posts. Additionally, they valued instructor-created videos and felt this was another form of communication.

One student who took an online course in Fall 2020 with a communicative instructor and another in Spring 2021 with an instructor who did not communicate effectively reflected, "Reflecting back to the fall course, what a difference communication makes but especially with online courses." Another student discussed how communication with the

instructor made the online course more personable, explaining, “Having a maintained line of communication via email or canvas is very important. That the relationship is with them and their course, not just with the online course, therefore making the online course more personable.”

Communication goes beyond response time, as many students suggested the instructor initiating communication built trust with the students. One student stated the value in having their instructor “[send] encouraging weekly emails and encouraging but honest comments on assignments.” Another student expressed instructors reaching out to students personally created a sense of trust and caring, explaining, “I appreciate personal reminders. Example: “Hey John, Remember assignment x closes tonight. Best of luck!” It makes me think they care and are checking in and reminding me that they look forward to receiving my assignments.”

Overall, students valued instructors who maintained open lines of communication throughout the semester and responded to emails but also initiated contact with reminders and words of encouragement.

Empathy

A desire for encouragement and caring connects with an overarching sense of value in instructor empathy. For the purpose of this study, we define empathy as demonstrating understanding, care, and concern for students and their learning. Students described many empathic traits they valued in their instructors. They used terms such as ‘empathy’, ‘struggles’, and ‘humanize’. Terms such as these were coded 146 times in the open-ended responses. Since many of the students were forced into an online environment when they would prefer face-to-face; they wanted the instructors to understand their struggles with Covid as well. One student stated, “I do not want to hear from an instructor that I have been doing online now for a year and I should be use to it and good at it.”

Students acknowledged that times were different and difficult for all parties including instructors but wanted instructors to also acknowledge that students were also struggling during Covid. One student mentioned, “I think the more understanding they are the more they can connect to their students and the students will be more confident and comfortable around them.”

Sociability

Empathy contributes to sociability. For the purpose of this study, sociability for instructors is an extension of one of the foundational definitions of social presence (perceiving the other as real in the online space) to feeling the instructor is aware of the specific situations of students and knows their audience, being “sensitive to others’ needs and show[ing] concern for others’ well-being” (Northouse, 2022, p. 34). One student described how their instructor created a sense of belonging and showed concern for their students:

> *I have noticed that myself and other students have been really appreciative of professors checking in with their students to discuss their feelings and feedback about the course, the semester, etc., especially this semester. It's encouraging to know that our instructors care about our feelings and wellbeing, especially during such an odd time. I wish more professors took the time to humanize themselves and build a sense of report with the class.*

The degree to which a person is perceived as “real” in computer-mediated communication is one of the foundations of social presence research. Students in the current study affirmed that desire for humanization and connection. As one student explained, they valued instructors “showing that they are also just another person that has a life outside of class. Connecting on a non educational level.”

Several students mentioned the importance of an instructor who was relatable, sharing humanizing personal stories or experiences relevant to the course. One student explained, “Getting a tad more personal builds trust and connections.” Students mentioned the importance of this personal connection and interpersonal relationship, giving specific examples of how a timely response to emails is important, as discussed above, but they value personalization in those emails, “asking how I feel about the course, and what I struggle with,” or students who value other check-ins, “when they ask for updates on how we feel throughout the semester.” Another student stated, “Talk to me like a person, not just a

student." While another stated, "Be off-topic with us. Just sit and shoot the breeze – we get so little social interaction. It's nice to see human instructors who aren't so robotically locked on the topic at hand."

Discussion

The results of this study corroborate existing literature regarding the value of timely feedback, email response time and course design for student learning in online courses (Martin et al., 2018; Martin et al., 2019; Whiteside et al., 2017). There have been many studies on communication strategies and the appropriate technology tools (Borup et al., 2012), yet the students in this study stated they are not as concerned about the technology tool as they are with continuous and regular communication. With regular communication, students feel they are seen more as a person rather than a number.

One area the researchers noted is that although the Berge (1995) framework separates managerial and pedagogical strategies, these are intertwined for an instructor. In order to provide timely responses to emails as well as timely and quality feedback (pedagogy), an instructor must manage their time around due dates, particularly with large assignments. One recommendation to assist instructors with time management would be to break large projects into smaller chunks; therefore, the instructor will be providing continuous feedback without a large investment of time (Schussler, 2017).

In instructor-recorded videos, being conscious to project warmth, confidence, and trustworthiness rather than apathy or hardness also creates a sense of connectedness and trust. Finally, when reviewing the student data, the facilitation strategies overall create a sense of sociability (see Figure 3) not just implementing one strategy over another. The combination of feedback, organization, response time, communication, and empathy creates transparency for the students and a sense of sociability from the instructor.

Limitations

There were limitations to this study. First, this study was conducted during the Covid-19 pandemic; therefore, many instructors' and students' situations were not typical. Instructors were teaching under varying circumstances, and many were still teaching in either a blended or fully online environment which was outside their comfort zone. Additionally, while the survey questions were designed to address instructor connectedness, students may not have knowledge specific to instructor connectedness to provide appropriate answers to open-ended questions about teaching. However, we were explicitly seeking to understand students' perceptions. Currently, the researchers are conducting a sequential exploratory mixed methods approach (Creswell, 2009) to further determine student perceptions on instructor connectedness and the impact of satisfaction and perceived learning. Finally, students received multiple surveys from various campus departments which may have resulted in survey fatigue thus explaining the low response rate.

Conclusion

By making minor tweaks to an online course, an instructor can create a community of students. Although these tweaks may not create social presence among the students, the students will feel connectedness with the instructor, thus assisting with motivation and student satisfaction (Baker, 2010; King & Doefert, 1996). (See Table 3)

Figure 3

Feedback, Organization, Response Time, Communication, Empathy Contributes to Sociability

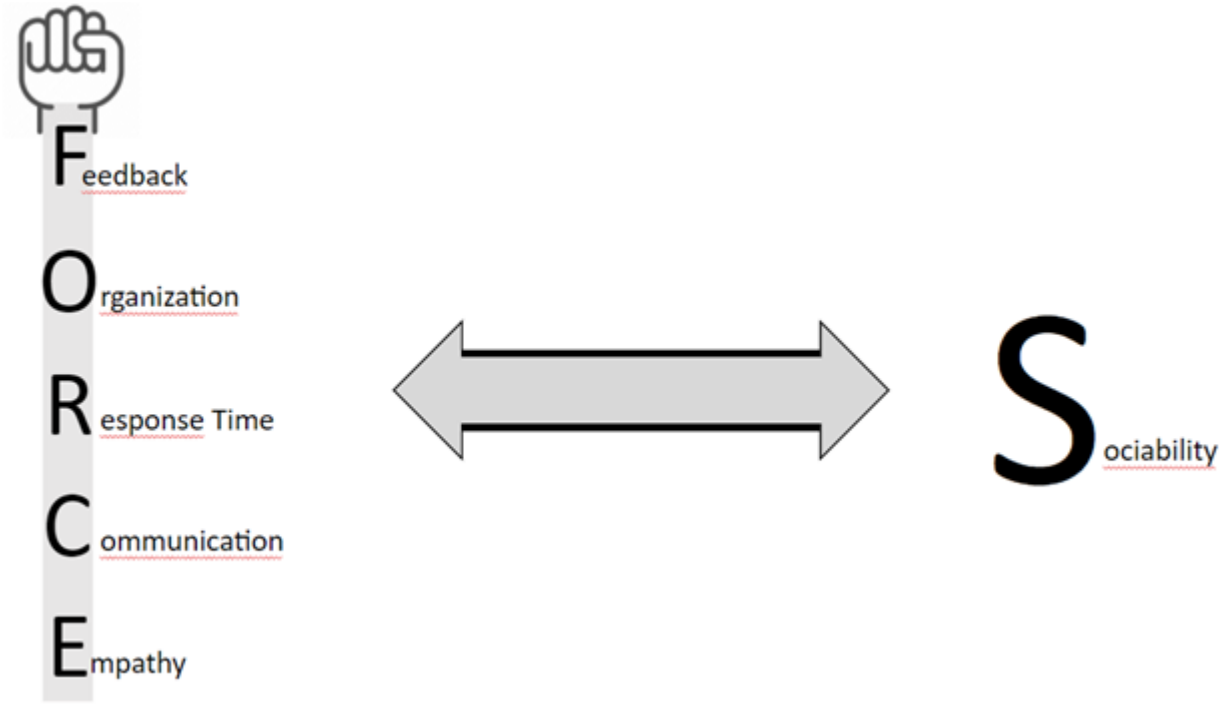


Image showing how Feedback, Organization, Response Time, Communication, and Empathy create Sociability.

Table 3 offers suggestions for using FORCES to create connections with students in the online environment. The FORCES can take instructor presence to another level from projecting themselves as a real person (Richardson et al., 2015) to creating a sense of comradery and trust with the student.

Table 3

FORCES with student examples and applications

Theme	Student Examples	Application	Things to Remember	Illuminating Quote
Feedback	Constructive feedback, yet with at least one positive point. Add what could be improved but end on a positive note.	Use a conversational tone with feedback (text-based) For example, add video feedback using TechSmith Capture: https://www.techsmith.com/jing-tool.html	Create feedback loops in online classes. Have students submit parts of large projects throughout the semester.	Provide feedback on assignments that shows they actually took the time to read and give back advice. Timely and detailed feedback is highly important, especially on the first graded assignments so I can adjust for future assignments.
Organization	Simple Easy to find materials Weekly modules Authentic learning activities	Organize content (assignments, content, etc) into weekly modules Change cumulative tests to short answer Chunk large assignments/projects into smaller checkpoints for feedback loop	Build in redundancies so students can access content via multiple clear paths.	Organization is an expectation of my instructors, if they expect me to be organized I expect the same from a professor. It also allows me to do my assignments without misunderstandings or miscommunication.
Response Time	Responses within 12 - 24 hours Knowing how to contact instructors Regular reminders of due dates	Send weekly email/announcements with reminders Use an Ask Your Question forum or something similar to funnel questions to one place.	Even if the answer may take longer, students appreciate getting an email that says, thank you for asking the question, I will get back to you within [x] days.	Just as important is the response rate. Even if/when an instructor can't fully answer your email at the time it's read, a response to let the student know it hasn't escaped the "to-

Theme	Student Examples	Application	Things to Remember	Illuminating Quote
			List typical response time on the syllabus and in the Canvas shell.	do" list of said instructor is important.
Communication	Announcements Email Optional Zoom meetings Asynchronous content videos	Set up weekly announcements to organize due dates Send emails on regular basis to connect students to content Offer Zoom or Teams work sessions Create asynchronous content videos with instructor presence	Students value videos created by their instructors over sending them links to other people's work.	I feel that weekly announcements and a to-do list are also helpful in creating and maintaining an online course.
Empathy	Students used the words care[ing] and understand[ing] when describing their successful instructors Note student situations Be positive in nature Demonstrate care for students and student learning	Send individualized emails Offer sincerity Send positive messages	Students value the message, not the mode of delivery.	I want them to understand the situation from our point of view as a student.
Sociability	Conversational tone Humor	Be yourself in videos Use a conversational tone in writing and in videos Tell a story about yourself	Instructional videos do not have to be polished.	Be kind, happy to see their students, excited for the class. Share their own experiences.

Instructional designers and faculty new to teaching in the online environment can use the FORCE to create a sense of sociability, helping students to perceive their instructors as real and feel more connected. This contributes to increased satisfaction and motivation to learn.

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Exploring Dimensions of the Past: A Historiographical Analysis of Instructional Design and Technology Historical Works

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Instructional Design History | Historiography | Historical Method | Postmodernism | Historicism | Socio-cultural History | Historical Perspectives

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Every academic field has a history valuable to understanding how a field developed (Ames, 2015). History can offer important insight into times, places, and people that have long been considered less relevant to the present or future. Through re-examination of written histories using new philosophical lenses or analytical approaches, researchers and practitioners are able to prevent stagnancy in historical research and uncover new perspectives or moments in history, specifically Instructional Design and Technology (IDT) history. This critical historiography of IDT's written histories examines how various approaches to writing IDT history produce certain interpretations and understandings of IDT's past. Historiography is the critical analysis of the written history of the history of a field or topic of study, such as IDT (Becker, 1938; Breisach, 2007; Cheng, 2012; Spalding & Parker, 2007). Historiography is useful in understanding how history has been written and how the act of writing and interpreting history impacts the understanding of history, the present, and the future (Cheng, 2012). This article introduces two major historical and philosophical paradigms evident in IDT history and explores associated research methods. The article then explores how historical record is thought about, shaped, and written to shed light on areas of IDT history previously unexplored and offer suggestions for future research and practice. A greater awareness of varied historical approaches and perspectives in academic inquiry can offer new ways to bolster or broaden research agendas and practitioner work in IDT.

Introduction

Everything and everyone has a history – a place from which it or they originated that conveys understanding (Breisach, 2007). Every academic field has a history valuable to understanding how a field developed (Ames, 2015). A field's

written history bridges its past to its present by offering valuable insights about times, places, and people long considered forgotten or less relevant to the present or future. Annalist historian Fernand Braudel (1980) stated about writing history, “everything must be recaptured and relocated in the general framework of history, so that despite the difficulties, the fundamental paradoxes and contradictions, we may respect the unity of history which is also the unity of life" (p. 18).

One strategy used to “recapture” and “relocate” a field’s history to create more unity within that field and “life” comes from using historiography. Historiography is the study of the history of history and achieved by examining the approaches historians have used to record specific histories throughout time. As such, historical research – the methods and philosophies – has much to offer in understanding instructional design and technology (IDT) history. A review of written histories of the field of IDT suggests an opportunity to expand the historical knowledge base to impact research and practice. IDT has a rich history documented by various authors which has served the field well over time (Cuban, 1986; Iverson, 1953; Lembo, 1970; Molenda, 2008; Reiser, 2001a, 2001b; Saettler, 1953, 1967, 1990, 2004). However, shifting historical approaches to IDT history deepens the understanding of IDT’s past, and prepares IDT researchers to fully represent the field in the future ensuring a wealth of uncovered knowledge and research or practice opportunities are not left behind.

