Guidelines for Informed Instructional Strategy Selection in Online Higher Education: A Design and Development Research

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ABSTRACT

The demand for online education has significantly increased in recent years, prompting many educational institutions to consider its continued adoption in many ways. However, some faculty members have encountered challenges in teaching online due to a lack of adequate training and guidance on effective online teaching practices. This study aims to provide evidence-based guidance for higher education instructors in selecting effective instructional strategies in online learning environments. It employs design and development research methodology to create instructional strategy selection guidelines for online courses in higher education. The guidelines, rooted in pedagogical approaches, are designed to assist faculty in selecting appropriate instructional strategies for online learning. They comprehensively outline the various instructional strategies and the factors influencing the decision-making process for selecting instructional strategies in online learning environments. The study makes contributions to research and content development by providing strategy selection guidelines for quality online education.

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GENERAL AUDIENCE ABSTRACT

Online education has become increasingly popular in recent years. Preparing for online teaching can be a complex process, and some instructors find it challenging to teach effectively due to a lack of preparation and guidance. As part of online teaching planning, selecting the appropriate instructional strategy is crucial to providing a quality online learning experience. Thus, instructional strategies aid in ensuring that students comprehend academic material, facilitate effective teaching and learning, and encourage student engagement. To address this issue, this study has been conducted to provide evidence-based guidelines for instructors in selecting effective instructional strategies for online courses in higher education. These guidelines are designed to assist faculty in choosing the right strategies for online learning, taking into account various factors that can influence this decision-making process. This study employs the design and development research (DDR) methodology to create an instructional strategy selection guide for online courses in higher education. The DDR methodology involves a systematic and empirical approach to developing and evaluating instructional and non-instructional products, tools, and models (Richey & Klein, 2007). The guidelines were created in four phases: analysis, design, development, and evaluation and validation. Each phase had a specific purpose in creating and refining the guidelines. These guidelines have been developed based on a foundation of theoretical concepts, a thorough analysis of relevant literature, and extensive evaluation and validation by experts in the field. By providing well-planned strategies for quality

online education, this study contributes to research and content development in the field of online learning.

DEDICATION

I would like to dedicate this work to my parents, Abdulkarim and Shareefa, for their unstoppable support and daily prayers. To my sweet daughter Ghadah for her loving company, patience, and encouragement throughout this journey. To my brothers and sisters, Hana, Alaa, Othman, Amr, and Ayla, for their virtual support and kind hearts and wishes.

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CHAPTER 1

INTRODUCTION

Well-designed online instruction encompasses an informed approach to creating meaningful and effective learning experiences for students through the careful and strategic design of online course content, assessments, and delivery methods. Well-planned instructional strategies play an essential role in ensuring the quality of online learning design. Well-designed online instruction should have clear goals and outcomes, and instructional strategies should be selected to effectively engage learners, thus providing a quality learning experience in the online environment. The implementation of a well-planned instructional strategy helps to promote student engagement, foster meaningful learning, and achieve desired learning outcomes.

Traditionally, the spotlight has been on teaching strategies in academic learning within in-person environments. Considerable efforts have been directed towards enhancing the teaching and learning process in traditional classrooms (Cayubit, 2022; Reiser, 2001). The aim was to devise instructional methods that are effective and engaging (Cayubit, 2022; Reiser, 2001). This emphasis on in-person instruction and strategy was rooted in the widespread belief that the most effective learning occurred in a face-to-face setting, surrounded by teachers and peers (Cayubit, 2022). However, as online learning has gained traction, the focus has shifted. Researchers and educators are now grappling with the challenge of creating effective and engaging online instruction and understanding the role these strategies play in online learning (The Institute for Higher Education Policy, 2000). They have come to realize that students in online learning environments require support and guidance (Keeton, 2004) to succeed, and that well-planned teaching and learning strategies are pivotal in providing quality online education (Kim & Bonk, 2006).

In recent years, the COVID-19 pandemic led to a sudden shift in education when in-person classes were suspended and replaced with online learning (Johnson et al., 2020). This sudden change highlighted the importance of online instructional strategies and demonstrated the need for all educators to have a solid understanding of how to effectively teach in the online environment (Johnson et al., 2020). The pandemic has taught us that online teaching and learning strategies are relevant not only to experienced online educators but to all educators (Johnson et al., 2020). For example, the application of online instruction during the pandemic, which was rapidly implemented, differs significantly from a time when it was effectively planned (Bozkurt & Sharma, 2020). In the latter case, online pedagogy and instructional strategies play a critical role in ensuring that students receive a high-quality education, regardless of their location (Bozkurt & Sharma, 2020). In addition, the pandemic has accelerated the need for online instructional strategy planning and has opened up new research avenues in this field (Johnson et al., 2020).

The COVID-19 pandemic has influenced administrators' and educators' decisions about selecting appropriate instructional strategies for different learning environments and contexts (Hodges et al., 2020). Many educators worldwide have transferred their teaching to remote learning environments (Johnson et al., 2020). Simultaneously, and more than ever before, numerous media options have been updated and made available to support the application of various instructional strategies. Some researchers have called this sudden transition to online learning "emergency remote teaching" (ERT), which is considered to be different from well-planned online learning (Hodges et al., 2020, p. 4).

Centers for online learning, instructional design, and teaching support have faced many challenges during this period, such as managing the pressure of training many people in a short

time and supporting a large number of instructors as they swiftly transferred their learning materials to online modes (Hodges et al., 2020). As a rapid, reactive, and unplanned response, ERT has been a way to address the need for learning continuity. When the ERT approach was in its early stages of application during the pandemic, it presented many challenges for both instructors and students (Jeffery & Bauer, 2020; Pascual & Satulan, 2023; Shim & Lee, 2020).

According to Shim and Lee (2020), some students have shown dissatisfaction with remote learning for many reasons, including network instability, insufficient interactions with peers and instructors, and reduced concentration levels. Furthermore, Jeffery and Bauer's (2020) study of students' responses to ERT revealed critical factors affecting students' engagement, emotions, motivation, and cognitive processing. These factors included a lack of peer interactions, modeling problem-solving, hands-on experience, and increments of cognitive load (Jeffery & Bauer, 2020). Some of these instructional problems can be solved by utilizing learning and teaching strategies that are better planned and more effective.

The current literature contains various resources that describe the best-practice experiences of educators and researchers who have transitioned to ERT (Kuntz & Fleming, 2022). As emergencies can happen unexpectedly, it is essential to be prepared to switch to online learning quickly. For example, during the fall semester of 2022, several universities in the Southeast switched to online learning in anticipation of Hurricane Ian (Staff, 2022). This highlights the need for institutions to have a plan in place for such situations. Many faculty members have endured similar situations in the context of the COVID-19 pandemic and have acquired cumulative experience in shifting quickly to ERT. In the future, their past experiences with and expectations of the learning environment will allow them to transition to online environments faster than before (Caron, 2023).

In addition, the 2022 EDUCAUSE Horizon report mentions that two years into the pandemic, many institutions that initially adopted ERT as a quick response to the pandemic are now evolving these into well-designed online and hybrid learning programs (Pelletier et al., 2022). These changes suggest that online education is viewed not just as a temporary solution but as a long-term strategic capability, indicating a shift in how educational institutions perceive and use technology in their teaching methods (Pelletier et al., 2022). Ultimately, the ability to shift to online learning will continue to be necessary for numerous reasons. Therefore, evidence-based guidance for instructors is needed regarding the instructional methods that work well with online learning environments in higher education.

Practical design for instruction is a complex process that requires various skills and knowledge (Driscoll, 2014; Smith & Ragan, 2005). Moreover, online teaching is a multifaceted process that involves understanding not only technology but also mastering pedagogies and content tailored for the online teaching environment (Frass et al., 2017). After identifying the goals and objectives for the learning content, the educator's choice of instructional strategies is one of the factors that influence learners' achievement (Marzano, 2003). Marzano (2003) indicated that there are three factors through which the decisions made by individual teachers can impact learners: instructional strategies, classroom management methods, and classroom curricular design. The instructional strategy selection process should be planned and structured in a purposeful and systematic way to ensure that students achieve the desired outcome (Smith & Ragan, 2005).

From an instructional design perspective, choosing instructional strategies is an integral part of the systematic design process, as they are the core of instructional design (Larson & Lockee, 2020). Hill and Jordan (2021) have defined instructional strategies as "the instructional

materials and procedures that enable students to achieve the learning outcomes" (p. 1). Some scholars classify instructional strategies into various components or integrate them as part of the systematic instructional approach (Dick et al., 2015; Larson & Lockee, 2020; Ragan & Smith, 1994). For example, Ragan and Smith (1994) outlined three instructional strategy components: organization (content presentation), delivery (media), and management (schedule and resource allocation). They emphasized that the primary concern when designing instruction is organizational strategies. From their perspective, organizational strategies include content design choices for presentations, activities, and the sequence of learning events.