This article aims to demonstrate how views about history and approaches to documenting history may cultivate and constrain understanding of IDT’s past. It is hoped that such an understanding can advance IDT’s historical research agenda towards informing a more holistic and inclusive practitioner agenda in the future. This article defines historiography and traces how philosophical approaches to history have been applied in the representation of IDT history. Using historiography, this article outlines historical perspectives existent in IDT history and introduces new perspectives or approaches to researching and writing IDT history. By re-assessing how historical record is thought about, shaped, and written, the next generation of IDT scholars can shed light on areas of IDT history previously unexplored. Greater awareness of the historical approaches and perspectives in IDT’s academic inquiry can offer new ways to bolster or broaden agendas in IDT research and practice and hold potential for more inclusive representation in telling the stories of the field’s past, present, and future.

Defining Historiography

Historiography is the critical analysis of the written history of the history of a field or topic of study, such as IDT (Becker, 1938; Breisach, 2007; Cheng, 2012; Spalding & Parker, 2007). Historiography is defined as:

> *A historical technique in which the researcher examines how the history of a topic has been written, including the author’s ideologies and arguments, the scope and foci of the person’s work, the treatment of sources (or lack thereof), and the historical context of the work being reviewed (Gasman, 2011, p. 402).*

Historiographies help to paint a fuller picture of interpretations of the past to direct future research and practice. Historiographical analysis allows for re-examination and re-interpretation of written histories using new philosophical lenses or analytical approaches. Consequently, new and seasoned researchers are able to prevent stagnancy in historical research and uncover new perspectives or moments in history, specifically Instructional Design and Technology (IDT) history.

If historiography is the history of history, then, what is history? Professional historians have argued about this question for centuries with little consensus as to the answer (Breisach, 2007; Cheng, 2012; Spalding & Parker, 2007). Historiography should not be used synonymously with “history.” Historiography considers how all writers of history and historical record possess their own perceptions of the past. From Roman and Greek historians of antiquity, to Voltaire, Hume, and Gibbon of the Enlightenment era, to Hegel, Marx, and Bancroft’s histories of modernization, these historians all had preconceived understandings of what history is and its subsequent purpose for posterity (Arnold, 2000; Bancroft, 2002; Breisach, 2007; Cheng, 2012; Spalding & Parker, 2007; Stern, 1956). Likewise, writers of IDT history have set notions of what history is in relation to IDT as a realm of practice in the past and, consequently, the present. Therefore,

historiography is a useful tool for understanding how history has been written and how the act of writing and interpreting history impacts the understanding of history as it has been written over time. Historiography shifts the focus away from specific historical events – what many people conceive as the study of history (Becker, 1938). Spalding and Parker (2007) explain history is *the past* and historiography is the study of descriptions of the past or how the past is described. Historiographers caution that the simplicity of viewing the definition of history as only *the past* denies the inclusion of an expansive understanding of how history is shaped by those that author it, their assumptions, and their biases (Cheng, 2012; Spalding & Parker, 2007). Written histories are inherently embedded with the biases of their authorship meaning there is no particular way to truly know the past as it was – only as it is detailed through the lens of another (Cheng, 2012; Gaddis, 2002). Historiography acknowledges the subjectivity of written histories and allows for a critical lens aimed at author's perspective, author's agenda, "accuracy" of interpretation, source selection, and historical assumptions to determine patterns, new understandings, and limitations in a body of historical work (Becker, 1938; Breisach, 2007; Cheng, 2012; Gasman, 2011; Spalding & Parker, 2007).

Early Philosophical Views of History

How has the history of IDT evolved to be represented as a field? For pragmatic purposes, historians generally agree history is a complicated puzzle skillfully pieced together through research of primary and secondary sources – i.e., the historical method (Arnold, 2000). Marc Bloch (1992), Annalist historian, stated "the historian is, by definition, absolutely incapable of observing the facts which he examines" (p. 40). Because a historian cannot observe the past, Januszewski (1996, 1997), an IDT scholar, explains resources are analyzed, interpreted, and inferences are concluded based on the historian's epistemological, philosophical, and theoretical views about history, and IDT more specifically, as a field of study and practice. Unfortunately, historians are often left without enough recorded evidence to determine the "truth" about what occurred, or as German idealist Leopold von Ranke stated, "Wie es eigentlich gewesen ist (the way it really was)" (Cheng, 2012, p. 74). Historians must ask questions such as what happened? or, did not happen? and, why? what was it like then? and what was the cause or the impact? Because historians cannot observe historical facts directly, historians are forced to, instead, answer these questions with evidence-based guesswork from primary and secondary sources (Cheng, 2012; Gasman, 2011).

Historical guesswork is heavily influenced by the researcher's understanding of what history is and the events and people being studied, and historians are rarely able to validate their interpretations because no historian truly knows the past. Entire tomes of philosophical research and writing have been dedicated to supposition regarding the definition and philosophy of history, and the subsequent histories written from these perspectives. A thorough discussion of these perspectives is outside the scope of this article (Januszewski 1996, 1997; See *Stanford Online Encyclopedia of Philosophy*, E. H Carr's 1961, *What is History*? or R. J. Evans' 2000, *In Defense of History*). Instead, primarily as an introduction to historical thinking, this article explores two broad philosophical realms influencing IDT history and how IDT history is described – historicism and postmodernism.

These two realms are *not* diametrically opposed, but have various perspectives, methods, and approaches that often overlap depending on the author and historical context in which they are writing (Cheng, 2012). Historicism envelops rich traditions such as positivistic history, Hegel's dialectics, historical relativism, Marx's historical materialism and more, while postmodernism encompasses such approaches as social scientific, feminist history, and social history, to name a few. Both perspectives allow researchers to make valuable contributions to the field through rigorous historical primary and secondary source research. However, by separating historical philosophy in this manner, it is easier to demonstrate the broader implications of how histories in IDT, specifically, are predicated on these views and major underlying assumptions.

Early Rankean Historicism

Rankean historicism calls for critical analysis and scrutiny of historical records to uncover accuracy and authenticity through rigorous primary source investigation (Arnold, 2000). Leopold von Ranke (1795-1886) coined the term historicism to describe the study of the past as it was and urged historians to steer away from overarching explanations

of causal analysis, tempting interpretation where not required (Cheng, 2012; Stern, 1956). Historicism was a disciplined response to historical narrative, romanticism, embellishment, and storytelling in historical records – an attempt to dispel philosophical influences and personal belief. Principles of historicism maintain an observable truth of the historical past (Arnold, 2000). Each historical period or moment is unique and significant and should not necessarily be considered a precursor to present or future events (Cheng, 2012). Ranke's historicism became the underlying assumption of the historical profession – that everything in history is a product of historical forces shaped and conditioned by historical context (Cheng, 2012). Historicism relies on principles such as Comte's scientific idea of observable frequencies – if enough observable examples or facts could be discovered, then laws or patterns could be deduced about the past as it really occurred at a particular moment (Arnold, 2000; Cheng, 2012). Consequently, historicist methods are traditionally taught to all school-aged learners and novice historians as the foundation for historical inquiry, and these methods are reflected in valuable histories in IDT.

Both McClusky (1981) and Lembo (1970) examine the historical development of the Department of Audio-Visual Instruction (DAVI) via primary source analysis. Lembo's (1970) DAVI sanctioned dissertation on the history of the growth and development of DAVI is the result of an extensive interrogation of primary documents from 1923 to 1968 using the historical method. Iverson's (1953) dissertation on the history of audiovisual instruction uses in-depth archival evidence to construct a historical narrative of the audiovisual movement. In *Teachers and Machines*, Cuban (1986) accessed primary sources on technology use in the classroom throughout the early 20th century. Cuban (1986) inspected various public-school reports and records to determine technology use in classrooms from the 1920s onwards to examine the progress of technology's promise to enhance the classroom environment. Saettler's (1953, 1967, 1990, 2004) comprehensive histories of the field are indicative of a Rankean approach to historicism, based on descriptive use of primary and secondary source analyses. All of these works focus on the collection of facts observable in historical records to determine patterns or natural laws existent in IDT's past.

Modern Historicism, Progress, & Historical Timelines

Early Rankean historicist methods developed and focused on rigorous procedures known as the historical method to explain observation of historical facts. However, historians recognized the inherent difficulty in maintaining purist stances of objectivity in historical writing under the auspices of observable facts because widespread interpretation was consistently required to explain how or why events occurred. Historians considered objectivity especially challenging while personally living during periods of political and socioeconomic change or influence (Arnold, 2000; Cheng, 2012). Over time, conflicted historians agreed the science of history was determined by objectivity of facts such as dates, places, and names, but some subjectivity supported reconstructing cause, motive, and explanation (Cheng, 2012). The meaning and procedures of historicism shifted and weakened constraints on Ranke's original intentions for historical analysis resulting in new patterns, causes, and overarching explanations of history (Cheng, 2012; Breisach, 2007; Spalding & Parker, 2007). Historians started to use causal analysis to explain ideas of progress as central to history's movement (Bancroft, 2002; Cheng, 2012; Stern, 1956; See Fisher's 1970 explanation of the fallacies of causation and generalization in *Historians' Fallacies: Toward a Logic of Historical Thought).* Enlightenment reason and nineteenth-century idealism transformed historicism to reflect teleological ideas and the movement of humanity's progress throughout time (Cheng, 2012). Teleological perspectives of history are based on the idea that humanity or society is moving towards civilization through constant improvement (Arnold, 2000; Cheng, 2012; Fischer, 1970; Stern, 1956). History suddenly presented as a long march to a predetermined endpoint or culmination in history examined through historical record (Bancroft, 2002; Cheng, 2012).

Teleological views of history are not new to historians nor are they absent in IDT histories. Ideas of progression and determinism are maintained in 21st-century contexts as contemporary historians and educators speak of technological growth and development as cycles (See Gartner Hype Cycle, Panetta, 2021). Saettler's (1953, 1967, 1990, 2004) compendiums use causal connections and archival guesswork to demonstrate the rise, development, and linear movement (i.e., teleology) of IDT by connecting IDT history to early philosophy in ancient times through to its lengthier development during the 20th century. Saettler's (1953) dissertation "confined itself to tracing in outline the general development of this field" (p.8). Saettler (1953, 1967, 1990, 2004) uses a general arc of progress and development to

frame IDT's success and progress as a field. Histories, such as Saettler's, analyze primary sources from the earliest points in IDT history to ultimately demonstrate the realization or accomplishment of the field of IDT.

Saettler's histories are moderate versions of what historians describe as historical exceptionalism or the idea that the realization of an artifact or event's history occurred at the pinnacle of the arc in its historical timeline or trajectory. Similarly, Cuban's (1986) history uses progress of technology development in the classroom to trace cycles of adoption and failure throughout the history of the classroom. Iverson (1953) and Lembo (1970) both emphasize the growth of the audiovisual movement and progress of DAVI over a similar arc of progress. Lembo (1970) threads a line through DAVI's rise, evolution, and establishment in the audiovisual movement exemplifying similar historical progression via a coming-of-age history. Reiser (2001a, 2001b, 2017a, 2017b) and Molenda (2008) trace the order of major IDT developments and the naming of the field of IDT throughout the twentieth century. All previously mentioned IDT histories describe the development, change, and flow of events towards an undetermined endpoint measured by progress (Arnold, 2000; Cheng, 2012; Kvale, 1995; Popper, 2002) to demonstrate the trajectory of IDT's history. However, while valuable to understanding how IDT developed as a field, these perspectives also construct what historians call "meta-narratives" defined by recognized postmodernist Jenkins (1991) as "old organizing frameworks that presupposed the privileging of centers" (p. 71) – total overarching accounts of historical events and experiences. Axiologically, teleological histories inadvertently use the historical method to demonstrate value or confirmation of certain ideas such as progress, supremacy, and greatness through grand designs of advancement and improvement.

Problematizing Historicism

IDT historical interpretations rely heavily on teleology to emphasize what is valued in IDT history and how far the field has developed, changed, and most importantly progressed or improved over time using a common, yet somewhat problematic historical tool – periodization. Historical periodization is a necessary tool in historical writing and heavy reliance on periodization in writing structures permeates teleological histories. Historians use periodization to label sections of time to easily describe changes and progression with identifiable start and end points (Arnold, 2000; Gaddis, 2002; Popper, 2002). Teleological interpretations of history adhere heavily to divisibility of time to demonstrate passage of time (Cheng, 2012). While practical in displaying an organized progression of the field through periodization of events, theories, and ideas, periodization is a historical paradox (Bentley, 1996; Popper, 2002). Researchers use periodization in consideration of their goals in writing which in turn unintentionally prescribes meaning about how a period is situated in the broader framework of history. Based on how broadly or narrowly periods are defined by a historian, prescribed timeframes often imply meaning not originally intended by the researcher (Arnold, 2000). Butler (1995, 2000a, 2000b), Cuban (1986), Lembo (1970), Molenda (2008), Reiser (2001a, 2001b), and Saettler (1953, 1967, 1990, 2004) utilize chronological order and prescribed time divisions to describe sections of IDT history.

Saettler's (2004) book section and Butler's (1995, 2000a, 2000b) histories of the audiovisual movement date the audiovisual movement between approximately 1920 and 1960. Cuban (1986) situates the start of the audiovisual movement in the 1920s. Lembo's (1970) entire dissertation on the audiovisual movement and DAVI, places the movement precisely between 1923 and 1968. However, in a transcribed interview of Elizabeth Golterman in Butler's (1995) dissertation, developments in educational film were historically evident long before the 1920s and 1930s. A similar example, instructional television's rise is situated in the 1950s and 1960s in most IDT histories (Cuban, 1986; Reiser, 2001a, 2001b, 2017a, 2017b; Saettler, 1953, 1967, 1990, 2004), but Taylor (1967) points toward earlier development and use of television and broadcasting in education. Developments before and after instructional television reached its apex in the 1950s and 1960s risk being lost because periodization artificially constrains instructional television to one moment in time. As a result of periodization, IDT researchers and practitioners may fail to look for education and technology developments in IDT history outside of time periods strongly associated with the emergence of those technologies in written IDT history.