Other instructional design scholars have incorporated the process of instructional strategy selection as part of the systematic design and development process. For example, the sixth step or component of Dick et al.'s (2015) systems approach model is developing an instructional strategy. Larson and Lockee (2020) also describe instructional strategy as part of the ADDIE systematic approach: the design phase.

In addition, theories and best practices are crucial factors in selecting an instructional strategy. Theories and best practices can play a critical role in selecting an instructional strategy as they provide a framework for understanding how people learn and what approaches have been shown to be effective in facilitating that learning (Driscoll & Burner, 2021). By considering established theories and best practices, instructional designers and educators can make more informed decisions about which strategies to use in different contexts, which can lead to better outcomes for learners. Additionally, theories and best practices can help to ensure that instructional strategies are evidence-based and grounded in research rather than relying on intuition or guesswork. Therefore, an explanation of the theories and best practices relevant to selecting instructional strategies, especially in online learning environments, is needed.

Strategies reflect different general categories of pedagogical approaches, and these approaches are based on various theories of learning. For example, the process of selecting appropriate instructional strategies should take into consideration learning outcomes, theoretical assumptions, and related pedagogical approaches (Dick et al., 2015; Hill & Jordan, 2021; Larson & Lockee, 2020). Thus, it is essential to provide explanations of the related major and to highlight foundational learning theories (e.g., behaviorism, cognitivism, and constructivism) to help instructors understand the rationale behind the selection of instructional strategies (Larson & Lockee, 2020).

Need for the Study

The COVID-19 pandemic has caused significant changes and disruptions in the higher education sector, forcing colleges, universities, educators, and students to quickly adapt to the new normal. Analyzing the learning context during the pre, during, and post-COVID era is crucial to understanding the need for better preparedness. The pandemic highlighted the importance of having contingency plans, infrastructure, technology, and training to support remote learning, as well as providing ongoing support to educators transitioning to online instruction. A Quick Poll conducted by Caron (2023) assessed the current state of change and disruption in higher education, with most respondents reporting that their institutions were still undergoing substantial transformation.

The pandemic served as a wake-up call, emphasizing the need for better emergency preparedness in the future. The transition to online learning, while challenging, presented opportunities for educational institutions to learn and grow (Johnson et al., 2020; Pelletier et al., 2022). By applying the lessons learned from the pandemic, institutions can better prepare for future disruptions and ensure quality education under any circumstances (Johnson et al., 2020;

Pelletier et al., 2022). The experience of emergency remote teaching (ERT) provided faculty members with valuable insights and skills for current and future online learning transitions (Pelletier et al., 2022; Schmidt et al., 2020).

Thus, this research aims to provide evidence-based guidance to educators in higher education for selecting effective instructional strategies in online learning environments. Developing such guidance has become increasingly important in preparing instructors for online teaching due to the rapid growth of online education, accelerated further by the COVID-19 pandemic (Gao et al., 2022; Schmidt et al., 2020). These guidelines will equip faculty with valuable resources to engage students effectively in remote settings and better accommodate diverse student populations.

Recently, the demand for online instructors in higher education has risen significantly (Berry, 2019; Gao et al.,2022). To meet this demand, institutions are planning a path forward that involves continued use of online education (Schmidt et al., 2020). However, it is crucial for instructors to be prepared to teach effectively in the online environment (Schmidt et al., 2020). Despite the growth in online education, faculty members have encountered challenges in teaching online, mainly due to the need for sufficient training and guidance on effective online pedagogical practices (Berry, 2019; Gao et al.,2022).

In the realm of professional development, studies show that the focus has often been placed on technological training, overshadowing the critical aspect of online pedagogy (Berry, 2019; Gao et al.,2022). Thus, to ensure the quality of online education, it is vital to recognize that teaching online requires different competencies compared to traditional face-to-face teaching (Gao et al., 2022; Schmidt et al., 2020). Faculty need to adopt pedagogical approaches and develop the necessary skills to succeed in the virtual classroom.

Therefore, developing the guidelines is highly needed, and it becomes crucial to address these challenges. Such guidelines will prioritize pedagogical approaches and support faculty in selecting appropriate instructional strategies for online learning. By doing so, instructors can design and deliver optimal online courses that contribute to improving online education.

Research Problem

Selecting instructional strategies has been a research focus in education for decades. However, most of this research pertains to in-person traditional learning environments (Kentnor, 2015). As online distance learning has become more popular, researchers have begun exploring instructional strategies for online learning environments to enhance student engagement and learning (Kentnor, 2015). Still, the literature on selecting and applying instructional strategies under unusual learning conditions—such as health-related emergencies (pandemics), wars, natural disasters, and human-made emergencies—is less robust than that for more typical learning environments. Unusual circumstances are often unpredictable, and their impacts on educational systems can vary significantly, making it challenging to develop universal instructional strategies.

During emergencies, educational institutions often need to adapt quickly (Hodges et al., 2020), making extensive research on effective instructional strategies difficult. Emergencies often prioritize immediate needs, such as ensuring the safety and well-being of faculty and students, over evaluating instructional methods (Hodges et al., 2020). However, there is an emerging body of literature on crisis education and emergency remote teaching (ERT), particularly following the COVID-19 pandemic (Jeffery & Bauer, 2020; Shim & Lee, 2020).

Even though many educators have acquired experience in online teaching due to the sudden impacts of the pandemic, the literature shows several limitations in the skills related to

choosing appropriate, well-planned instructional strategies for achieving learning goals (Jeffery & Bauer, 2020; Shim & Lee, 2020). This design and development study aims to develop guidelines addressing the following issues:

a. Introduction to Instructional strategy types and options based on pedagogical and environmental considerations for online learning environments in higher education.
b. The factors associated with selecting instructional strategies during the systematic instructional design process.
c. The types of learning theories and pedagogical approaches supporting the choice of instructional strategies for online learning environments in higher education.

Purpose of the Study

This study aims to develop informed instructional strategy selection guidelines for higher education instructors to ensure quality learning design within online environments. The guidelines provide current, research-based resources with practical examples, understand the learners and their needs, analyze the online context learning modes, highlight essential elements for achieving learning objectives, and connect instructional strategy selection with related learning theories and pedagogical approaches. By grounding instructional strategies in learning theories and linking factors associated with instructional design, the guidelines will ensure a solid pedagogical foundation for educators and facilitate the selection of appropriate strategies. This integration of learning theories and instructional design principles will help educators make informed decisions when selecting and implementing instructional strategies, effectively enhancing their online teaching endeavors.

CHAPTER 2

LITERATURE REVIEW

This chapter presents a literature review that explores the various aspects of selecting instructional strategies for online learning environments in higher education. The literature review begins by examining the diverse types and characteristics of instructional strategies, which serve as a foundation for selecting appropriate methods to engage learners in online settings. The review then explores the learning theories and pedagogical approaches that underpin instructional strategy selection, providing a theoretical grounding for understanding the principles behind effective teaching methods. This section also highlights learning theories tailored explicitly to online learning, which can further inform the design of instructional strategies for virtual environments. Additionally, the review investigates the importance of context and learner analysis in selecting instructional strategies. This includes an in-depth examination of the online learning environment and its unique challenges, as well as the diversity of learners and their needs. Lastly, the review discusses the role of learning outcomes and objectives in guiding the selection of instructional strategies, ensuring that chosen methods align with the desired educational goals.

Overall, this literature review thoroughly analyzes selecting instructional strategies for online learning in higher education. The review provides foundational information for designing a guide to help educators improve their online teaching practices.

Types and Characteristics of Instructional Strategies

Selecting the appropriate instructional strategy to support targeted learning outcomes can be a complex task. Various instructional strategies are available, and determining the most

suitable one is essential for addressing the specific needs of the class and offering the optimal learning experience (Larson & Lockee, 2020).

In general, instructional strategies encompass teaching and learning strategies (Larson & Lockee, 2020), and the term "instructional strategy" covers various teaching and learning activities (Dick et al., 2015). Larson and Lockee (2020) state that instructional strategies may also be referred to as "activities, exercises, learning experiences, methods, techniques, plans of action, or teaching models" (p. 218). A *teaching strategy* is an approach employed by an instructor to deliver content to students based on specific learning objectives (Larson & Lockee, 2020), while a *learning strategy* is an action taken by a student to optimize and enhance the learning process (Larson & Lockee, 2020). Thus, a teaching strategy focuses on the instructor's role in the learning process, while a learning strategy centers on the student's role in their learning process. In the field of instructional design, both aspects are crucial for effective teaching and learning (Larson & Lockee, 2020).

Different sources categorize strategies differently, leading to diverse classifications of teaching and learning strategies based on their level of instruction, function, and support. Concerning the instructional level of strategies, Dick et al. (2015) and Richey et al. (2010) posit that strategies can be divided into two groups: micro and macro strategies. Micro strategies refer to specific tactics an instructor employs to achieve a particular learning objective or engage students in a specific manner (Richey et al., 2010). Examples of micro strategies include using visual aids, conducting formative assessments, or leading class discussions. In contrast, macro strategies represent overarching approaches that define the overall structure and design of a lesson or instructional unit (Dick et al., 2015). They outline the sequence of events and overall goals of instruction (Richey et al., 2010). In essence, micro strategies are the tools utilized by a

teacher to implement a macro strategy, which defines the broader approach to teaching and learning.

Reigeluth (1983) categorizes strategies by their function and identifies three key components of instructional strategy: content organization, media delivery, and management strategies. Organizational strategies are lesson-level strategies that address the presentation and sequencing of content and facilitate learners' mental operations (Smith & Ragan, 2005). Although these strategies may vary depending on the learning goal and outcome type, selecting an organizational strategy should follow a process that includes an introduction, body, conclusion, and assessment (Smith & Ragan, 2005).

Delivery strategies focus on choosing instructional media and organizing learners into groups (Smith & Ragan, 2005). Selecting these strategies involves identifying appropriate instructional media and appropriate learner grouping strategies. These choices may remain consistent throughout the lesson or vary between different instructional events.

Management strategies involve scheduling and resource arrangement (Smith & Ragan, 2005). These strategies direct and coordinate organizational and delivery strategies, controlling the scheduling of instructional events and delivery methods. Instructional management strategies encompass techniques for providing learners with necessary instructional resources, ensuring a seamless and effective learning experience (Smith & Ragan, 2005).

Organizational and delivery strategies (media decisions and grouping strategies) are often chosen simultaneously, considering their impacts on each other to create a cohesive and effective learning experience. Both are managed and controlled by management strategies (Smith & Ragan, 2005).

Another category of instructional strategies, as explained by Smith and Ragan (2005), depends on the level of support and mental effort required. This category includes supplantive and generative strategies, representing two ends of a continuum in instructional design, each with distinct characteristics and benefits.

According to Smith and Ragan (2005), supplantive strategies facilitate more mental processing for the learner by providing explicit goals, guidance, and structure. These strategies are particularly beneficial for novice learners, complex or new information, situations with time constraints, or high-risk tasks (Smith & Ragan, 2005). In addition, supplantive strategies provide learners more support than generative strategies (Richey et al., 2010). For example, instructors can select expository instructional methods such as direct instruction and guidelines (Richey et al., 2010).

Conversely, Smith and Ragan (2005) indicate that generative strategies encourage learners to define their own goals, organize content, control pacing, self-monitor understanding, and apply knowledge to new contexts. This approach enables learners to "generate" most of the mental processing, which promotes active engagement, critical thinking, and personalized learning experiences (Smith & Ragan, 2005). For instance, selecting a problem-based learning strategy in a learner-centered context is considered a generative strategy (Richey et al., 2010).

Both supplantive and generative strategies possess distinct advantages and disadvantages that need to be carefully considered when implementing these approaches in an instructional setting. While generative strategies are often associated with better learning outcomes (especially for knowledgeable and able learners), they can place high cognitive demands on learners, potentially leading to cognitive overload or frustration (Smith & Ragan, 2005). Success with generative strategies depends on learners' prior knowledge and their repertoire of learning

strategies (Smith & Ragan, 2005). Supplantive strategies, on the other hand, offer more scaffolding, support, and guidance for learners, leading to more focused and predictable outcomes. However, they may be less personally meaningful or motivating for some learners (Smith & Ragan, 2005).

Both supplantive and generative strategies can lead to personal interpretations of knowledge, active learning, and motivation. The key is to find a balance between requiring sufficient mental effort for learning while providing enough support to avoid overloading learners' working memory (Dabbagh, 2003). In addition, factors such as learner characteristics, content complexity, and instructional context should be considered when deciding on and selecting the appropriate approach for a particular learning situation (Dabbagh, 2003; Richey et al., 2010; Smith & Ragan, 2005).

Instructional Strategy Selection Factors

Several factors influence the selection of appropriate instructional strategies, requiring instructors and instructional designers to carefully consider various aspects of the learning environment. One key factor is the desired learning outcomes, which should align with the chosen instructional strategies and assessments (Larson & Lockee, 2020). Additionally, personal values and beliefs about teaching and learning play a crucial role in this decision-making process (Hirumi, 2021). In some cases, instructors and instructional designers may need to step out of their comfort zones and apply strategies they have yet to experience (Hirumi, 2021).

Personal epistemological beliefs also affect the likelihood of teachers employing different instructional strategies. For instance, an instructor who believes knowledge is constructed by individual learners is more inclined to select strategies such as discussion and group problem-

solving, as opposed to someone who believes knowledge is absolute and must be directly transferred to learners (Driscoll, 2014).

Typically, classifying the learning task is one of the initial steps that designers take, as this decision provides direction for many subsequent design steps, and particularly in the strategy selection stage (Richey et al., 2010). The work of early instructional theorists also impacts the selection of instructional strategies (Driscoll, 2014; Larson & Lockee, 2020; Richey et al., 2010). For example, the work of Robert Gagne and his nine events of instruction (Gagne, 1985) is particularly significant and impactful (Driscoll, 2014). His work guides educators in selecting instructional strategies that align with learning objectives and the cognitive needs of learners (Driscoll, 2014). For instance, it informs when and how to use methods such as direct instruction, facilitated discussion, problem-based learning, and so forth, based on the nature of the content and the cognitive demands/ condition of the task.

The chosen instructional strategies may also vary depending on factors, including subject matter, learning objectives, students' needs, and the educational context (Hill & Jordan, 2021). Further analysis and review of these factors will be elaborated in the upcoming sections. Consequently, instructors and instructional designers must carefully consider these factors to select the most appropriate and effective instructional strategies for their learners.

Learning Theories and Pedagogical Approaches

The role of learning theories in instructional strategy selection is essential, as they provide a foundation for creating effective, engaging, and theoretically sound learning experiences for students (Hirumi, 2021). Content design based on a theoretical foundation has several advantages, including leveraging existing research and insights to inform design, aligning

instructional design with recognized learning theories, and simplifying the design process by identifying the goals and scope of the instruction (Driscoll, 2014; Larson & Lockee, 2020).

Learning theories provide a framework for understanding how individuals acquire knowledge, skills, and attitudes (Larson & Lockee, 2020). Based on theoretical assumptions, research, and observation, these theories inform the design of effective instructional strategies and learning experiences (Picciano, 2021). For example, applying constructivist principles might involve designing collaborative learning activities that encourage learners to build knowledge through social interaction. In addition, learning theories are not mutually exclusive; instead, elements from various theories can be blended to align with teaching methods and better understand students' needs (Saunders & Wong, 2020).

Scholars organize and categorize learning theories to develop a better understanding of the diverse perspectives on knowledge acquisition and to identify the most effective ways to facilitate learning (Ormrod, 2020). However, it is essential to consider that applying these theories across diverse learning contexts and learner populations may present challenges, requiring flexibility and adaptation to meet specific needs (Driscoll, 2014; Larson & Lockee, 2020).

Researchers from different fields have adopted various approaches to discuss major learning theories, focusing on different aspects such as their popularity in teaching and learning (Fairbanks, 2021; Saunders & Wong, 2020), practical application (Driscoll, 2014; Ormrod, 2020), domain-specificity (Joyce et al.,2015; Mayer, 2019; Picciano, 2021), and contributions to the field of instructional design (Driscoll, 2014; Larson & Lockee, 2020).

Some researchers, like Fairbanks (2021) and Saunders and Wong (2020), focus on the most well-known and influential educational theories, such as behaviorism, cognitivism,

constructivism, humanism, and connectivism. Each theory offers unique perspectives on how learning occurs and the factors that influence it. For instance, behaviorism focuses on observable behaviors and reinforcement, while cognitivism emphasizes mental processes and information processing.

Due to their significant influence on education, Picciano (2021) highlights major learning theories, such as behaviorism, cognitivism, and social constructivism. These theories have shaped how educators consider and approach teaching and learning, and many related theories and models have roots in one or more of these major learning theories. Picciano (2021) then describes learning theories relevant to specific domains or contexts, such as online learning. As educational technologies and methodologies evolve, it is crucial to consider how these theories might be adapted to accommodate new learning environments.