Periodization may also influence perceptions of the historical trajectory of theoretical foundations in IDT. As a mechanism for framing trends in the field, Reiser (2001a, 2001b, 2017a, 2017b) uses periodization in his histories to describe the development of instructional theories and associated decades. For example, systems thinking is situated in the 1970s, industry and performance enhancement is featured as a development of the 1980s, and constructivism

gained prominence in the 1990s (Reiser, 2001a, 2001b). Molenda (2008) also bases the latter part of his chapter on outlining decades of IDT development on learning and instructional theories. While periodization provides better understanding of the general movement and development of IDT theory, it could possibly limit recognition of the range of time in which historical foundations of a theory developed. Roots of instructional theories developed before the commonly associated decades in IDT history. For example, constructivism's roots appeared long before the 1990s – a time where more researchers started to accept the theory as useful in the field of IDT. Piaget, Vygotsky, Papert, Dewey, and Bruner all promoted learning theories based on similar underlying philosophies (Driscoll, 2005). Periodization inadvertently confines theories like constructivism to certain places in time which has the unintended effect of redirecting the focus of research exclusively to that time point (Arnold, 2000). This limitation may be a particular challenge for novice researchers or practitioners who may not possess the skills or knowledge to uncover contributions to the development of IDT's theoretical underpinnings, as well as those outside of the field who may utilize IDT concepts as a basis for cross-disciplinary research and practice. Future researchers or practitioners may fail to look beyond constructed periods for precursory evidence of IDT's theoretical beginnings.

Existing written histories of IDT evidence strong support for traditional historicism and thorough attention is paid to the rise and development of our field. However, while historicism through teleology lends itself well to exhibiting the development of IDT via cause and explanation, another historiographical issue with teleology is generalization (Arnold, 2000; Gaddis, 2002; Popper, 2002). Spalding and Parker (2007) explain historicism is comfortable because it is human nature to organize, order, and explain. Evans (2000) defends historicism's usefulness in causal explanation because humanity yearns to know "why?". However, teleological histories and metanarratives of progression also equate the full complexity of a field's history to single sweeping patterns or cycles (e.g., rise and fall of civilizations or empires). These interpretations may range from an inadequate representation of the full complexity of historical trajectory to, in extreme cases, communicating determinist ideas (Gaddis, 2002). IDT histories relying heavily on teleology convey strong generalizations of historical time periods and people to the exclusion of other historical perspectives and experiences (Jenkins, 1991). In response to generalization and the paradox of periodization, the rise of postmodernist ideas in historical analysis has led to the deconstruction of issues resulting from the limitations of historicism.

Postmodernism: A Shift in Historical Perspectives

By the mid-twentieth century, a change in perspective regarding how history is examined and represented impacted the study of IDT history. Historians considered interpretations of history a product of the influence of authors' social and cultural context (Becker, 1932; Spalding & Parker, 2007). Cheng (2012) explains context became the central focus of historical inquiry. Context's influence on historical writing stipulates there can be no definitive universal truth about the past because overcoming subjectivity in writing history is impossible (Becker, 1938; Cheng, 2012; Jenkins, 1991). Postmodernist historians argue history is a constructed past and there is a plurality of criteria to determine what is true and for whom (Breisach, 2007; Cheng, 2012). Historian Jacob Burckhardt (1818-1897), as quoted in Oléron Evans, Müller, and Giannaccini (2017), puts the postmodern view into perspective:

> *In the wide ocean upon which we venture, the possible ways and directions are many; and the same studies which have served for my work might easily, in other hands, not only receive a wholly different treatment and application, but lead to essentially different conclusions (p. 7).*

With varying interpretations, postmodernists believe seeking a universal truth does not fit with contemporary understandings of knowledge production, cultural experiences, and construction of a historical past (Cheng, 2012). Critics of historicism's philosophy deconstruct the prevalent paradigmatic approaches derived from the Rankean tradition. Bloch (1992) conceived of history outside of the traditional linearity of progress. He proposed a multiplicity of ways of looking at the complex layers and interconnectedness of historical time and place (Breisach, 2007; Cheng, 2012). By considering new concepts of time, historians focus less on generalizations and more on the complexities of specific timepoints in history and the participating humans. These historians contend teleological histories look for meaning where it does not exist – outside human experience and artifact (Cheng, 2012; Gaddis, 2002). Bloch (1953) proposed that, "everything that a man says or writes, everything that he makes, everything he touches can and ought to

teach us about him" (p.66). Postmodernists aim to contextualize history in order to reveal human experiences and return agency to individuals and groups in order to convey history from their personal perspectives.

The Postmodern Lens in IDT

New perspectives often promote new methodological approaches, as is evident in more recent historical research explorations in IDT. Scholars including Bradshaw (2018), Butler (1995, 2000b, 2008), Butler and De Vaney (1994), Butler and Lockee (2016), Donaldson (2016), Lockee and Song (2016), Subramony (2018), and Young (2001, 2009) characterize postmodernism in their historical analyses. Butler (1995, 2000b, 2008) and Butler and De Vaney's (1994) research of IDT history use discourse analysis to focus on extracting meaning from everyday action or language without assuming that all humans experience history the same way. Butler (1995, 2000b, 2008) and Butler and De Vaney's (1994) histories focus more on historical experience and less on explanations for historical occurrences while Donaldson (2016), Subramony (2018), Bradshaw (2018), and Young (2001) seek to contextualize historical experiences in IDT and return agency or voice to previously excluded individuals and groups. Butler (2008), Butler and Lockee (2016), and Lockee and Song (2016) challenge the precedence of written text in history by recording interviews with *AECT Legends and Legacies* as living records for posterity and promoting oral history as a valuable research approach. All of these histories aim to examine new areas of IDT history otherwise previously unnoticed or forgotten due to traditional historical perspectives and methods. Postmodernism addresses the limitations of historicism by forgoing prevalent ideas of teleology and using new tools and approaches to unveil missing parts of the past.

Challenging Historicist 'Documentation' and Tools

Evident in postmodern perspectives is the use of different research methods and tools to complement the historical and philosophical approach. Butler and Lockee (2016) and Donaldson's (2016) research in IDT use written biographical and autobiographical methods in history as forms of historical record. Butler and Lockee (2016) composed historical vignettes on prominent women in the field of IDT. Historical vignettes are short episodic highlights of important features of historical experiences or biographical snapshots based on historical sources. Gasman (2011) explains historical biographies or autobiographies examine the intertwined life of a single person or group of people affected by historically situated issues. Piecing together biography and autobiography, Donaldson's (2016) *Women's Voices in the Field of Educational Technology* reflects the use of prosopography. Prosopography is "a controversial form of historical research, involving the use of collective biography [or autobiography] to make assertions based on themes or occurrences that happen across the biographies [autobiographies]" (Gasman 2011, p. 406). According to Gasman (2011), traditional historians do not sanction collective use of biographies to generalize about larger historical issues. Countering, Gasman (2011) argues prosopography "can be quite useful in terms of looking at the actions of individuals across decades or the influences of a movement or National events [historical moment] on many individuals" (p. 406). Donaldson's (2016) book collects personal experiences of women both past and current to demonstrate that while women's experiences differ, collective themes run throughout the personal and historical narratives of women of IDT.

Another innovative and controversial approach to history is oral history. Butler (2008) states "simply speaking, an oral history is a recorded interview of an individual or group of individuals by an historian . . . " (p. 34). Gasman (2011) describes oral history as controversial because it relies on the unreliability of memory. However, Gasman (2011) encourages the use of oral history because it results in real-life experiences that can be validated or invalidated with existing historical records. Oral histories in conjunction with other primary documentation could develop new understanding and perspective on IDT history. For example, many of the *AECT Legends and Legacies* (n.d.) interviews can be cross-validated with written records to substantiate memories. Oral histories are critical to historical record because quite often they are the only existing records of a time period (Butler, 2008). The *AECT Legends and Legacies* (n.d.) interviews provide valued records of researchers and practitioners in the field, and knowledge of IDT beyond academic journals (Bonk, 2018; Lockee & Song, 2016). AECT interviewees were more likely to share informal IDT knowledge gained from conference, personal, teaching, and academic or practitioner experiences – information not typically garnered from professional publications. Oral histories also challenge supremacy of forms of written history by recording living accounts of oral tradition and human experience (Butler, 2008; Cheng, 2012). The hegemony of written

history as a product of historical analysis is primarily a Western Eurocentric development that is highly valued over oral tradition (Breisach, 2007).

Challenging Teleological Passivity

Because of the paradigmatic primacy of written history and traditional approaches, historical research in IDT follows evident patterns of progression determining the people or groups included as the focus in historical writing. Teleology tracks progress and power in historically recorded events traditionally linked to masculinity (Lerner, 1979; Spalding & Parker, 2007). IDT as a field heralds its military beginnings because instructional design theory and practice were by proxy developed and tested under exacting specifications for military training (Butler, 1995; Butler & De Vaney, 1994; De Vaney & Butler, 2001; Reiser, 2001a, 2001b). Based on significant IDT contributions in preparing the military during the wars, portions of IDT history are indelibly attached to events where men are situated as central in social, economic, and political spheres of the time. Cuban (1986), Reiser (2001a, 2001b, 2017a, 2017b), and Saettler (1953, 1967, 1990, 2004) follow the progression of major developments in IDT history and therefore, predominantly male-oriented events or activities. Most IDT historical writing during the twentieth century plausibly depicts the work and actions of those in socially powerful positions – primarily men (Lerner, 1979).

As revealed, new approaches to historical analysis enable researchers to uncover the "hidden pieces of the past" or "history from below" (Breisach 2007, p. 368). Butler (1995, 2000b), Butler and De Vaney (1994) and De Vaney and Butler's (2001) work highlight women contributors to the field of IDT. De Vaney and Butler (2001) employed historical discourse analysis to deconstruct dominant language used in IDT to reveal the gendered perceptions of women in IDT and the barriers these perceptions placed on access to the field. The analysis focused specifically on how past IDT professionals referred to and spoke about men and women in the founding years of AECT. For instance, Saettler's (1953, 1967, 1990, 2004) histories refer to Amelia Meissner, Anna Verona Dorris, Margaret Devizia, Elizabeth Golterman, Rita Hochheimer, and Etta Schneider, but mainly as footnotes or single lines of reference in the broader narrative of IDT's development. Saettler (2004) explains that the St. Louis Educational Museum was a significant part of IDT history. He writes the museum was the, "impetus [. . .] of former United States Commissioner of Education William Torrey Harris" (p. 129) and Carl Rathmann, the Assistant Superintendent of the St. Louis Public Schools, "who became aware of the instructional potential of these exhibits." (p. 129) Saettler (1967, 1990, 2004) emphasizes Harris and Rathmann as the men responsible for purchasing and negotiating the museum's acquisitions – work perceived in the early 1900s and at the time of Saettler's (1967) earliest publication as men's sphere of influence. In five paragraphs about Harris and Rathmann, Saettler (2004) recognizes Amelia Meissner in a short statement as first, "the daughter of a famous horticulturist" (p. 129) and second, as "ready to bring the world to the child" (p. 129). Meissner is listed as the curator of the museum and not mentioned again. However, Butler (1995), Butler and Lockee (2016) and De Vaney and Butler's (2001) approaches to IDT history reveal Meissner was responsible for the development of museum instructional materials and exhibits. She was responsible for acquiring, collecting, and cataloguing educational artifacts while managing the museum (Butler, 1995).

Similarly, new approaches shift focus and highlight other overlooked women contributors such as Margaret Divizia – a highly active audiovisual materials officer for the US Navy (Butler, 1995; De Vaney & Butler, 2001). Margaret Divizia does not surface in most research before Butler (1995) and De Vaney and Butler's (2001) change in historical perspective and method of analysis. Notable IDT contributors such as Sister Mary Theresa Brentano, Elizabeth Golterman, and Rita Hocheimer are not prominent in the literature of the history of the field either. Herndon's (2001) micro-historical analysis looks for evidence of tape teaching before its epitome in IDT history. Herndon's approach uncovers Sister Mary Theresa Brentano's successful tape teaching classes in Catholic schools in the early to mid-twentieth century – before tape teaching was popularized. Butler's (1995) discourse analysis and oral history reveals Golterman led many audiovisual committees and worked alongside Amelia Meissner as an educator in the St. Louis Educational Museum (Butler & Lockee, 2016). Hocheimer was a film educator that oversaw the New York City Schools' Bureau of Visual Instruction for over 25 years (De Vaney & Butler, 2001). New approaches and perspectives reveal IDT as a field with a diverse past previously undetailed in historical writing. Postmodern thinking necessitates new historical approaches that equip researchers with tools to explore the dynamics of IDT's historical past including the interplay and perceptions of race, class, gender, ethnicity, and sexuality in IDT history.

IDT histories written from postmodern perspectives may reveal a richer, more nuanced history of the field. Critical race and gender analyses emphasize issues in historical writing regarding gender, class, and race homogeneity. Specifically, gender analyses move a step further past "women's history" (Cheng, 2012; Spalding & Parker, 2007). Referring to "women" in history as a homogenous group presupposes all women singularly experience history in one way – overlooking intersectional experiences associated with race, ethnicity, sexuality, and culture.

The term "women" is a socially-constructed label standardizing one historical experience for all women of different races, ethnicities, sexualities, and cultures (Tierney, 1991). Gender historians examine the complexities of gender as constructed labels reflected in historical writing. Women identified in IDT histories such as Butler's (1995) discourse analysis are primarily white, affluent, heterosexual women. While these women are contradictions to temporal norms, they still functioned within dominant cultural spheres of their time. Power, even historically, is multifaceted and distributed unevenly, and the intersectionality of social variables such as race, class, gender, and sexuality need to be accounted for in historical analysis (Subramony, 2018).