Some instructional design researchers focus on the practical applications of learning theories, exploring how they can inform instructional design, curriculum development, and teaching practices (Driscoll, 2014; Larson & Lockee, 2020). This approach emphasizes the real-world relevance of learning theories and their potential to improve educational outcomes.

Ultimately, learning theories play a critical role in selecting instructional strategies (for both traditional and online learning environments) by providing a research-based foundation for instructional design (Hirumi, 2021). By understanding the major learning theories and their influence on instructional strategies, educators can create effective, engaging, and theoretically sound learning experiences. Additionally, examining the context of online learning highlights fundamental theories specifically developed to guide the design and implementation of online learning environments (Goldie, 2016; Harasim, 2017; Mayer, 2019; Picciano, 2021). By

identifying these perspectives, educators can tailor their instructional strategies to suit the learning needs of their audience.

In the following section, an examination of the major learning theories and their influence on instructional strategies will be undertaken, followed by a discussion of select theories relevant to the context of online learning. This discussion aims to provide insight into the theoretical frameworks that have informed instructional practices across diverse settings and to highlight key theories that have been developed to guide the design and implementation of online learning environments.

Behaviorism

Behaviorism emphasizes the role of the environment in shaping the learner's behavior and focuses on observable behaviors (Driscoll, 2014). It is a group of theories that emphasize generalizable learning principles, observable events, and the idea that organisms are born as blank slates (Ormrod, 2020). Behaviorism emphasizes observable behaviors and their cause-effect relationships in education, and it aims to examine, evaluate, and control students' responses to stimuli (Picciano, 2021). The learning outcome of this approach is observable behavior (Driscoll, 2014). Therefore, behaviorists concentrate more on changing learning behavior because it is observable rather than mental processes (Larson & Lockee, 2020). They believe that knowledge is objective and external to learners, with instructional goals centered on effectively and efficiently transferring knowledge (Joyce et al., 2015).

Early behaviorists, such as Ivan Pavlov (1927), focused on stimulus-response relationships and changes in behavior as learning (Pavlov, 1927). This concept is still relevant to human responses, emotions, and attitudes, and counterconditioning can help in treating irrational fears and phobias (Ormrod, 2020).

Edward Thorndike (1905) and B. F. Skinner (1938) studied voluntary behaviors through operant conditioning, where responses leading to satisfying consequences are strengthened. This theory uses positive and negative reinforcement to help individuals learn new behaviors and punishment, which can be effective in decreasing inappropriate behaviors (Ormrod, 2020; Skinner, 1938).

According to the behaviorist theory, instructional strategies should be selected and designed with a focus on observable behaviors and their connections to stimuli and consequences. These strategies aim to promote the repetition of desired behaviors and discourage the repetition of undesired behaviors. As part of the instructor's role within this framework, they are responsible for developing strategies that involve identifying learning objectives, determining reinforcement opportunities, implementing a behavior modification program, and incorporating the learner's input throughout these processes (Driscoll, 2014). Additionally, educators must create instructional materials and interactions that facilitate effective learning while being mindful of environmental factors that could affect the learning process (Joyce et al., 2015).

Some examples of instructional strategies and principles based on behavioral theories include that educators should focus on clear learning objectives, task analysis, effective reinforcement, immediate and corrective feedback, practice and repetition, shaping and chaining techniques, and tailoring instruction to individual needs (Driscoll, 2014; Ormrod, 2020).

Cognitivism

Cognitivism emerged as a response to behaviorism's rigid emphasis on predictable stimulus and response relationships (Harasim, 2012). In the book *Human Learning*, Ormrod (2020) explains the similarities and differences between behaviorist and cognitivist approaches. The author points out that cognitivists, like behaviorists, believe that the study of learning should

be objective and grounded in empirical research. However, their approach diverges when it comes to understanding the learning process. Cognitivists observe human learners' responses to various stimuli and, based on these observations, make inferences about the underlying cognitive processes that contribute to those responses (Bransford & Franks, 1971; Clark, 2018). This approach allows cognitivists to indirectly explore mental processes involved in learning, which are not directly observable, by analyzing the relationships between stimuli and learners' responses (Bransford & Franks, 1971).

Cognitive theorists have highlighted the significance of the mind in learning and aim to explore what happens between the environmental stimulus and a student's response (Picciano, 2021). Cognitivists, considering memory and recall as central to learning, are strongly concerned with understanding the processes and conditions that improve memory and recall capabilities (Saunders & Wong, 2020). Therefore, individuals acquire and store knowledge, known as schema, in their long-term memory (Saunders & Wong, 2020). People also organize their knowledge into categories and establish schemas to retrieve relevant information when necessary (Mayer, 2019)

Ormrod (2020) states that contemporary cognitivism encompasses various perspectives, such as "information processing theory, individual constructivism, social constructivism, sociocultural theory, and contextual views" (p. 194). Picciano (2021) also highlights that cognitive science is interdisciplinary, drawing from psychology, biology, neuroscience, computer science, and philosophy to explain brain function and cognitive development, which form the basis of learning and knowledge acquisition. Consequently, cognitivism has emerged as one of the leading learning theories.

According to the cognitivist approach, instructional strategies should be designed to engage learners' mental processes and help them build connections between new and existing knowledge (Saunders & Wong, 2020). For example, Robert Gagne's (1985) model, the nine events of instruction, provides a framework for designing effective instructional materials by addressing the cognitive processes involved in learning (Driscoll, 2014; Picciano, 2021). The model helps to ensure that learners' cognitive structures are activated and that information is efficiently processed, stored, and retrieved (Driscoll, 2014). The nine events include "gain attention, inform learners of objectives, stimulate recall of prior learning, present stimulus, provide learner guidance, elicit performance, provide feedback, assess performance, and enhance retention and transfer" (Gagné, 2005, p. 190).

Finally, cognitivism is considered teacher-centered rather than learner-centered since it emphasizes the role of the instructor in organizing learning activities and establishing the conditions of learning (Mayer, 2019; Saunders & Wong, 2020).

Constructivism

As a learning theory, constructivism emphasizes that individuals and groups generate knowledge and meaning through their engagement and interaction with the world and environment (Larson & Lockee, 2020; Saunders & Wong, 2020). This approach highlights the important role of prior knowledge, mental structures, and beliefs as a foundation for individuals to generate new knowledge to construct meaningful experiences (Jonassen, 1991). Therefore, the learner actively seeks meaning from the new information they are learning (Jonassen, 1991).

One of the key impacts on constructivist thought is rooted in Vygotsky (1978), who posited that social and cultural aspects play a critical role in how learners learn (Vygotsky, 1978). Vygotsky's emphasis on social interactions illuminated how individuals and groups create

meaning and knowledge socially — through their interactions with others, their shared experiences, and their individual encounters (Saunders & Wong, 2020).

As a result, there are two primary types of constructivism: cognitive constructivism, which concentrates on creating the instructional design to assist individuals in constructing meaning, and social constructivism, influenced by Vygotsky's social perspective (Vygotsky, 1978), which emphasizes designing instruction for groups to enable collaborative meaning construction (Larson & Lockee, 2020).

Driscoll (2014) has indicated that no specific constructivist theory of instruction exists. Instead, the author explains that researchers from various fields, such as science education, educational psychology, and instructional technology, contribute to different aspects of constructivist theory. Some scholars consider constructivism more of a philosophy than a theory, but in the context of instructional design, it serves as a theoretical base for understanding the learning process (Harasim, 2017).

Constructivism is not based on one singular philosophy or psychological perspective. Instead, it combines multiple perspectives and viewpoints (Driscoll, 2014). Although there is some overlap between constructivism and cognitivism (both were built upon the theories of Jean Piaget), they still differ in many ways (Jonassen, 1991; Saunders & Wong, 2020). Unlike behaviorist and cognitivist perspectives, which view knowledge as objective, constructivism posits that knowledge is subjective (Larson & Lockee, 2020). This is because constructivists believe learners actively construct their understanding, making sense of their learning experiences (Jonassen, 1991). This could also be related to learner and instructor roles in the teaching and learning environment. Behaviorist and cognitivist approaches to teaching are generally considered teacher-centered, while constructivism is more student-centered (Jonassen,

1991). In a constructivist classroom, students are encouraged to engage with content, explore ideas, and collaborate with others to create meaning (Driscoll, 2014). The teacher's role is a facilitator, providing guidance and support while encouraging students to draw upon their prior knowledge and experiences (Jonassen, 1991; Saunders & Wong, 2020).

According to this theory, instructional strategies should be selected to encourage learners to actively engage with the material and to connect with others and the environment to construct their understanding. For example, Driscoll (2014) provides certain preconditions or strategies to support learning, including using complex and realistic/ill-structured problems, providing problem-solving resources, and incorporating strategies to support self-directed learning.