Subramony's (2018) sociological lens on the field of IDT highlights intersectionality at play in daily practice and research agendas. Subramony urges the IDT community to explore current participation of LGBQTIA2S+ identities in learning environments, workplace performance settings, and digitally mediated spaces. Subramony's dismay at not exploring the valuable contemporary experiences of the LGBQTIA2S+ community in IDT extends in this article to the past – IDT's history impacts present and future directions in IDT practice. Turning a critical race or gendered lens on IDT histories leads one to ask the following questions: How did the diversity of the LGBQTIA2S+ community contribute to IDT's history and what were the personal and social barriers to participation? Where were historical participants of different races, ethnicities, and cultures situated in IDT history? Did they have a contributing role? If not, what were the barriers placed on these communities and how did this impact IDT? And, how have valued forms of historical research and writing excluded underrepresented groups from IDT history?

Bradshaw's (2018) work on social justice and Young's (2001) history of African American participation in the field of IDT begins to address these questions. Bradshaw (2018) utilizes postmodern perspectives to discuss underrepresented groups in IDT history. Bradshaw's (2018) work demonstrates the importance of contextualizing histories of IDT. It is necessary to seek understanding of the past through the social contexts that shape the period being investigated and the author's writing about that period. For example, histories of IDT narrate history as it progresses through the mid-twentieth century. Very few works include references to historic social or cultural movements impacting society and consequently, education and technology. Bradshaw's (2018) analysis draws attention to the social backdrop of IDT history by outlining the importance of the Civil Rights Movement of the 1950s and 1960s from Martin Luther King Jr. and Rosa Parks to visceral responses towards Emmitt Till's murder. It is likely contributors to the field of IDT at that time would have been aware in some capacity of these events and even more likely those authoring IDT histories more recently would have knowledge of these events in historical hindsight.

Aiming a critical race lens on IDT history, Young (2001, 2009) uncovers significant African American contributions to nineteenth- and twentieth-century IDT and emphasizes how African American roles as active producers and participants in the past have been "ignored, lost, destroyed, excluded, omitted, sporadically documented" (p. 671) and therefore, devalued by historical record. Herbert Aptheker, prolific African American historian, as quoted by Young (2001), underlined the realistic impacts of historical perspective and interpretation:

> *A Jim Crow society breeds and needs a Jim Crow historiography. The dominant historiography in the United States either omits the Negro people or presents them as a people without a past, as a people who have been docile, passive, parasitic, imitative. This picture is a lie. The Negro people, the most oppressed people in the United States, have been militant, active, creative, productive (p. 671).*

Young's histories deconstruct existing historical narratives regarding the African American population. She examines the cultural and racial instructional components of an 1866 newspaper textbook named *The Freedman's Torchlight* and a 1920s monthly magazine known as *The Brownies' Book* with an aim to document African Americans' active engagement in educating their cultural and racial communities. Young's research provides evidence and argument for

the introduction of culturally responsive instructional design approaches and materials in IDT practice. Subramony (2018), Bradshaw (2018), and Young (2001, 2009) implore researchers and practitioners to understand that IDT's history is embedded in historically significant social, racial, and cultural contexts – so too are the writers authoring IDT history. By recognizing the socio-cultural and political impacts of the time in which a history is being written from a critical perspective, consumers of IDT historical research may better understand the interpretive lens from which a researcher describes historical experiences.

Directions for Future Historical Research in IDT

Given the issues, challenges, and varied perspectives on the exploration of IDT history, future scholars may wonder where to go from here. The history of IDT is still ripe for discovery and researchers have many opportunities and challenges to undertake as the field moves forward. Using the various philosophical perspectives and methods of historicism and postmodernism can serve to expand understanding, as both offer feasible approaches to history and historical research. The exploration of IDT history has been advanced by many IDT researchers mainly through the use of the historicist perspective. The addition of the postmodern perspective and related strategies hold potential to develop more robust and inclusive accounts of the evolution of the field. While there is much to be desired in the postmodern realm of IDT historical research, IDT benefits from viewing historicism and postmodernism as not only divergent, but complementary as well. Both perspectives leave room for future research and informative practice in the field of IDT.

A Place for Historicism

Historicism maintains potential as a strategy for exploring the history of IDT and it is not the intention of the authors to suggest historical traditions be deserted completely. The authors suggest, as Munslow (1997) stated in *Deconstructing History*, that it "is not the only history we can have" (p. 178). IDT should continue the historical tradition and urge for rigorous use of archival primary and secondary documentation to support traditional approaches to historical research in IDT. According to Butler (1998), the AECT archive contains enough source material "for several dissertations or books as well as articles, monographs, and other publications and/or scholarly works" (p. 29). More recently, Ames' (2015) dissertation developed a framework to identify the status and significance of IDT historical artifacts and confirmed the existing viability of the AECT archives for future research. Ames (2015) records:

> *The archives of AECT span the period from 1912 to 1984, with the bulk of the material dating from 1940 to 1970. The collection contains correspondence, articles, catalogs, convention material, minutes, reports, pamphlets, serials, teacher guides, bound ledgers and scrapbooks, catalog cards, and audio-visual material (including photographs, audio cassettes, audio reels, slides, and overheads (p. 5).*

Richey (2012) discusses a similar need for a rigorously detailed intellectual history of the IDT field in order to properly trace IDT's theoretical roots before the 20th century because much of IDT history is narrowly focused on the period in which IDT comes into its own. A more robust exploration of the archives utilizing a historicist perspective and historical method in IDT is needed to detail practitioner work in the more recent past as well. Ames (2015) states "as long as the artifacts related to the field exist, and are organized and known, there are possibilities for their use, and the field will continue to be capable of enriching itself with new histories" (p. 12). The field needs traditionally documented histories in order to inform the future of 'what works'. Researchers and practitioners better informed of the complexity and nuances of IDT's historical past aid in better use and implementation of instructional technologies. IDT researchers and practitioners can learn by relying on the past).

Awareness of the broad landscape of IDT history imparts better understanding for practitioners of technology implementation and adoption within education and instructional design approaches. However, critical historical analysis of the implementation, adoption, success, failure, and lifespan of instructional design approaches and technology aids IDT in making historically informed decisions about design, development, and implementation (Bull, 2016). Bull argues historical contextualization of the environments and the understanding of conditions in which instructional design

approaches and technologies were successful or faile can assist IDT practitioners in future implementation and use in the classroom and online (Bull, 2016). Dousay and Janak's (2018) article is an example of connecting IDT history and historical writing to current trends and understanding of instructional design and technology use. Dousay and Janak explore the history of educational radio to understand conceptualization and contemporary use of the MOOC. Another example is Shipley et al.'s (2018) examination of the historical changes in application of task analysis in instructional design or Branch and Dousay's (2015) exploration of instructional design models. Thorough investigation of how instructional design and technology has been implemented in education in the past can build a usable knowledge base of lessons learned. Historiographical analysis of processes, outcomes, research, and best practices, may help understand what worked, under which conditions, and why. As posited by Bull (2016), attention to IDT history and how it is written facilitates valuable knowledge about the successes and failures of instructional design approaches and technology's adoption and uses for educational purposes.

A Need for Postmodernism

Postmodernism remains a viable current approach, and used simultaneously alongside historicism, can be used to explore, question, and re-frame existing IDT histories. Because greater social and cultural awareness of IDT's history and context will inform more holistic research and practice, IDT historical research should begin to reflect diversity currently represented in the field. Butler and De Vaney (1994) and Butler and Lockee (2016) have completed groundwork on women in IDT, but this work is only a small facet of women's history and gender-related research still to be conducted. Thorough archival work on specific women identified as past leaders in the field may reveal more fully the extent of their participation and contributions. Triangulation of oral testimony, secondary source documentation, and archival reference will empirically support previous and future research. For example, many early women of IDT came directly from teaching in school systems and safeguard important "ways of knowing" related to instructional design principles (De Vaney & Butler, 2001). A social history approach – oral history – looking at women's roles within schooling as curriculum designers or lesson planners in teaching may reveal familiar instructional design heuristics endemic in IDT today.

Postmodern questioning of IDT histories unveils new local narratives regarding intersected communities centered on gender, race, class, sexuality, and more. Subramony (2018) urges IDT to consider LGBTQI+ perspectives in learning and instructional design. The history of sexual and gender identity stretches across centuries, but has largely been ignored. Examining historical representations and lack thereof in instructional media, textbooks, and curriculum could reveal paths forward for culturally responsive learning and instructional design in practice. Practitioners are better able to implement culturally relevant or responsive design when the cultural, social, and historical background exists to bolster use of the approach as valuable to contemporary instruction. Equally, Young's (2001) examination of *The Freedman's Torchlight* demonstrates that education's mainstream instructional materials and approaches are continuously centric to IDT investigations. The Freedman's Torchlight is one example of African Americans' historical struggle over education. Young (2009) also examines DuBois' creation and dissemination of *The Brownies' Book*, a monthly magazine created to educate children, primarily black children, about childhood, self-love, and racial pride – culturally informed learning. Informal education environments and resources throughout history need to be closely examined because historically undervalued communities, through resilient and resourceful efforts, design instructional approaches, materials, and technologies to learn and impart diverse ways of knowing (Kendi, 2016; Young, 2001, 2009). Similar to Young's work, if a broader array of historical examples are evident in IDT histories, researchers and practitioners might be better positioned or informed to draw on these approaches to implement culturally informed or responsive designs.

IDT research and practice pursued in countries around the world have histories and cultures that influence design and development and use of technologies in education. This article is primarily US focused because of the origin of most traditional IDT history. Shifting historical perspectives in research and practice encourages expanding to include histories internationally. Rigorous research agendas and practitioner work exist in IDT around the world and thus, histories exist globally on the development of IDT. New approaches may guide research and practice to move beyond Western or Euro-centric views. Existing IDT written histories represent the historical trajectory of IDT in one socio-cultural context in US history. Alshahrani's (2016) exploration of the spread and adoption of the internet in Saudi-

Arabian history is an example of how, historically, technology is accepted and used in education in other cultures. Chinese and Japanese academics have thousands of years of history with strong cultural traditions in learning, teaching, and curriculum design within institutionalized education systems (Jansen, 2000; Spence, 1990). Molenda (2008) touches briefly on non-Western perspectives on IDT history by explaining aspects of the foundations of IDT in Asia, but there is more to be unveiled. If knowledge, even historical knowledge, is socially and culturally constructed, there are many social and cultural histories that converge with IDT history yet to be explored. Educating Future IDT Scholars and Practitioners

One of the last implications for shifting the approach or lens on IDT history is the impact on IDT's future generations - researchers and practitioners alike. Providing new ways to re-think the IDT historical timeline and shifting the perspective or approach provides new historical knowledge regarding the foundations of the field of IDT. Students in IDT programs are more often than not taught basics of IDT history featuring foundational texts focused on signpost events (Molenda, 2008: Reiser, 2001a, 2001b, 2017a, 2017b; Saettler, 2004). The field's current understanding of IDT history is perpetuated in each new class of graduating students. Introduction of new histories of the field emphasizing a plethora of perspectives and experiences provides foundational literature to support future research and practice. The education of students in IDT will also better reflect diversity of the field writ large, as well as philosophically and pragmatically influence designer decision-making toward more inclusive practices.

Conclusion

George Santayana (1905) argued "those who cannot remember the past are condemned to repeat it" (p. 284). The field of IDT requires historical analysis as a compass to prevent repeating narratives from the past that offer little assistance to researchers or practitioners currently in the field. As such, this article reviewed some of the prominent written histories collected from the IDT field and, using a historiographic analysis, argues IDT history stands as a guide, but also leaves ample room to expand on. By analyzing current IDT histories to provide guidance for the future and expanding IDT history to be more inclusive of various experiences, this article opens doors for current and future researchers and practitioners to support their work. A nuanced approach to history allows the field of IDT to dive back into the history of the field by examining historical moments more critically to learn from past experiences, and to include experiences more broadly representing race, ethnicity, gender, sexuality, and culture which have contributed to the evolution and development of IDT. A predicted outcome of employing a historiographical approach to the history of IDT may be the growth of the field through inclusion of those with a minimal or non-existent presence in the current histories. It is imperative the field of IDT remain culturally competent and responsive.

Current designers, instructors, and researchers representing the field model behaviors desired for future members of the field. From Social Cognitive Theory (Bandura, 1997) when people see others modeling a behavior, the more like "us" the modeller is, the more inclined one is to believe they can perform the behavior being modeled. With researchers and practitioners more aware of historiographic analysis and historical perspective (i.e., modeling), IDT's future histories can be more inclusive and tell a narrative including more people "like us" – the inclusivity of all scholars and practitioners in IDT. Likewise, with research informing practice related to IDT histories influenced by multiple historical perspectives, history can model how to proceed or not to proceed in the design, development, and evaluation of instruction in various contexts. Practitioners can learn from what did not or did work related to instructional interventions and technologies implemented in learning contexts from the past.

The idea of including a historiographic approach to IDT's history is about opening the doors to IDT's past even wider, to show the field the array of people, places, and events which brought IDT to where IDT is today. This article merely scratches the surface of methods of historical analysis or historical perspectives and the layers of IDT history. Only a small portion of historical methods and perspectives have been explored thus far, leaving a wealth of uncovered knowledge and opportunities for future research informing practice. A historiographical evaluation of IDT history provides a critical understanding of how the history of IDT has been researched, written, and discussed in the literature. Increased awareness of historical approaches such as those described herein elucidate the impact of varying methodologies in the representation of perspectives brought forward, perspectives left behind, or those left out

completely. Using historiography, this article demonstrates views about history and how approaches constrain or cultivate understanding of IDT's past in hopes of directing IDT's historical research and practitioner agenda towards a more holistic future. The field of IDT has a diverse history that, when examined through new philosophical lenses and documented with new analytical approaches, will open opportunities for present and future researchers and practitioners of the IDT community to see more clearly the true breadth and depth of the field's past and future potential. It will encourage growth in the field that serves a global community and acknowledge the diverse communities that represent the strength of the field.