Social Theories of Learning

According to the literature, social theories of learning may include key principles from the major learning theories, including constructivist (social constructivism), cognitivist, and behaviorist aspects (social cognitive theory) (Driscoll, 2014; Larson & Lockee, 2020; Picciano, 2021; Richey et al., 2010). These theories are based on the work of several prominent theorists, including Lev Vygotsky (1978), Jean Piaget (1970), and Albert Bandura (1977) (Larson & Lockee, 2020; Picciano, 2021). This approach emphasizes the importance of social interactions and collaboration in the process of learning and knowledge construction (Picciano, 2021).

Social theories of learning highlight the role of culture and context in shaping the learning process (Larson & Lockee, 2020). They posit that learning is not an isolated process but is deeply rooted in the social context, culture, and interactions among learners (Saunders & Wong, 2020). Learners construct knowledge within a specific cultural and social context, and their understanding is influenced by their experiences and behaviors (Richey et al., 2010). The main concepts in social theories of learning include learning through observation (Bandura,

1977b), self-efficacy (Bandura, 1977a), and the Zone of Proximal Development (ZPD) (Vygotsky, 1978).

According to Albert Bandura, people can learn by observing others (Bandura, 1977b), as stated by Richey et al. (2010). By observing others and the consequences of their actions, individuals can acquire and perform new behaviors (Richey et al., 2010). When learners have confidence in their ability to perform a specific task, it indicates that they possess self-efficacy (Richey et al., 2010). In a social context, both observation and self-efficacy play significant roles in influencing how a person approaches a learning challenge (Larson & Lockee, 2020).

The ZPD concept, introduced by Vygotsky (1978), refers to the difference between what a learner can do independently and what they can achieve with the help of a more knowledgeable other (MKO) (Larson & Lockee, 2020). Social learning occurs within the ZPD as learners work with their peers or mentors to progress from their current level of understanding to a higher level (Vygotsky, 1978).

According to the social theories of learning approach, educators need to consider some additional principles when selecting instructional strategies. For example, instructors can apply strategies that provide learners with opportunities for observation and modeling, fostering self-efficacy (Richey et al., 2010), utilizing scaffolding and support, and encouraging social interaction and collaboration (Larson & Lockee, 2020).

Connectivism

Picciano (2021) points out that connectivism, a learning model proposed by George Siemens (2004), acknowledges the significant shifts in knowledge and information flow due to vast data communication networks like the Internet. According to Siemens (2017), connectivism is a learning theory integrating principles from chaos, network, complexity, and self-organization

theories. Siemens suggests that learning occurs in nebulous environments with shifting core elements and that it can reside outside of ourselves. It emphasizes the importance of connecting to and participating in learning communities, which enable interaction, sharing, dialogue, and collaborative thinking (Goldie, 2016).

The development of the online environment allows learners to create personal learning environments (PLEs) that facilitate the production and consumption of learning resources (Goldie, 2016; Harasim, 2017). In connectivism, learning communities are described as nodes within larger networks, which can consist of organizations, libraries, websites, journals, databases, or other sources of information (Goldie, 2016). Successful networks have characteristics such as diversity, autonomy, openness, and connectivity (Goldie, 2016). This approach moves learning from individual activities to group, community, and crowd activities (Picciano, 2021). In this model, connections are more important than the current state of knowing, and students must understand and navigate the ever-changing information landscape (Picciano, 2021; Siemens, 2017).

Educators are unlikely to rely solely on connectivism to understand learning in technology-driven networks; it can be used alongside other learning theories to comprehend learning in tech-enabled networks (Goldie, 2016). Picciano (2021) suggests that connectivism is particularly suitable for courses with a large number of students, where the primary aim of learning is to generate and develop knowledge rather than merely transfer it.

According to this theory, instructional strategies should be selected to emphasize network building, encourage collaboration, and leverage technology (Siemens, 2017). For example, some strategies used in connectivist applications include Massive Open Online Courses (MOOCs) and Personal Learning Environments (Larson & Lockee, 2020).

Related Theoretical Concepts

The literature indicates that no one-size-fits-all learning theory serves as the ultimate approach for instruction, either in classroom-based learning or online education (Goldie, 2016; Picciano, 2021). Various learning theories have been developed to tackle different facets of the learning process, with many originating from the previously reviewed major learning theories (Mayer, 2019). In the online context, a selection of learning theories will be explored and assessed for their suitability for application within online learning environments. Online learning is a rapidly evolving field, and the advancements related to the internet and various online technologies have brought about significant implications for both learning theory and its practical applications (Harasim, 2017). Therefore, various learning theories have been proposed and utilized to inform the design and implementation of online courses (Picciano, 2021). Some of the most prominent learning theories and concepts for online learning include the theory of transactional distance, cognitive load theory, and andragogy.

Theory of Transactional Distance

Moore's 1993 Theory of Transactional Distance is a framework for understanding the psychological and communication gaps that arise between instructors and learners in an educational setting, particularly in distance education (Moore, 1993). The theory posits that three main variables influence transactional distance: dialogue, structure, and learner autonomy. Transactional distance increases when there is less dialogue, a more rigid course structure, and greater learner autonomy (Moore, 2019).

Moore's Theory of Transactional Distance is well-aligned with online learning because it specifically addresses the unique challenges, such as emotional distance due to geographical separation, faced by learners and instructors in remote educational settings (Bolliger & Halupa,

2018). Thus, it helps educators to understand and manage the distance that arises due to the lack of physical presence and aids in designing effective online courses (Moore, 2019). According to Falloon (2011), Moore's theory of transactional distance is especially relevant when examining the use of virtual classrooms in online teaching to promote high-quality dialogue. The theory provides a framework for researchers to assess how effective virtual classrooms can reduce learners' perception of transactional distance (Falloon, 2011).

According to this theory, instructional strategies should be selected to minimize transactional distance by promoting dialogue, providing an appropriate balance of structure and flexibility, and supporting learner autonomy (Moore, 2019). For example, instructors can use synchronous and asynchronous communication tools to foster interaction, provide clear instructions and guidelines for course activities, and offer opportunities for learners to take control of their own learning experiences (Falloon, 2011; Moore, 2019).

Cognitive Load Theory (CLT)

Cognitive load theory, based on John Sweller's (1988) work and G. A. Miller's (1956) idea of limited working memory, informs methods to reduce the demand on learners' working memory (Larson & Lockee, 2020). The theory emerged in the 1990s and continues to evolve as a significant advancement in learning theory, particularly relevant to the instructional design of online learning (Mayer, 2019).

Cognitive load refers to the effect of message structure on cognitive processing. It encompasses the complexity of the content (intrinsic load), the design and organization of the instruction (extraneous load), and the effort required by learners to assimilate the information and create a mental framework (germane load) (Richey et al., 2010).

In the context of online learning, CLT can be applied to optimize instructional materials' design and delivery, focusing on managing learners' cognitive load to facilitate learning. By reducing extraneous cognitive load and managing intrinsic and germane loads, educators can create more effective online learning experiences (Mayer, 2019). Instructional designers and instructors should aim to minimize extraneous cognitive load resulting from unsuitable instructional procedures, enabling learners to process information effectively within their cognitive system's constraints (Mayer, 2019).

Andragogy

Andragogy is a model under the humanism theory that helps educators understand adult learning, but it is not a theory itself (Arghode et al., 2017). The approach developed by Malcolm Knowles (1988) is based on a set of assumptions about adult learners' experiences, motivations, and needs, and it highlights the importance of understanding these differences when teaching adults (Knowles, 1988). Since the target group for this design and development study is higher education students, educators in higher education need to be aware of the andragogy view when designing online instruction. This will help to create a learner-centered environment that values immediate applicability, relevance, and self-directed learning.

Andragogy emphasizes the unique aspects of adult learning, highlighting key assumptions such as adults having a self-directed learning approach (Saunders & Wong, 2020), possessing a wealth of experience that can be used as a learning resource, being ready to learn based on their social roles, valuing the immediate applicability of knowledge, being driven by internal motivations, and needing to understand the rationale behind their learning (Knowles, 1988).

Faculty can enhance their teaching and learning strategies for adult learners by following Knowles' (1988) recommendations, which include fostering a cooperative climate that encourages collaboration, open discussion, and respect, assessing learners' needs and interests to create tailored learning experiences, developing clear and relevant learning objectives based on student's needs, interests, and skills, designing activities that logically build upon one another to promote progressive skill and knowledge development, collaborating with learners on selecting instructional methods and materials to ensure relevance and engagement, and continually evaluating and adjusting the learning experience based on feedback, while adapting course content to address students' ongoing learning needs (Saunders & Wong, 2020; TEAL Center, 2011).