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Designing Virtual Teams for K-12 Teachers

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The COVID-19 pandemic turned many homes into virtual workspaces. Until the pandemic hit, business organizations were the primary users of virtual team models in the workplace. As a result of the pandemic, organizations outside the business sector had to deploy communication technologies to support virtual teams and virtual teamwork amongst employees. K12 teachers were and still are amongst those impacted by this shift. However, the current literature does not reflect enough evidence to support disciplines outside of business organizations with virtual teams in the workplace. As a result, K12 teachers do not have access to virtual team models that best support their progress toward desired outcomes. This article addresses this gap by first reviewing and sharing relevant literature on virtual teams. This paper then follows with a model for virtual team use by K12 practitioners based on the literature around virtual teams and professional learning.

Introduction

The COVID-19 pandemic forced many people to change the way they live and how they work. Over the last year, homes turned into virtual workspaces as COVID-19 mandates forced many employers to run their businesses remotely (Marshall & Moody-Marshall, 2020). With this shift came an increased focus on online professional learning methods to continue to grow their employees. However, shifts to online professional learning across various contexts occurred before the pandemic. Advances in technology and internet connectivity have led to continuously changing professional learning approaches as new tools for collaboration and communication entered the workforce (Handke et al., 2019). An example of this exists in education: for teachers to continue to grow their practice, they have taken part in a variety of models of online learning.

A recent article by Charteris et al. (2021) discussed the shift K12 teachers experienced from in-person to virtual teams due to the COVID-19 pandemic. Drawing on a professional learning and development (PLD) framework from the Australian Institute for Teaching and School Leadership (AITSL, 2012), Charteris et al. (2021) discuss how practitioners in education can use virtual teams to deliver PLD that is relevant, collaborative, and future-focused. Since literature is almost absent on virtual teams for K12 teachers, Charteris et al. (2021) call for more research and models for virtual

team application in education to support teacher PLD. Overall, Charteris et al. (2021) found that teachers successfully transitioned into virtual teams during the pandemic and need continued PLD that supports their contexts.

Professional learning and development support participants' professional learning related to improving their knowledge and skills to be successful in their roles. Online professional development supports professional learning facilitated in one or more of three different ways. may include synchronous, asynchronous, and hybrid strategies (Charteris et al., 2021). Synchronous learning happens in real-time and often mimics face-to-face learning with digital tools. Next, asynchronous learning happens across different times for participants. In this setting, participants may engage in instructor-directed activities such as discussion boards and other social networks for collaborating across time and space. Finally, hybrid learning includes a mix of both synchronous learning and asynchronous learning. Hybrid learning could include in-person sessions followed by virtual asynchronous work (Bates et al., 2016). One model that can consist of all these approaches is a virtual team. Virtual teams are online teams used for various reasons across organizations (Dulebohn & Hoch, 2017). Virtual teams are groups of individuals who work together across space and time, usually toward a common purpose (Bell & Kozlowski, 2002; Gillam & Oppenheim, 2006; Handke et al., 2019; Lin et al., 2008; Snellman 2014). There are several different structures for virtual teams depending upon the team's purpose (Ebrahim et al., 2011). Regardless of the design, these teams typically use digital communication and project management tools to support teams meeting goals.

School leaders often bring teachers together to develop teaching practices through professional learning (Charteris et al., 2020). Professional learning is essential for schools to facilitate teacher learning continuously. Schools and districts apply professional learning to address gaps between their current reality and desired state. In addition to traditional, face-to-face professional learning for teachers, educational leaders have had to explore online approaches to professional learning. Given the potential of professional learning on teacher growth, it is vital for professional learning to be effective. As a result, extensive literature explores effective design features for face-to-face professional learning and online professional learning. Virtual teams provide an avenue for professional learning for teachers. Thus, it is important to consider a possible virtual team model to consider what constitutes effective online professional learning (Charteris et al., 2021). Even though the COVID-19 pandemic forced organizations to move to informal virtual team models, research exists on effective virtual team models (Charteris et al., 2021). However, there is very little research on how virtual teams might support K12 teachers as a form of online professional learning. Therefore, this article aims to explore current research on virtual teams and online professional learning to provide a framework to guide practitioners who seek to deploy virtual teams in an educational setting.

Literature Review

The following section discusses the relevant literature related to online professional learning and virtual teams. The beginning of this review discusses key ideas and delivery modalities for delivering online professional learning. Next, a description and explanation of virtual teams and their defining features follow. Finally, the review ends with discussing the current literature on virtual teams related to teacher education and professional learning.

Online Professional Learning

Professional learning is a common approach to teacher development across school districts. According to Johnson (2014), "professional development is the strategy schools and school districts use to ensure that educators continue to strengthen their practice throughout their career. The most effective professional development engages teams of teachers to focus on the needs of their students" (p. 1). Additionally, characteristics of professional development often include an emphasis on changing knowledge, skills, and practices (An, 2018). Although the purpose remains the same, professional learning can be delivered using a variety of structures that include face-to-face and online components. Online learning has become a popular and prevailing way for adults to learn (Sharp & Whaley, 2018). This popularity may primarily be due to the flexibility online learning provides (Anthony, 2020). Adults taking part in online learning typically choose when and to complete assignments. As a result, this allows participants to learn during a time that best suits their needs and unique contexts.

Regardless of the approach, teachers report issues with current professional learning models, such as time constraints, misaligned content and context, and alternate agendas by administrators (Hanson, 2009). As a result, online learning received increased attention, potentially alleviating some of these barriers and providing more choices for teachers (Elliot, 2017). Currently, research focuses on effective design components of online learning experiences so that those designing the experiences can maximize instructional outcomes.

Current research shows that practical professional learning experiences for teachers include content-focused learning, encourages active participation, is coherent, timely, and considers the learners' context (Desimone, 2009; Yurtseven Avci et al., 2020). Furthermore, State et al. (2019) shared that a core feature of effective professional development is acquiring and translating skills into practice. Therefore, it is important to plan time during professional learning experiences for participants to practice their skills from the session actively. However, when facilitators feel the pressure of time, they may leave out the practical application or suggest it after the learning. As a result, the lack of application may make professional learning irrelevant to the learner's context. Some research indicates that professional development for K12 teachers may feel "top-down," coming from the administration, with little power or control given to the teachers (Hanson, 2009).

In-person and online professional learning can come in many forms for K12 teachers, including conferences, in-service training, online modules, professional learning communities, and coaching. Over the last year, school districts deployed professional learning opportunities through asynchronous, synchronous, and hybrid methods (Hartshorne et al., 2020). Furthermore, these delivery modalities exist in formal and informal professional learning settings.

Asynchronous Online Professional Learning

Asynchronous learning is learning that happens at a time designated primarily by the learner. Examples of this kind of learning include recorded training sessions distributed to employees to watch and complete activities, instructional videos or slideshows sent to learners for viewing, and the use of discussion boards. A primary benefit of asynchronous learning is flexibility (Anthony, 2020). This approach to asynchronous online learning models allows instructors to provide learners with materials and use the resources to learn at their own pace and during a self-selected time. However, providing learning materials, regardless of their quality, is insufficient for supporting learning (Murphy, 2004; Schaefer et al., 2019). Many studies have shown that learner interaction plays an essential role in producing favorable learning outcomes (Bond, 2016; Castro, 2019; Schaefer et al., 2019). For instance, Murphy (2004) shared a model for online asynchronous discussions that include collaboration in asynchronous online learning. Therefore, those designing online professional learning experiences must consider maximizing participant collaboration.

Collaboration in asynchronous environments can happen in many forms, but it must be carefully designed and implemented in online learning environments. For this kind of interaction to show effective results, the collaboration must clarify a purposeful relationship between the learners and where they work to achieve an outcome (Göktürk & Dikilitaş, 2020; Schrage, 1995). When the design of online learning environments considers this component, the social interactions amongst peers support reflection and high learning processes (Schaefer et al., 2019). Furthermore, collaborative environments promote psychological well-being and social competence (Laal & Ghodsi, 2012). Overall, collaboration is an important component of asynchronous learning as it supports instructional outcomes and social well-being.

Synchronous Online Professional Learning

Online synchronous learning happens in real-time between the learners and the instructor. For example, instructors may use some parts for synchronous learning, such as discussion or other forms of interaction (Finol, 2020). However, some research explores the impact of synchronous learning for teachers for online professional learning. For example, Francis and Jacobsen (2013) analyzed the effect of synchronous online discussions on math teachers. Findings suggested that more straightforward mathematical tasks promoted the highest level and quality of interaction. Furthermore, Chen et al. (2009) explored the impact of synchronous learning on pre-service teachers. The survey results suggested that synchronous models could benefit this group of teachers, but these conditions depended on safety, environment, self-efficacy, and competency. While these studies provide a couple of examples exploring the impact of

synchronous learning on teachers, they only focus on specific content or teaching experience. Additionally, both suggest considering components for the teaching to be effective. These results give little to no insight into how teachers perceived the learning experience and whether they would have instead had the learning delivered in a different online delivery form.

Hybrid Online Professional Learning

Hybrid online professional learning combines both asynchronous and synchronous teaching methods. Current research shows many benefits to utilizing hybrid learning for teachers (Anthony et al., 2020; Belland et al., 2015; Matzu, 2013). For example, both Anthony et al. (2020) and Belland et al. (2015) reported positive results with hybrid learning connected to instructional outcomes for participants. Furthermore, Matzu (2013) reported positive effects of hybrid learning for teachers related to increased engagement. Overall, current research on online professional learning provides implications for designing a successful virtual team experience for K12 teachers. For example, a virtual model must include content relevant to the learners' context. Additionally, the content should be focused and timely. Finally, participants should have many opportunities to collaborate and work toward a common goal or purpose. Many of these components are also crucial design components for effective virtual teams.

Virtual Teams to Support Professional Development

One online learning approach for professional development is a virtual team. Based on the current literature, virtual teams are defined as team members dispersed across time and space using communication technologies to work toward a common goal or purpose (Bell & Kozlowski, 2002; Gillam & Oppenheim, 2006; Handke et al., 2019; Lin et al., 2008; Snellman 2014). Businesses frequently use virtual teams, especially those with employees spread out globally (Dulebohn & Hoch, 2017). Despite its popularity, very little has been written about virtual teams in education (Charteris et al., 2021; Rolando et al., 2014). Additionally, research on virtual teams lacks empirical data in the academic sphere, and there is very little known about virtual teams as a pathway or model for e-learning (Makani et al., 2016).

Even though little research exists, some researchers see virtual teams as an opportunity to support professional development for K12 teachers (Charteris et al., 2021). Some even argue that virtual teams are the next stage of organizational evolution (Martin, 2021). The following section discussed the current literature on virtual teams to provide definitions and typical characteristics of virtual teams, and ends with an explanation of existing studies on virtual teams for K12 teachers.

Defining Virtual Teams

Virtual teams provide an opportunity for a flexible learning environment that still guides learners toward goals. Most of the interdisciplinary literature on virtual teams provides definitions that include members dispersed across time and space using communication technologies to work toward a common purpose (Bell & Kozlowski, 2002; Gillam & Oppenheim, 2006; Handke et al., 2019; Lin et al., 2008; Snellman, 2014). For instance, according to Dulebohn and Hoch (2017), virtual teams include groups of people who are "geographically dispersed, have limited face-to-face contact, and work interdependently through the use of electronic communication media to achieve common goals" (p. 1). Another definition from Martin (2021) explains virtual teams as "teams with a common purpose that use technology to cross time zones, distance, and the boundaries of organizations" (p. 17). Practitioners in education may see similarities between these definitions and online communities of practice. However, Charteris et al. (2021) explain that a critical difference is that virtual teams are continuous, ongoing professional learning cohorts. Whereas a community of practice, online or in person, might exist as an isolated, informal professional learning event. Overall, slight variance exists between definitions of virtual teams across the literature.

Even though many researchers agree on a standard definition of virtual teams, the 'virtual' component can include different approaches. There are many technologies available in the workplace used by teams to support organizational goals. However, Gibbs et al. (2019) made an important distinction about virtuality in that there is not an "on-and-off switch," but instead, virtuality should be seen as a "continuum ranging from low to high" (p. 8). In this way, virtual teams could include several online learning modalities such as asynchronous, synchronous, and hybrid approaches. However,

what makes virtual teams differ from other online communities is that they don't take as much time to grow (Owen, 2014), and they are centered around a core purpose with intentional and relevant outcomes (Bell & Kozlowski, 2002; Gillam & Oppenheim, 2006; Handke et al., 2019; Lin et al., 2008; Snellman, 2014).

Design Features and Characteristics

Virtual team designs include a variety of features and characteristics. According to Stevenson (2017), virtual teams harness the power of collaboration. Moreover, collaboration can happen over time and space (Dulebohn & Hoch, 2017). This collaboration is important for schools as a virtual team model could connect K12 teachers in rural and urban areas, providing knowledge-sharing opportunities. (Charteris et al., 2021). There are also a variety of virtual team types. According to Duarte and Snyder (2006), there are seven basic types of virtual teams: networked, parallel, project, production, service, management, and action. Each of these types differs based on the group output or goal. Other research explains that it is best to consider their mode of interaction, context, and group (Jarvenpaa & Leidner, 1998).

Principles and practices guide many virtual teams. For example, Watkins (2013) shared ten guiding principles for virtual teams that include in-person and virtual meetings, virtual "water coolers," and commitments to shared communication channels, tasks, and processes. Current research and writing show that while agreement exists on definitions of virtual teams, approaches to a successful implementation of virtual team models vary. However, many authors emphasize the importance of successful interactions to help sustain a virtual team community (Charteris et al., 2021; Dulebohn & Hoch, 2017; Jarvenpaa & Leidner, 1998; Marlow et al., 2017; Watkins, 2013; Wilson, 2007).