Ultimately, the more familiar adult educators are with the adult learning knowledge base, including principles of andragogy, the more effective and responsive their practice can be to the needs of adult learners (TEAL Center, 2011). By applying the principles of andragogy, educators can create more engaging and effective learning experiences, promoting students' success in higher education.

To sum up, learning theories play a fundamental role in informing instructional strategies, allowing educators to create engaging and effective learning experiences tailored to the needs of their audience (Larson & Lockee, 2020). These theories provide a foundation for selecting effective instructional strategies, as they help educators understand the factors influencing learning and the principles underlying effective instruction (Bransford et al., 2000). Instructional strategies are designed based on the principles and assumptions of a specific learning theory, with the goal of enhancing the learning process through their application to instructional design (Harasim, 2017).

It is important to note that learning theories are not mutually exclusive; educators can combine elements from various theories in ways that align with their teaching styles and reflect their understanding of their students' needs (Saunders & Wong, 2020). Having a diverse range of learning theory tools in one's toolbox enables educators to design instruction that caters to the needs of learners with different motivations, prior knowledge, and intellectual capabilities (Bransford et al., 2000).

Overall, learning theories offer valuable guidance for selecting and implementing instructional strategies that are effective and engaging for learners. By understanding these theories, educators can reflect on their practice, improve, reshape, and refine their work, and contribute to advancing the discipline (Harasim, 2017). Integrating strategies from multiple theories enriches the design tools at an educator's disposal, allowing for more purposeful choices in achieving specific learning goals (Bransford et al., 2000).

Context and Learner Analysis

Learning Context

The instructional context is crucial in shaping strategies and activities that promote learning. Understanding its nature allows educators to make informed decisions about fostering learning and achieving desired outcomes (Larson & Lockee, 2020). Instructional strategies and activities can influence the learning context and technologies used for delivery. Instructional contexts involve various dimensions, such as physical, temporal, and social aspects, all of which affect the learning experience (Dick et al., 2015; Smith & Ragan, 2005; Tessmer & Richey, 1997).

Dick et al. (2015) have stated that the learning context is where learners acquire new skills and knowledge. Analyzing the learning context requires understanding resources,

constraints, and other factors impacting the learning process. Tessmer and Richey (1997) have also stressed the importance of considering contextual factors in instructional design.

Key elements in learning context analysis include the delivery mode, learner characteristics, available resources, task characteristics, and constraints (Dick et al., 2015; Tessmer & Richey, 1997). Dick et al. (2015) have proposed four key aspects to consider: (1) compatibility of the site with instructional requirements, (2) adaptability of the site for simulating workplace aspects, (3) adaptability of the site for using various instructional strategies and delivery approaches, and (4) constraints affecting design and delivery of instruction. When analyzing the online learning context, these key elements should be applied as follows:

1. Compatibility of Site with Instructional Requirements: Ensure the online learning platform, like a learning management system (LMS), supports essential tools and resources for effective instruction (Cheuk, 2021). Check compatibility with various devices (Cheuk, 2021), accessibility features for disabled students, and multimedia resource availability (Hodges et al., 2020).
2. Adaptability of Site to Simulate Workplace: In online environments, simulate workplace aspects using virtual tools, case studies, real-world projects, or online collaboration tools (Jowsey et al., 2021; Martin & Bolliger, 2018). Consider incorporating interactive simulations or virtual labs for learners to practice skills in a safe, controlled environment resembling their future workplace (Georgiou et al., 2007).
3. Adaptability for Delivery Approaches: Online platforms should support various instructional strategies and delivery approaches (Hodges et al., 2020), such as synchronous and asynchronous learning, video lectures, interactive modules,

discussion boards, and group projects (Cheuk, 2021; Shank, 2007). Be mindful of students' diverse learning preferences and ensure adaptability to these needs (Tessmer & Richey, 1997).

4. Learning Site Constraints Affecting Design and Delivery: When analyzing constraints (Tessmer & Richey, 1997) in an online learning context, consider factors like internet connectivity, device compatibility, and learners' digital literacy (Cheuk, 2021). Identify organizational policies or decisions affecting online instruction design and delivery (Dick et al., 2015; Shank, 2007), such as the required use of specific technologies or platforms.

By addressing these factors, instructional designers can create customized learning experiences that meet learners' needs.

The relationship between learning context and instructional strategies is dynamic and iterative. Educators need to consider how decisions about the learning context impact strategy and activity choices. This process involves revisiting and revising plans based on new insights, feedback, or changes in the learning environment.

Learner Analysis

Understanding the target audience's characteristics is crucial for creating engaging and effective instruction. As part of the instructional design process, instructional designers analyze various learner characteristics, such as demographics, individual differences, beliefs, attitudes, and mental models, which impact motivation, learning, and knowledge transfer (Richey et al., 2010).

To select the appropriate strategy, educators must understand their target learners to create effective and engaging instruction. Dick et al. (2015) identified eight essential elements

for educators to understand their target learners: entry skills, prior knowledge, attitudes toward content and delivery, academic motivation, educational and ability levels, learning preferences, attitudes toward the organization, and group characteristics. Data about these characteristics can be gathered through observation, surveys, interviews, assessments, reviewing existing data, consulting with colleagues, and research (Dick et al., 2015; Smith & Ragan, 2005).

Faculty members can apply this approach by considering diverse learner characteristics when designing courses, creating inclusive content, accommodating various learning preferences, and fostering motivation and engagement (Smith & Ragan, 2005). This focus facilitates a more effective learning experience, guiding students from novice to expert levels of understanding and improving overall academic outcomes and satisfaction.

Understanding learner variables is essential for selecting and developing instructional objectives and strategies. These variables inform strategy selection, as well as the choice of relevant examples, instructional delivery methods, and engaging and meaningful skill practice. This adapted approach will enhance the overall learning experience.

Online Learning as a Delivery Mode

The choice of delivery mode in distance education refers to the technological system used to transmit instruction to learners (Head et al., 2002). The decision on the delivery mode is often made before the course begins and is based on considerations such as learning needs, learner characteristics, and the learning context (Lockee et al., 2022). It should also align with the organization's infrastructure, values, and management strategies (Lockee et al., 2022; Moore, 2020). However, instructors can adjust the delivery mode as the course progresses based on student engagement, learner needs, and their own teaching experience (Lockee et al., 2022).

Furthermore, online courses can be presented in synchronous or asynchronous modes (Dennen, 2019; Shank, 2007), impacting the timing of class activities and the nature of student interactions. Understanding the benefits and challenges of both synchronous and asynchronous delivery assists instructors in choosing the most appropriate approach, or a combination of both, for a given situation (Shank, 2007).

Despite the significance of the delivery mode, it should not overshadow the importance of instructional strategies and appropriate media use (Head et al., 2002). The delivery mode should be flexible enough to accommodate the instructional strategy, which is, in turn, shaped by the delivery mode (Head et al., 2002). Regardless of whether a course is delivered online in a synchronous or asynchronous mode, the quality of instruction is more heavily influenced by the teaching methods and learning materials used (Head et al., 2002).

In essence, the delivery mode and the instructional strategy in distance education have a reciprocal relationship, each influencing the other and together playing a vital role in the overall learning experience. This relationship should be carefully considered in the design and implementation of online courses. Instructors should base their decisions regarding delivery mode and instructional strategy on a holistic understanding of the learning ecosystem, including learners' needs, available resources, and the potential impacts of different modes and strategies (Lockee et al., 2022).

Delivery Mode Affordances and Constraints. In the realm of online education, delivery modes present unique affordances and constraints - features or limitations impacting learning and teaching. In order to ensure successful online education, it is essential to acknowledge and address specific factors. Instructors should leverage the resources at hand and find ways to overcome any obstacles, ultimately creating an environment conducive to effective learning

(Lockee, 2021). To do so, they must rethink and select strategies to meet the specific demands of online education, thereby creating effective and engaging learning experiences that work within the boundaries and possibilities presented by their chosen mode of delivery (Lockee, 2021).

Online delivery modes provide various affordances that enhance the learning experience. Flexibility is a paramount advantage (Lockee et al., 2022), enabling instructors to customize the pace, giving the learners access to content, providing an opportunity to participate in discussions, and complete assignments when convenient (Dennen, 2019; Means et al., 2014; Shank, 2007). Adult learners who must balance their education with work and family responsibilities can benefit a great deal from this approach (Dennen, 2019). Accessibility is another key affordance, with distance education offering educational opportunities regardless of geographical location (Lockee et al., 2022; Means et al., 2014; Shank, 2007). Interactivity, enabled by tools for both real-time and time-independent interactions such as chats, forums, and video calls, fosters learner engagement and community building (Dennen, 2019; Means et al., 2014; Shank, 2007). The adaptability of online education, supported by a range of available technologies, allows instructors to employ diverse multimedia content and learning activities to accommodate various learning needs and preferences (Dennen, 2019; Means et al., 2014). Finally, particularly in asynchronous environments, online education fosters self-directed learning, empowering learners to control their learning process, which, in turn, promotes the development of skills like self-motivation, time management, and problem-solving (Hartnett, 2019; Means et al., 2014; Shank, 2007).