Effective Virtual Teams

A number of researchers have begun to explore the critical components of successful virtual teams. Overall, trust is crucial to the success of virtual teams (Brahm & Kunze, 2012; Erez et al., 2013; Kiffin-Peterson, 2004; Pangeli & Chan, 2012). For example, Pangeli and Chan (2012) explored the relationship between trust and virtual team effectiveness, where they deployed a survey used within a cross-sectional study in Malaysia and found that three types of trust are significantly related to virtual team effectiveness. These three types of trust are personal-based, institutional-based, and cognitive-based trust. Personal-based trust connects to trust that builds from a mutual exchange of knowledge. Next, institutional-based trust relates to accountability measures from the institution in that there will be rewards and punishments for not sharing knowledge. Finally, a cognitive-based trust includes the type of trust that builds from the professional credibility of the team members (Pangeli & Chan, 2012).

Parke et al. (2017) explored how some face-to-face interactions impacted the performance of a virtual team model. They tested a virtual team model focused on the initial meeting approach and embedded team-building activities. The researchers set up an experiment that included 644 participants and 161 virtual team members. They found that virtual teams with an initial face-to-face meeting instead of a completely virtual one increased knowledge sharing. However, in these cases, the structured team-building exercises diminished knowledge sharing in some areas. In addition to trust, Parke et al. (2017) provided some additional insights into the benefits of an initial face-to-face meeting before virtual teamwork begins.

Finally, Cohen and Gibson (2003) shared five factors that support virtual team effectiveness: (a) supportive organizational structure, (b) task characteristics, (c) technology, (d) team member characteristics, and (e) team processes. Even though a few of these factors might not require in-depth levels of trust or collaboration, the effectiveness of these factors is dependent upon strong organizational structures (Berry, 2011). To provide supportive organization structures, practitioners facilitating virtual teams should develop norms and expectations around communication and collaboration, including accountability measures (Gibson & Cohen, 2003; Whitener et al., 1998).

Virtual Teams and K12 Teachers

Virtual teams exist across various organizations; however, very little is known about virtual teams in education (Charteris et al., 2021). Two studies provide insight into how virtual teams might fit into a professional learning model for K12 teachers. First, Wilson (2007) applied an action research study with 24 preservice middle school teachers. This study aimed to explore the impact of a simulated interdisciplinary virtual team on the participant's development. Data

collection included student artifacts, interviews, and field notes. The study took place at a university during a required course for preservice teachers. Wilson (2007) created eight 3-person teams while intentionally ensuring interdisciplinary teams. Wilson (2007) documented their journey through reflective journals using three forms of data throughout the semester.

Participants provided journal entries and reflections, and photographs. The researchers explicitly asked participants to reflect on their teaming experiences throughout the study. This study revealed that the participants built community, developed skills to work more effectively on teams, and valued the teaming approach as an authentic experience. In addition to these findings, Wilson's (2007) reflections serve as a guide to future virtual team models for K12 teachers. First, collaborative structures and practices can be taught and modeled for teams. For Wilson (2007), preservice teachers have minimal experience with collaboration and often approach their work together as more cooperative. Another exciting reflection came in the importance of compromise in problem-solving. Teams were given authentic tasks that required conflict resolution, problem-solving, and compromise. Even with initial reports of discomfort around compromise, groups reported that this felt like an asset to the group over time. However, perhaps the most fundamental component of virtual teaming was the time Wilson (2007) took on building community and team cohesiveness. While this work provides some general guidelines for creating effective virtual teams for K12 teachers, preservice teachers have very different experiences and needs than those who have had exposure to teaming efforts in schools.

Chapman (2016) focused on teacher growth around curriculum implementation, ELA resources, enhanced learning management tools, and content/resource curation. They developed a Virtual English Faculty that met in person once a semester. The participants include teachers from several rural and remote communities who work together via video conferencing and an online drive. They communicate and share resources online to support pedagogical practices that increase student achievement and outcomes. While the author briefly discusses the purpose and activities of this group, they do not provide any empirical evidence of the impact of this model on their intended purpose and outcomes.

In summary, professional learning is a crucial component of teacher development and success. Additionally, professional learning can be delivered through different online modalities, including synchronous, asynchronous, and hybrid approaches to online learning. The COVID-19 pandemic forced many organizations to explore these online learning approaches more deeply for their employees as people began working from home. K12 teachers have experienced this shift as well by moving into virtual teams. The business discipline dominates the literature on virtual team use. Overall, Wilson (2007) and Chapman (2011) provide some initial information on how virtual times might benefit K12 teachers as a form of professional learning. While many studies exist devoted to defining virtual teams and exploring effective features of virtual teams, very little is known about how virtual teams would best serve K12 teachers. The following section focused on applying the current literature on virtual teams into a design framework that would best suit the needs of teachers.

Designing Virtual Teams for K12 teachers

Designing an effective virtual team model for K12 teachers should reflect best practices connected to professional learning and instructional design principles. Therefore, the following section includes an overview of the considerations for these best practices to inform the design of a virtual team model for K12 teachers. First, this section begins with a description of best practices around PLD according to a synthesis study from the Australian Institute for Teaching and School Leadership (AITSL). Next, the section follows with a description of instructional design models and theories that foster the components of the AITSL framework when applied. Finally, this section summarizes the key ideas that informed the development of the virtual team model presented at the end of this paper.

AITSL Professional Learning and Development Framework

As little research exists on the design or impact of virtual teams for K12 teachers, some researchers have created models using a combination of available research on virtual teams and literature on professional learning for K12 teachers. Charteris et al. (2021) draw on the work of the Australian Institute for Teaching and School Leadership (AITSL) to recommend a virtual team model for K12 teachers. The AITSL (2012) created 'Teacher Professional Learning and Development – Iterative Best Evidence Synthesis,' which involved an analysis of 97 individual studies and groups of

studies that showed a substantive link between student outcomes and teacher professional learning and development. Charteris et al. (2021) use AITSL's (2012) strategic characteristics of professional learning development for teachers (relevancy, collaboration, future-focused) as a recommendation for creating an effective virtual team model that supports professional learning for teachers. First, relevant PLD considers goals, aspirations, and the needs of the participants. Next, collaboration is fundamental to PLD for teachers and includes activities that encourage knowledge sharing. Finally, future-focused PLD supports participants with adapting and embracing change and challenges that come with the profession. Future-focused PLD incorporates and leverages the professional context by encouraging participants to examine job-embedded problems of practice and solutions. Overall, based on the findings and recommendations from AITSL (2012), a virtual team delivery model for professional learning should include relevant learning, collaborative opportunities, and future-focused content. Consequently, instructional design approaches and learning theories were explored to achieve these components within the virtual team model presented at the end of this paper.

Virtual Team Framework for Teachers

We present here a planning guide to support practitioners considering adopting a virtual team model for K12 teachers as professional learning. This guide brings together the literature on virtual teams and effective instructional design models to produce considerations for a virtual team model that aligns with evidence-based instructional practices for adult learners working together in an online environment. This guide has three phases: pre-instruction planning, instructional planning and facilitation, and evaluation and revision. Table 1 provides an overview of these three phases, the rationale from research, and an example outline for a professional learning plan that adheres to this model.

Phase I: Pre-Instruction Planning

The IPO framework, alongside constructivist and connectivist learning principles, support the pre-instruction planning process. Before thinking about instruction, it is crucial to consider a few factors. These are also referred to as inputs. Inputs include individual, team, and environmental or organizational factors. (Forsyth, 2008). These factors can directly or indirectly impact the virtual team as they work together toward common goals. Within this phase, a practitioner considers selecting team members to work together in a virtual setting. Since a primary draw of virtual teams allows those to connect regardless of time and space, practitioners in education should consider how to connect K12 teachers across these elements. For example, a virtual team might be composed of teachers at different schools who all use the same curriculum for math.

Additionally, a survey that includes a self-assessment given to prospective participants will help designers know their learners' strengths and experiences. This information can then be used to support connectivist elements such as personalization and learner skills (Siemens, 2005). This also helps the analysis phase of the ADDIE instructional design framework by analyzing current learner contexts. This process allows the designer to be aware of the learners' needs so that the instructional goals and outcomes are relevant to learning needs, a critical component of effective professional development for teachers (AITSL, 2012) and connectivist learning environments (Siemens, 2005). Furthermore, aligning outcomes with participants' needs in the context of their profession helps plan a future-focused learning experience. During the pre-instruction planning phase, designers should consider which technologies support network structures, interactions, and resource sharing. This keeps the groundwork for much of the collaboration and interaction necessary for learning to occur under constructivist and connectivist learning environments (Allen, 2006; Siemens, 2005). Moreover, collaboration is a critical component of evidence-based practices for teacher professional working (AITSL, 2012).

Phase I requires practitioners to gather data and conduct some preliminary planning. For example, to ensure that the instruction will meet the needs of the learners, data should be collected on the learners. The examples provided in Table 1 include strategies for successfully preplanning for this phase. For instance, surveying groups of teachers who will be a part of the virtual team to learn about needs, digital communication preferences, and experience with digital knowledge sharing is a start to learning more about how individual team members might be paired together to function

the most effective in a virtual team. In summary, this phase provides practitioners with the foundational information necessary to design the instructional processes.

Phase II: Instructional Planning and Facilitation

As with Phase I, the frameworks and learning theories guide much of the work in Phase II. This portion of the design includes the processes that become a bridge between the inputs and team outcomes (Forsythe, 2008). However, designers should plan initial face-to-face or synchronous meetings with all participants before planning for instruction. This gives everyone a chance to build community and provides an opportunity to review goals and outcomes and create group norms. Second, take some time to plan to set up and practice with communication and resource technologies. This helps address technical issues that arise when using digital tools and platforms. These initial steps will help transition into the instructional scope and sequence of learning.

The instructional scope and sequence should begin with the BSCS 5 Es Instructional Model (Bybee, 2006). This allows for a strong foundation built on constructivist practices that allow for the integration of connectivist strategies. This model suggests that the BSCS 5 Es Instructional Model (Bybee, 2006) be used in 4-week cycles. This instructional model can be used to support the design and implementation phases of the ADDIE framework (Allen, 2006). Each week focused on a different 'E' barring the first week, which combines *engage* and *explore*. These elements provide participants with time to find to engage in activities and tasks requested throughout the week. It also gives learners processing time that better meets their needs. For each week, designers should provide specific individual and group expectations and outcomes based on the 'E' for that week. In addition, clear communication expectations should be set by and with the group. Communication expectations can be set up during the initial face-to-face meeting and reinforced each week.

After applying this model as a base, connectivist elements can be integrated alongside the model's current features. For example, designers could evaluate areas of their plan to ensure that there is a place for learners to personalize the experience or explore diverse perspectives. These can be added to group discussions or tasks. Some elements already overlap with the BSCS 5 Es Instructional Model. For instance, opportunities to practice occur naturally in an authentic context during the elaboration phase. These two instructional models provide overlapping elements that support participants with learning by providing them a space to interact and construct knowledge together.

Phase II of this model requires practitioners to create an instructional map that meets the needs of the learners. Table 1 describes how to use the BSCS 5 Es Instructional Model to map out instructional goals and tasks from week to week. This instructional model provides a simple foundation for practitioners to focus on ensuring participants build and share knowledge from week to week. Additionally, practitioners should plan ways to build community and trust during this phase. Community builders could include "water cooler" spaces or virtual meetings where the goal is simply to get to know each other or play community-building games. This phase is also a time for facilitators to assess instructional purposes from week to week, such as participant journals, discussion posts, or projects. In the end, Phase II will be an iterative process and will take up the bulk of the planning time.

Phase III: Evaluation and Revision

Finally, Phase III includes evaluating how the process supported the virtual teams and individuals in achieving desired outcomes. The final phase of ADDIE encourages the evaluation of both participants and instructors after the learning experience (Allen, 2006). Outcomes might include a variety of variables such as performance, satisfaction, or innovation (Landy & Conte, 2016). At the end of the first cycle, an assessment of learning should be conducted. The assessment provides data on how well the model helped meet desired outcomes and goals. The assessments also allow learners to self-assess their growth and satisfaction with the experience.

Furthermore, discussions can take place about the next steps for the group. Designers can use this feedback to plan another cycle around the same topic or move on to a more immediate need that the group would like to explore together. Using the same approach, the designer creates a new cycle using the integrated instructional models, and the process repeats for the team.

The final phase in this model emphasizes the importance of evaluation and revision. There are several ways for instructors to evaluate the effectiveness of their instruction while also engaging learners in self-reflection. For instance, Likert-scale surveys can collect participant feedback on the relevancy, collaborative aspects, and future-focused content at the end of every four-week interval. Furthermore, participants can journal or evaluate their understanding before and after the learning experience. Overall, this phase focuses on assessing the instructional model from various angles so that the designer can continue to modify learning cycles to keep the professional learning relevant, collaborative, and future-focused.