While online delivery modes come with numerous affordances, they also present specific constraints. Technological issues, such as lack of access to reliable internet or suitable devices, software/hardware malfunctions, and challenges in navigating the learning platform, can pose

hurdles in the learning process (Lockee, 2021). Learner isolation is another concern, especially in asynchronous learning environments. The lack of face-to-face interaction and real-time feedback can lead to minimal communication and feelings of isolation, potentially affecting motivation (Hartnett, 2019). The flexibility of online learning demands self-motivation and discipline from learners to effectively manage their time and complete coursework (Dennen, 2019). Furthermore, online learning may limit practical exposure, especially for disciplines requiring hands-on experiences, posing challenges in effectively delivering such content (Johnson & Barr, 2021). For instructors, transitioning to different delivery modes can be burdensome, requiring substantial effort in course design, learning new technologies, and managing the online environment. Therefore, adequate professional development and training are essential for instructors to fulfill their roles effectively in the online setting (Martin et al., 2019).

Ultimately, delivery modes in online education come with their advantages and limitations that affect the learning experience. It is essential to make the most of benefits like flexibility and adaptability while finding ways to overcome challenges like technological issues and learner isolation to help students succeed (Lockee et al., 2022). In addition, it is crucial to consider factors such as course content (Dennen, 2019), learner demographics and needs (Lockee et al., 2022), and available resources (Lockee et al., 2022; Shank, 2007) to choose the right delivery mode.

Learning Outcomes

Instructional design and development consist of three main components: objectives, strategies, and assessments. The alignment of these components is crucial for effective instructional design, ensuring that learners successfully attain the desired knowledge and skills (Dick et al., 2015; Hirumi, 2014; Larson & Lockee, 2020; Smith & Ragan, 2005). Clear and

measurable objectives guide content selection, instructional strategy development, and assessment processes (Dick et al., 2014).

Similarly, engaging and efficient online learning environments require well-defined objectives and valid learner assessments aligned with these objectives (Hirumi, 2014). Instructors should then select instructional strategies that support the achievement of objectives, align with assessments, and reflect their educational beliefs and values.

Educators need to classify objectives based on learning domains, types of learning outcomes, and learning processes to help learners master specific tasks (Larson & Lockee, 2020). This holistic approach ensures that learners effectively acquire the necessary knowledge and skills for successful task completion.

Smith and Ragan (2005) outline six primary steps essential for creating effective instruction and conducting a learning task analysis:

> 1. Write a learning goal. 2. Determine the types of learning required to reach the goal. 3. Conduct an information-processing analysis of the goal. 4. Conduct a prerequisite analysis and determine the type of learning required to achieve the prerequisites. 5. Write learning objectives for the learning goal and each prerequisite. 6. Write test specifications (p.76).

Learning goals, outcomes, and objectives are precise terms in the task analysis process, each serving a different purpose in the instructional design process. Types of learning for the learning goal (intended learning outcomes) involve various learning domains, such as cognitive, psychomotor, or affective learning (Smith & Regan, 2005). Many educational theorists, including Benjamin Bloom (1956), Robert Gagné (1985), and David Merrill (1983), have

categorized learning tasks to help educators understand the different types of learning and design instruction accordingly (Richey et al., 2010).

Bloom (1956) developed a hierarchical classification of learning objectives within the cognitive domain, which was later revised by Krathwohl (2002). The hierarchy includes the following actions: remembering, understanding, applying, analyzing, evaluating, and creating. Merrill's theory (1983) focuses on the organization and presentation of instructional content, classifying learning tasks into four categories based on content and performance dimensions.

Gagné’s (1985) categorization system is widely considered the most fundamental and useful framework for designing instructional materials (Driscoll, 2014; Richey et al., 2010; Smith & Regan, 2005). Gagné proposed a categorization of learning outcomes/domains consisting of five types: intellectual skills, cognitive strategies, verbal information (declarative knowledge), psychomotor skills, and attitudes. These categories emphasize the different cognitive processes involved in learning and help guide the selection of instructional strategies (Driscoll, 2014; Larson & Lockee, 2020; Richey et al., 2010; Smith & Regan, 2005).

An information-processing analysis of the goal is a valuable step in determining the necessary content of instruction. This process helps instructors identify prerequisite skills and knowledge that students must acquire to reach the learning goal (Smith & Regan, 2005). By conducting an information-processing analysis, instructors can optimize the learning process by determining which content should be included and which can be left out. This analysis also allows them to identify prerequisite knowledge, skills, or abilities learners need before achieving the learning goal and determines the types of learning associated with those prerequisites. This comprehensive approach, as described by Smith and Ragan (2005), ensures a well-structured and targeted learning experience for students, providing sufficient data to form learning objectives.

Learning objectives are clear and concise statements outlining what learners should achieve upon completing a specific segment of instruction (Dick et al., 2015; Driscoll, 2014). To create performance objectives, instructors should start with behaviors specified in skill statements, adding conditions and criteria to transform them into performance objectives (Dick et al., 2015). In selecting appropriate conditions, instructors need to consider appropriate stimuli and cues, appropriate resource materials, task complexity, and the relevance or authenticity of the context (Dick et al., 2015).

For attitudinal objectives, instructors need to think about situations where learners can make choices without fear of consequences. Finally, instructors should specify appropriate criteria for the conditions and behavior described, with consideration to the target group's developmental level (Dick et al., 2015).

Pedagogical Approaches

Larson and Lockee (2020) discuss the role of pedagogical approaches in selecting instructional strategies through a systematic process that begins with understanding the learning context and identifying learning outcomes. They emphasize the importance of uncovering the underlying assumptions about learning and using them to guide the choice of pedagogical approaches.

The authors suggest examining learning outcomes from different perspectives and considering whether multiple outcomes can be addressed simultaneously. They also highlight the importance of reflecting on assumptions, outcomes, and pedagogical approaches, even under constraints such as tight schedules or budgets, as this can lead to significant improvements in instructional effectiveness. After identifying the desired learning outcomes, which reflect the needs of the learners, Larson and Lockee (2020) outline a process for identifying learning

assumptions, selecting appropriate pedagogical approaches, and choosing relevant strategies. The process involves the following steps:

1. Examine underlying assumptions: Study the learning outcomes closely and reflect on the beliefs and assumptions about learning that they imply. Engage in discussions with key stakeholders to uncover these assumptions (this relates to learning theories).
2. Choose pedagogical approaches: Based on the identified assumptions, select one or more suitable pedagogical approaches that align with your goals and the context of the learning environment. Common approaches include instructivist, constructivist, and connectivist. If multiple pedagogical approaches are applicable, reorganize the outcomes under the relevant pedagogical approaches.
3. Select instructional strategies: Choose appropriate instructional strategies that align with the chosen pedagogical approach(es) and support the desired learning outcomes.

Throughout this process, it is essential to remember that the development of outcomes, assessments, and strategies should be considered simultaneously, even though they are discussed separately. By identifying learning assumptions, selecting appropriate pedagogical approaches, and choosing relevant strategies, instructors can create the foundation for effective and engaging learning experiences.

Summary of Literature Review

To sum up, the selection of instructional strategies is a multi-faceted decision that requires a thorough analysis of various elements.

Identifying instructional strategies is necessary, as they differ in type and detail depending on the micro to macro level. These strategies may be teaching or learning strategies

and could be selected for content organization, media delivery, and management, and can range from highly supportive (supplantive) to learner-driven (generative) approaches.

Understanding learning theories is essential for selecting instructional strategies and designing effective learning experiences. Learning theories are foundational for instructional strategy selection, informing the design of effective learning experiences. These theories, such as behaviorism, cognitivism, constructivism, and others, offer insights into knowledge acquisition and instructional design. Their application varies across contexts, especially in evolving environments like online learning. Understanding these theories enables educators to select engaging, research-backed instructional strategies that are applicable to specific learning needs and environments.

The instructional context is another element that impacts the selection of learning strategies. When designing instructional materials, it is essential to analyze the learning context components such as the learners, delivery mode, available resources, and potential constraints. This ensures that the chosen instructional strategies are compatible with the desired learning outcomes and can be delivered in diverse ways. Additionally, it is important to consider design constraints and affordances, particularly in the context of online learning.