Table 1

Phase Elements and Rational

Phase I: Pre-instructional Planning	**Rationale**	**Example**
• Virtual Team selection strategies • Survey team participants • Evaluate and decide on communication technologies • Evaluate and select file and resource sharing software • Create instructional outcomes aligned to participants needs at the individual level and team level	• Relevant, just-in-time learning opportunities (AITSL, 2012) • Technology and network selection (Siemens, 2005) • Future-focused, adult learning experiences (AITSL, 2012) • Analyze learners and context (Allen, 2006; Bybee, 2006) • Design learning relevant learning outcomes (AITSL, 2012; Allen, 2006; Bybee, 2006)	• 7th grade math teams from different schools in same district • Send out survey to participants to gather data on perceived strengths and areas of growth with student discourse • Use GSuite features for communication and resource sharing: Gchat, Google Drive, and Google Classroom • Design group outcomes based on survey feedback and have participants set individual goals for their practice
Phase II: Instructional Planning	Rationale	Example

• Plan initial synchronous meeting
• Develop norms and expectations
• Apply 5Es Instructional Model to learning
• Incorporate frequent community and trust building activities
• Integrate Connectivist elements into weekly planning
• Incorporate 4-week learning cycles
• Plan for reinforcing expectations
• Weekly Checks/Formative Assessment
	• Build community through synchronous initial meeting, norm creation, and community building activities (Brahm & Kunze, 2012; Erez et al., 2013; Kiffin-Peterson, 2004; Pangeli & Chan, 2012)
	• Apply instructional design frameworks to create a learner-centered, interconnected experience (Allen, 2006; Bybee, 2006, Siemens; 2005)
	• Collaborative opportunities and structures lead to knowledge sharing (AITSL, 2012; Bostanciaglu, 2018; Desjardins & Bullock, 2019; Gray & Smyth, 2012)
	• Create a means of continuously assessing progress toward outcomes (Allen 2006; Bybee 2006)
		• Kickoff meeting: bring participants together for community building, norm development, expectations, and logistical overview
		  ◦ Group to generate norms and accountability measures
		• Instructional Scope Cycle #1
		  ◦ Week 1: Engage and explore student discourse in a math classroom through independent research
		  ◦ Week 2: Explain learning on students discourse in a math classroom through shared network
		  ◦ Week 3: Elaborate on learning through practical application of discourse strategies and videotape example
		  ◦ Week 4: Evaluate learning through self-assessment
		• Collaborative norms and expectations each week for engaging in GChat and Google Classroom
		• Weekly portfolio and reflection for formation assessment checks and individual coaching opportunities
		• Positive narration in GChat and Google Classroom when meeting deadlines and adhering to group norms

Phase III: Evaluating and Revising	Rationale	Example

Phase I: Pre-instructional Planning	Rationale	Example
• Assessment of learning • Participant self-assessment • Satisfaction survey • Evaluate and plan next cycle	• Evaluate instruction and learner experience for revisions to next learning cycle (Allen, 2006; Landy & Conte, 2016)	• Review teacher videos for application of learning • Participants self-assess on norms, expectations, satisfaction, and new learning • Review data and revise for next cycle

Conclusion

This article has addressed the gap in the literature around virtual teamwork for K12 teachers by providing an overview for how virtual teamwork can support professional learning. As a result of the COVID-19 pandemic, the shift to virtual teamwork and professional learning across many different organizations has created a need for more research on how virtual team approaches might best fit across disciplines. This paper builds on Charteris et al. (2020) by providing a specific instructional framework for virtual teamwork as professional learning for K12 teachers. This instructional framework was developed by synthesizing the literature for online professional learning, effective virtual teams in organizations, and instructional design and learning theories. It is our belief this framework provides a way for practitioners in education to deploy and evaluate a structured virtual team model for various content-area teachers.

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Motivational Design for Inclusive Digital Learning Innovation: A Systematic Literature Review

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The recent shift of learning to technology-enriched, and -enabled learning environments (TEELE) has exposed unequal access to education. Digital learning innovation derived from such a shift is predictively neglecting learners' diverse motivational needs in online learning. As the first step to design an inclusive digital learning innovation, this systematic literature review is focused on motivational design inquiries published between 2010 – 2021. The review discovered a lack of studies in addressing diverse learners' motivational needs. The findings also suggested applying systematic motivational design through various methodological approaches to understand the role of motivational design in supporting inclusive digital learning environments.

Introduction

As a result of COVID-19, recent education and learning and development operations have shifted the delivery of learning and teaching activities to online environments due to limited face-to-face interactions in physical workplaces and school settings (Means & Neisler, 2020). As an unintended consequence, critical limitations in online learning environments are highlighted owing to the increasing deployment of online learning and technology-enriched and -enabled learning environments (TEELE) (Huang, 2021; 2022) across various learning and development contexts. For instance, disparities among students' access to computers and the internet continue to remain a significant barrier (Bacher-Hicks et al., 2021; McGuire et al., 2021). In addition to the access barrier, the most challenging aspects of employing online learning include: (1) maintaining students' motivation with this learning format (Zaccoletti et al., 2020) and (2) dealing with the diverse demographics of online learners (Conto et al., 2020). These challenges highlight the importance of applying motivational design strategies for online learning environments by understanding the roots of learners' motivation. Online learning has played a vital role in the dissemination of education during the pandemic. To sustain the innovative features of online learning systems, diverse learners' motivational needs should be considered.

The Role of Motivational Design in Instructional System Design

This rapid shift in the delivery mode of instruction from face-to-face to online may have led learners across contexts to experience considerable challenges in maintaining their motivation with online learning (Huang, 2013; Park & Choi, 2009; Zaccoletti et al., 2020). This present study, grounded in prior inquiries (e.g., Hartnett, 2016; Huang, 2013; Keller, 2010; Ryan & Deci, 2000), considers online learning motivation an ongoing social process that dictates learners' decisions to interact with intended online learning processes. Further, online learning motivation is largely localized to individual learners' early responses to intended learning processes, and it contributes to "learning engagement" that aims at sustaining meaningful and long-term online learning processes. The Engagement Theory (Kearsley & Shneiderman, 1998) emphasizes that engagement is different from interaction in the context of online learning, which may consist of learners' cognitive processes as well as perceived motivational support. Therefore, focusing only on cognitive and behavioral interactions in online learning environments is insufficient to fully motivate learners (Huang, 2013). In addition, learners in online learning contexts are more likely to have control over what to learn, when to learn, and how to learn. Learners have the flexibility to learn anytime and at different locations (Dhawan, 2020). Even if flexibility is one of the strengths of online learning, the metacognitive and meta-social control a learner has to implement for online coursework depends on learners' motivational status (i.e., volitional control) (Keller, 2008). Providing learners with motivating online learning processes via systematic design approaches, however, has often been overlooked in mainstream instructional system design processes and models. Although research has argued that systematic approaches to address learners' motivational needs (motivational design) is critical to ensure effective online learning (Huang, 2013, 2018; Keller, 2018).

The definition of 'motivational design' adopted in this study stems from John Keller's scholarship with decades of conceptual and empirical findings (Keller, 1987, 1988, 2008, 2010). In terms of design process, motivational design refers to "the process of arranging resources and procedures to bring about changes in people's motivation" (Keller, 2010, p. 22). Motivational design in this study is focused on the design and development of motivational support in learning environments. It involves systematic processes and motivational strategies that help learners sustain their behaviors of achieving learning goals. The systematic motivational design process includes ten steps: (1) obtain course information, (2) obtain audience information, (3) analyze audience, (4) analyze existing materials, (5) list objectives and assessments, (6) list potential tactics, (7) select and design tactics, (8) integrate with instruction, (9) select and develop materials, and (10) evaluate and revise (Keller, 2010, p.57).

Diversified Online Learner Populations

Online learner populations are becoming significantly diverse due to the ongoing systematic interruption (i.e., COVID 19) as it necessitates the expansion of online learning across various learning and development contexts. Such diversity among learners not only is manifested by their access to and prior learning experiences in online learning environments, but also it is grounded in learners' racial, social, and cultural backgrounds. All the demographic, educational, and social backgrounds among online learners are the foundation to form their unique motivational needs and therefore, influence engagement with online learning. As an example, studies have shown that ethnically underrepresented students in STEM fields tend to struggle with having motivation for online courses (Asgari et al., 2021; Cromley & Kunze, 2021; Walsh et al., 2021). In contrast, an alternative study (Amina, 2021) reports that women's capabilities are increased through expanded access to online learning by having more opportunities to be involved in their STEM-related jobs during the pandemic. These studies show that learners' social and cultural background impact their learning motivation when they learn through online learning.

Conto and colleagues (2020) reported that in recent school shutdowns around the world due to limiting face-to-face interactions, lower-income nations show the least utilization of online platforms and take-home materials (64%) and are alternatively relying on television (92%) and radio (93%). In comparison, higher-income nations show the most utilization for online platforms (95%) while relying the least on television (63%) and radio (22%).

Prior to the school closures, online learning was generally more adopted for training returning adults and transfer students where online learning programs were focused on primarily adults returning to school from an absence. For K-

12 students, very few teachers and students had extensive experience with online learning before the mandatory school closures by the pandemic (Barbour & LaBonte, 2017; Barbour & Reeves, 2009).

As of late March 2020, UNESCO projected that more than 190 countries in the world closed schools. As a result, this pandemic context affected 1.6 billion students' learning experiences (Conto et al., 2020). While the emerging challenges brought by the pandemic could be less relevant years from now, they have offered impetus to respond now to the changing demographics of online learners and the accompanied diverse learners' needs for long-term success in online learning or digital learning environments.

In the context of this present study, the diversity of learners, manifested by their motivational needs, highlights a focus on physical access to online learning environments or digital learning innovations, but learners' motivational needs for achieving intended online learning processes and outcomes must be addressed. In particular, designing motivational support in online learning environments should be the priority. Our rationale is threefold. First, motivational support is the foundation of learning engagement (Huang, 2013; Kearsley & Shneiderman, 1998). "Learning motivation" that is largely localized to individual learners' early responses to intended learning processes can lead to long-term "learning engagement" in online learning environments. Second, motivational support has been largely overlooked by prominent instructional design processes and models. As learner motivation drives learners' early cognitive, affective, and behavioral efforts during online learning processes, instructional design effort should purposefully be a part of learners' motivational analysis and motivational design. Third, as online learner populations are increasingly diverse in their racial, social, cultural, linguistic, and educational backgrounds, the design of motivational support for learning should no longer be based on outdated assumptions (e.g., all learners have equitable access to internet connections, learners' skill levels in using online content are the same) (Ragnedda, 2019). A dedicated motivational design analysis is needed to reveal the fundamental causes of learners' motivational barriers created by learners' social and cultural backgrounds. Grounded in the aforementioned reasons, we are advocating for inclusive digital learning innovation that is focused on addressing learners' diverse motivational needs with systematic motivational design processes.

Purpose of the Study

Current societal and social phenomena show the importance of motivational design for diverse learners as the first step towards inclusive digital learning innovation in the context of online learning. This systematic literature review study surveys the landscape of motivational design research between 2010 and 2021 to understand the recent trends of how motivational design has been investigated and what types of learners have been included in online and digital learning environments. The definition of 'motivational design' helps this study focus on the systematic motivational strategies and methods to enable changes in people's motivation rather than the broadly defined instructional design strategies.

Research Questions

This review aims to answer the following questions:

1. What are the roles of motivational design in online and digital learning environments?
2. What are the demographic and contextual criteria considered for motivational design in online and digital learning environments?

Method

This research was carried out by following the systematic literature review key steps laid out by Pati and Lorusso (2018).

Selection criteria

The following criteria were applied to identify the literature to be reviewed:

1. The literature was selected if it was published in peer-reviewed journal articles and proceedings in the English language. This provides easy access to the majority of scientific publication readers around the world as most scientific publications are in English (Gordin, 2015; Montgomery, 2013; Ramírez-Castañeda, 2020).
2. The literature was included if the studies provided empirical data and interpretation of data analysis. Literature reviews, proposals, and conceptual papers were excluded.
3. The literature was included if studies were conducted for online courses, blended courses, and digital learning applications.
4. The literature was included if the studies were conducted in teaching and learning environments. Studies for patients, the general public, and employees without teaching and learning goals were excluded.

Search and selection process

The literature search and selection process is listed below.

1. SCOPUS was used as the literature database for two reasons. First, Shah and colleagues (2017) reported that on the topic of inclusive education research, SCOPUS could retrieve publications from influential research journals more effectively than automated academic databases (e.g., Google Scholar). Second, the use of SCOPUS allows the study to be differentiated from previous literature review search strategies on motivational design based on a broad range of academic databases (e.g., Li & Keller, 2018).
2. The keywords “motivational design”, “motivation" and “instructional design" and "online learning”, “motivation" and "instructional design" and "blended learning”, and “motivation" and "instructional design" and "digital" were used based on the literature review. These keywords are used to keep the focus of this study on systematic motivational strategies in the instructional design process and methods, specifically in the context of online learning, blended learning, and digital learning environments.
3. The literature was limited to published peer-reviewed journal articles and proceedings between January 2010 and December 2021.

The search process yielded a total of 58 publications. The volume is insignificant in comparison with the volume of peer-reviewed publications with keywords of “learning technology (n=3,814), “educational technology” (n=3,978), or “instructional design” (n=1,358) during the same publication period (2010 - 2021) on SCOPUS. All 58 articles were reviewed by two researchers to enhance validity and reliability. Only 29 articles met the mentioned four selection criteria and were included in the analysis.

Data Analysis

Based on the nature of the research questions and the amount of literature, content analysis (Hsieh & Shannon, 2005) was conducted for this review. The two research questions served as the initial coding categories for the intended content analysis. That is, all 29 articles were reviewed and categorized based on the research questions. In addition, considering the essential role of ARCS motivational design in the field of learning system design (Keller, 2018; Li & Keller, 2018), the literature was divided based on whether or not the study adopted the ARCS model to guide the study. A discussion on the ARCS model will follow. To answer the first research question, all 29 articles were categorized by “research goals” and “roles of motivational design”. Second, to answer the second research question, all 29 articles were compared based on the “locations of the research”, “learning environment”, “target learners”, and “studied demographic factors” to reveal demographic and contextual factors applied in reviewed studies. The demographic factors in this study refer to the target audiences’ socio-demographic factors (e.g., age, gender, race, education, and prior experience), which were either identified by the study participants or were applied to interpret the findings. Both researchers were able to achieve a high level of inter-rater reliability at 96% (Drost, 2011; Frey, 2018) prior to analyzing all 29 publications.

Findings

Although all 29 publications studied some aspect of “motivational design”, 17 studies applied the ARCS model (Keller, 1987) to their inquiries. The ARCS motivational design model was developed for creating effective ways to identify major influences on the motivation to learn, and for adopting systematic methods to diagnose and address learners’ motivational needs. This model articulates concepts and variables that characterize learning motivation and implements strategies that enhance the motivational appeal of instruction. The model defines four major motivational conditions (i.e., Attention, Relevance, Confidence, and Satisfaction) that must be met for learners to become and remain motivated. Also, it proposes a systematic motivational design process (i.e., Define, Design, Develop, and Evaluate), which can be used with typical instructional system design and development models (Huang, 2013; Keller, 1987, 2010).

ARCS Model-Grounded Studies

Studies grounded in ARCS model can be categorized by “research goals”, “roles of motivational design”, “locations of the research”, “learning environment”, “target learners”, and “studied demographic factors”. The roles of motivational design are depicted in study findings by explaining the impact of motivational design on various learning outcomes and learners’ attitudes. 11 studies applied the ARCS model to design and evaluate new instructional tools; another six studies applied the ARCS model only for evaluating existing educational tools with the focus on learner’s motivation status; eight studies applied the ARCS model to measure learner’s motivation along with learners’ learning outcomes, confidence, interests, tendency to use technology, and engagement (see Table 1).

Table 1

Goals of research and roles of motivational design of reviewed ARCS model studies

Goals of Research	Roles of motivational design	Studies
Design and evaluate	Learners’ motivation	Colakoglu & Akdemir (2010) Hamzah et al. (2015) Durrani & Kamal (2020) Vagianou et al. (2021)
	Learners’ motivation with learners’ learning outcomes/confidence/interests/ familiarity/tendency to use technology/engagement	Omrani et al. (2012) Hodges & Kim (2013) Sek et al. (2015) Yurdaarmagan et al. (2015) Thompson & Carrier (2016) Stockdale et al. (2019) Iwasaki (2021)
Evaluate the existing educational tools	Learners’ motivation	Pittenger & Doering (2010) Huang (2014) Wan & Gregory (2018) Huang (2019) Ma & Lee (2020)
	Learners’ motivation with learners’ learning outcomes	Lu et al. (2020)

Studies that developed educational tools by applying the ARCS model describe the role of motivational design as it plays an effective part in developing learners’ motivation in regard to the new learning environments (e.g., Open Learner Model and blended learning environment) (Durrani & Kamal, 2020; Sek et al., 2015), towards their interests/attitudes toward mathematics with better learning outcomes (Hodges & Kim, 2013), and the audience’s inspiration for future technology use (Huang, 2014). In addition, one study showed how the combination of another instructional design model/feature (e.g., ADDIE model and gamification) and motivational design improved learners’ motivation and learning process (Vagianou et al., 2021). On the other hand, studies that evaluated existing educational tools based on the ARCS model were focused on the roles of motivational design based on the motivational factors such as ‘Attention, Relevance, Confidence, and Satisfaction’. For instance, augmented reality (AR) functionality in physical puzzle-type games did support a comparatively lower confidence level among K-12 students (Lu et al., 2020). The learners’ motivation progress was mostly measured by using the validated Instructional Materials Motivation Survey (IMMS) (Keller, 1987) or the Course Interest Survey (CIS) (Keller & Subhiyah, 1993). Learning outcomes, learners’ interests, and tendency to use technology were measured by learners’ post-course test scores and other instruments, such as the Fennema-Sherman Mathematics Attitudes (FSAMA) (Fennema & Sherman, 1976). The analysis implies that the motivational design strategies are applied to improve not only learners’ motivation but also learners’ confidence and familiarity with using technology.

The geographical locations of the 17 studies using the ARCS model include Australia, Byzantine, China, Iran, Malaysia, Taiwan, Turkey, and the U.S. There are ten studies conducted outside of the U.S., while seven studies were conducted in the U.S. (see Table 2).

Table 2

Locations of the Reviewed ARCS Model Studies

Locations	Studies
Australia	Wan & Gregory (2018)
Byzantine	Vagianou et al. (2021)
China	Ma & Lee (2020)
Iran	Omrani et al. (2012)
Malaysia	Hamzah et al. (2015), Sek et al. (2015)
Taiwan	Lu et al. (2020)
Turkey	Colakoglu & Akdemir (2010), Yurdaarmagan et al. (2015)
UAE	Durrani & Kamal (2020)
US	Pittenger & Doering (2010), Hodges & Kim (2013) Huang (2014), Thompson & Carrier (2016) Huang (2019), Stockdale et al. (2019), Iwasaki (2021)

The studied learning environment grounded in the ARCS model consisted of blended learning, digital application/web 2.0 (social media), e-learning/online learning, Massive Open Online Course (MOOCs), and virtual reality (see Table 3). Digital applications include music instrument practice and augmented reality function puzzle games to motivate learners. While the online and e-learning environments were studied the most, the ARCS model was applied to diverse learning environments.

Table 3

Learning Environment of reviewed ARCS Model Studies

Learning Environment	Studies
Blended learning	Colakoglu & Akdemir (2010), Durrani & Kamal (2020)
Digital application/Web 2.0	Huang (2014), Yurdaarmagan et al. (2015), Wan & Gregory (2018), Lu et al. (2020)
E- learning/Online learning	Omrani et al. (2012), Hodges & Kim (2013), Hamzah et al. (2015), Thompson & Carrier (2016), Stockdale et al. (2019), Iwasaki (2021), Vagianou et al. (2021)
MOOCs/Open learning	Pittenger & Doering (2010), Sek et al. (2015), Ma & Lee (2020)
Virtual Reality	Huang (2019)

In terms of target audience, only four out of 17 studies based on the ARCS model targeted the K-12 learning setting, while 13 studies were situated in higher education (see Table 4). For studies in K-12, learners' age was mainly considered as a demographic factor. One of the studies developed a new motivational design framework and this framework was evaluated not by students but K-12 teachers (Vagianou et al., 2021). In this study, teachers' field of study, working experience, and gender were considered during the data collection process. Studies in the higher education setting addressed many socio-demographic factors of learners including academic level, age, gender, marital status, learning preference, and prior experience with technology (or online learning). One study mentioned the efforts of including diverse students' groups and indicated that there were no participants from the special needs group (Durrani & Kamal, 2020). Participants demographic factors were described in the methodology section but none of these studies showed how the findings were related to the participants' socio-demographic factors. For example, how learners' motivation and learning outcomes were different based on their demographic factors was not addressed.

Table 4

Target learners and studied demographic factors of reviewed ARCS Model Studies

Target learners	Studied demographic factors	Studies
K-12	Age/gender	Yurdaarmagan et al. (2015)
	Field of study/gender/working experience	Vagianou et al. (2021)
	Age	Wan & Gregory (2018)
	Age	Lu et al. (2020)
Higher education	Academic level	Colakoglu & Akdemir (2010)
	Academic level/Age/gender	Pittenger & Doering (2010)
	Ability to use computer/age/gender/marital status	Omrani et al. (2012)
	Age/gender/race/academic level/prior experience	Hodges & Kim (2013)
	Academic level/gender/major	Huang (2014)
	Academic level	Hamzah et al. (2015)
	Gender/learners' preference/major	Sek et al. (2015),
	Academic level	Thompson & Carrier (2016)
	Academic level/gender/prior experience	Huang (2019)
	Age/gender/prior experience	Stockdale et al. (2019)
	Academic level/age/gender/special needs	Durrani & Kamal (2020)
	Academic level	Ma & Lee (2020)
	Academic level/major	Iwasaki (2021)

Other Motivational Design Studies

There were 12 reviewed studies that did not use the ARCS model for the motivational design inquiries. Among these 12 studies, four studies either did not measure learners' motivation or did not directly discuss learners' motivation in their findings (Casimiro, 2011; Joo et al., 2015; Ng & Przybyłek, 2021; Rosenberger, 2019). These studies were excluded from Tables 5, 6, and 7. One study applied modality and radiance design principle (Mayer, 2014) to design and evaluate adult learners' situational interest in the online learning environment (Dousay, 2016). Motivational design in this study was implemented by avoiding needless multimedia methods to teach learners so that learners can sustain their interests for better learning outcomes. Another study applied the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) to investigate how learners might be motivated to engage with the Open Learning Environment System (Huang, 2017) (see Table 5 and 6). The main role of the motivational design in this study was to examine the Open Learning System to address learners' motivational challenges relevant to learning goals and self-efficiency. Also, there was one study which measured how the motivational design influenced learners' attitude toward the blended learning format and the results showed that students highly rated this format since it helped the learners to stay on track (Gawlik-Kobylińska et al., 2021). In this study, participants were asked about their prior experience with the learning format. Similar to the aforementioned studies with the ARCS model, none of these studies connected participants' socio-demographic factors to study findings (see Table 7).

However, there is one study connecting learners' gamification user types to online learning activities to understand how learners are motivated differently based on their types (Bovermann & Bastiaens, 2020). This study suggests that it is important to understand target learner groups with their own leaning types and use a systematic approach to conduct meaningful online learning design.

Table 5

Goals of research and roles of motivational design studies without ARCS model (n=4)

Goals of research	Roles of motivational design	Studies
Design and evaluate	Learners' emotion/engagement	Dias et al. (2010)
	Learning outcomes/learners' interests	Dousay (2016)
	Learning outcomes/learners'	Hui et al. (2018)
	Learning outcomes/learners' motivation/learners' attitude to learning format	Gawlik-Kobylińska et al. (2021)
Evaluate	Learners' motivation	Author (2017)
	Connection between gamification user types and online learning activities	Bovermann & Bastiaens (2020)
	Learners' motivation/mental effort/learning outcome/cognitive load	Hawlitschek & Joeckel (2017)
	Learners' learning performance/learners' mental effort (motivation) /learners' involvement	Königschulte (2015)

Table 6

Learning environment of reviewed studies without ARCS model (n=4)

Learning environment	Studies
Blended learning	Hui et al. (2018), Gawlik-Kobylińska et al. (2021)
Digital application	Königschulte (2015), Hawlitschek & Joeckel (2017)
E-learning/online learning	Dias et al. (2010), Dousay, (2016) Bovermann & Bastiaens (2020)
Open learning	Huang (2017)

Table 7

Target audience, demographic factors, and locations of reviewed studies without ARCS model

Target learners	Demographic factors	Studies	Locations
Higher education	Academic level/age	Königschulte (2015)	Germany
	Academic level	Hui et al. (2018)	Hong Kong
	Academic level/prior experience	Gawlik-Kobylińska et al. (2021)	Poland
	Academic level/age/gamification user type/gender/major	Bovermann & Bastiaens (2020)	Germany
Adult learner	Academic level/age/gender Academic level/age/gender /job types	Dousay, (2016) Huang (2017)	U.S. Taiwan
K-12	Age/gender	Hawlitschek & Joeckel (2017)	Germany
No specified learners	None	Dias et al. (2010)	Brazil

Discussion

The findings highlight several emerging needs in order to address motivational needs of diverse online learner populations. First, this review study suggests the need for applying systematic design processes to improve motivational support as merely half of the reviewed studies (11 out of 25) applied a systematic process (i.e., ARCS model) to design and evaluate corresponding motivational support. Many studies have not applied systematic design methods or have not appropriately measured learners' motivation progress. Even for studies applying the ARCS model to design new learning tools, the effectiveness of the motivational strategies was assessed by learners' assessment scores or other non-motivational achievements. According to Keller (1987), it is an important fact to base evaluation of the instructional materials primarily on motivational and learning outcomes since learning achievements (e.g., scores) could be affected by many other circumstances. Learners' persistence, intensity of effort, emotion, and attitude should be considered to understand the effectiveness of motivational strategies to address learners' diverse motivational needs.

Second, K-12 learners and teachers, by comparison with other learning and development contexts (e.g., higher education, workplaces), have not been exposed to the online learning environment extensively. Consequently, there is a lack of motivational design studies that are focused on K-12 learners' online learning environment for formal learning purposes. Motivational design studies that targeted K-12 learners are also limited to the shorter-term use of digital applications as part of some learning activities. A comprehensive and longitudinal approach to diagnose and address young learners' and their teachers' motivational needs in online learning environments is in dire need.

Third, the findings show the diversity of learning environments (blended learning, e-learning, mobile applications, and virtual reality) and many geographic locations (Australia, China, Malaysia, and U.S.) of the reviewed motivational design studies. However, there is a noticeable absence of studies investigating influences of social experiences, cultural affiliation, economic status, and prior educational struggles of learners in a time when online learning is becoming increasingly diverse. In other words, learners' diverse backgrounds and thus their impact on learners' motivational needs have been excluded from the majority of reviewed motivational design studies. As online learners' motivational needs are the product of constant social interactions with systemic barriers (access barriers), considering online learners' vibrant and diverse experiences based on sex, age, race, ethnicity, socio-economic status, languages, and culture is essential to fully understand the root causes of their motivational problems. By extension, diversity-driven motivational design approaches could help us address the impact of digital divides derived from current and future digital learning innovations.

Fourth, for a deeper understanding of diverse learners' motivational needs, an expanded inquiry of motivational support using various methodological approaches is needed. In addition to cross-sectional studies, longitudinal research design should be adopted more frequently to contribute to the field of motivational design with time-based evidence to document online learners' fluctuating motivational needs during learning processes.

Finally, this study recognizes the limitation of sourcing the reviewed studies from one scientific and academic database. Our goal is to provide a focused and differentiated perspective derived from impactful peer-reviewed research publications.

Conclusion

To address the need of applying motivational design as the first step towards an inclusive digital learning innovation, the keywords of "motivational design", "motivation" and "instructional design" and "online learning", "motivation" and "instructional design" and "blended learning", and "motivation" and "instructional design" and "digital" were used to retrieve 29 peer-reviewed journal articles published in English from 2010 to 2021. These papers were reviewed based on research goals, research locations, learning environments, and targeted audience. The findings suggest:

1. Applying a systematic design process to improve motivational support is needed
2. There is a lack of motivational studies for K-12 online learners
3. There is a lack of effort to study the impacts of the learners' diverse backgrounds on their motivational needs in the context online learning
4. Various methodological approaches for a deeper understanding of diverse learners' motivational needs are required.

A collaborative approach of these efforts would enhance our understanding on how to make the motivational design process more systematic and inclusive.

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