Learning domains/outcomes and learning objectives are another important element that would influence the selection of instructional strategy. The clear description of what learners need to achieve (objectives) and the desired endpoint of their learning journey (outcomes) act as indicators to provide direction and guidance for educators to select the most appropriate, effective, and engaging instructional strategies.

Selecting effective instructional strategies for online learning can be a complex task. Therefore, developing a roadmap that combines theoretical knowledge with practical

considerations is highly needed. The guidelines will enable the instructors to make decisions on the most appropriate strategies for their students in any online learning environment. By utilizing this pedagogical process, they can ensure that the instructional strategies are practical and aligned with best practices in online education.

CHAPTER 3

RESEARCH METHODOLOGY

This study uses design and developmental research (DDR) methodology (Richey & Klein, 2014) to create an instructional strategy selection guide for online courses in higher education. This research aims to contribute to the knowledge base for instructional strategy selection in online learning environments within higher education. Therefore, this study's outcome is to develop guidelines as an instructional tool that serves as a foundation to support educators in making decisions for an instructional strategy to enhance the online learning experience for their students. The DDR methodology involves a systematic and empirical approach involving the development and evaluation of instructional and non-instructional products, tools, and models (Richey & Klein, 2007). The guidelines were developed in four phases: analysis, design, development, and evaluation. Each phase serves a specific purpose in the creation and refinement of the guidelines.

Study Design

The essence of the instructional design fields revolves around the systematic process of analysis, design, development, implementation, and evaluation of non-instructional and instructional solutions, including products, tools, programs, models, and frameworks in educational settings (Reiser, 2001). On the other hand, Design and Development Research (DDR) is a systematic methodological approach that allows instructional designers to test theories, models, and frameworks and validate their practice (Richey & Klein, 2007).

DDR is an applied/empirical research methodology (Richey et al., 2004) that will continually grow as technology and media emerge and evolve or can address issues such as a lack of a tool or product in any educational setting (Ross et al., 2008). Design and development

research aims to generate knowledge based on data obtained through a systematic approach to enhance educational practices (Ross et al., 2008).

DDR is categorized into two main categories: Product and Tool Research/ Type one and Model Research/ Type two (Richey et al., 2004; Richey & Klein, 2007, 2014; Ross et al., 2008). Product and Tool research can be further subdivided into comprehensive design and development projects, specific project phases (e.g., ADDIE stages), design, and development and use of tools (Richey & Klein, 2014). Model Research, on the other hand, can be classified into model development, model validation, and model use (Richey & Klein, 2007).

Researchers in instructional design use different procedures and processes for developmental research. Richey et al. (2004) have explained their process through a framework, which is shown in Table 1. The research method may include the Instructional System Design (ISD) processes (Richey & Klein, 2007), and the terminology, number of phases, and applications may differ based on different research purposes and outcomes (Ross et al., 2008).

Table 1

Design and development research phases and principles

DDR Research Model Phases	Process	Reference
3 Phases	Follow the tenets of ISD under the process of: -Problem definition -Literature reviews and -Research procedures	Richey et al. (2004)

In terms of methods, most design and development studies could utilize qualitative, quantitative, or a mix of both methods (Ross et al., 2008). However, qualitative methods are

usually the more prevalent, including the use of strategies such as “case studies, participant interviews, focus groups, field observations, activity logs, archival reviews, and think-aloud techniques” (Richey & Klein, 2014, p.148). Quantitative methods are also commonly used, utilizing surveys and questionnaires (Richey & Klein, 2014). Thus, methods used during different phases of research may vary as new needs and issues arise and the focus of the study changes.

For DDR participants, Individuals participating in design and development research may or may not be chosen based on their affiliation with an organization; however, they are almost always selected for their unique role and contribution to the design and development process (Ross et al., 2008).

Different research aspects and reasons can affect the nature of the populations involved. For example, when evaluating interventions, participants may include developers, practitioners, experts, and users (Richey & Klein, 2007). Richey et al. (2004) distinguish between types of participants based on the type of research and their function. Generally, the typical populations related to this field are designers, developers, evaluators, clients, instructors and program facilitators, organizations, DDR researchers, and learners (Richey et al., 2004). The relationship between researchers and participants in DDR research appears to be collaborative and flexible. In addition, DDR researchers may play a dual role; this means that the researchers often act as the designers and developers, observing their own actions and decisions as part of the study (Ross et al., 2008). DDR must go beyond commercial product development by identifying research problems based on existing literature and addressing gaps in order to contribute to the instructional design knowledge base (Ellis & Levy, 2010). As a result, DDR plays a crucial role in the continuous improvement and advancement of instructional design practices and tools,

ensuring their effectiveness and relevance in the ever-changing landscape of technology and media (Ellis & Levy, 2010).

Study Procedures

This study is tool development research, as Richey and Klein (2007) indicate that research on tool development involves the necessary certification processes for creating instructional or non-instructional tools. It includes the development of guidelines (tools) for instructional strategy selection in online learning higher education environments. It was conducted through a four-phase process, utilizing design and development research (DDR) methodology. These phases are as follows:

Phase One-Analysis Phase

The analysis phase is conducted prior to starting the guide design and development for product or tool development research (Richey et al., 2004). In this phase, a thorough review of the literature (Richey et al., 2004) was conducted to identify the characteristics and factors influencing the decision-making process for instructional strategy selection in online learning environments. This phase also involves determining factors that have impacted the use of the tool (Richey et al., 2004), such as explaining how specific theoretical foundations influence the development of the guidelines.

The analysis phase aims to clarify the current research landscape and best practices in instructional strategy selection and identify existing gaps which the guidelines will address (Richey et al., 2004). The literature review collected evidence and investigated areas such as instructional strategy characteristics, the influence of learning theories, online instructional context, learning domains/outcomes and objectives, online learning modes, and pedagogical approaches.

The literature was gathered from scientific resources such as academic databases, related published guidelines, books, peer-reviewed articles, and academic journals. The literature was selected based on its relevance to the topic of instructional strategy selection and publication date. Additional information regarding the process can be found in Chapter Four.

Phase Two-Design Phase

After the analysis phase, the first draft of the instructional strategy selection guidelines will be created. During this phase, the ideas for addressing the research problem usually begin to be broad and unclear, but over time, they become more precise, streamlined, and put into action. This phase involves synthesizing the findings from the literature review with the identified theoretical foundations and instructional strategy elements, as well as inspiring practical examples to plan a coherent and structured guide. The guidelines tool structured and provided an initial framework outlining an overview of the various instructional strategies and the factors that influence the decision-making process for selecting instructional strategies in online learning environments.

Phase Three-Development Phase

In the development phase, the guidelines were further refined, and a rubric was created to evaluate their effectiveness and usability. This phase starts with creating an initial/prototype guide that is ready for evaluation, ensuring that the form and level of detail are appropriate for this initial stage of development. The guide was built based on the design outlines; then, it was shared online in a digital format with expert reviewers for evaluation (Richey & Klein, 2007). It incorporates additional insights and resources to enhance the guidelines' practicality and value for educators in online learning environments within higher education based on the data collected (see Appendix A).

After the evaluation, the researcher revisited this phase to make adjustments and refinement according to the feedback received from expert reviewers. What was needed was to revise the guidelines and ensure a clear goal for the final revision that provides better content for the changes being made (see Appendix G). It is also helpful to follow this systematic process to guide the revisions.

This phase also includes developing a survey/ rubric (see Appendix F), which provides a set of criteria for assessing the guidelines' organization, clarity, inclusiveness, and relevance to the target audience (Richey & Klein, 2007).

Phase Four-Validation Phase

The final phase of the process involves evaluating and validating the instructional strategy selection guidelines. Expert reviewers were invited to evaluate the guidelines using the evaluation rubric developed in the previous phase. Based on the reviewers' feedback, necessary revisions were made to improve the guidelines' quality and applicability (see Appendix G). Once the revisions are completed, the final version of the guidelines is reported along with the validation results in Chapter Five.

This four-phase approach was followed to ensure a systematic and rigorous process in developing and validating the instructional strategy selection guidelines for higher education online learning environments. By following the DDR methodology, the guidelines are grounded in current research and best practices, ultimately providing educators with a valuable tool to enhance their decision-making processes and improve the overall learning experience for their students.

Participants/Characteristics of Expert Reviewers

The participants for this study are expert reviewers. Expert reviewers will be selected (Ross et al., 2008) based on their specific roles in instructional design, particularly within the context of instructional design and online learning environments in higher education. These experts play a crucial role as participants in this study, contributing to the validation and refinement of the instructional strategy selection guidelines for higher education online learning environments. These reviewers were carefully selected based on their knowledge and expertise in instructional design, online teaching, and higher education. They are experts in instructional design, educational technology, or a related field and possess professional experience designing, implementing, and evaluating online learning environments in higher education contexts.

Richey and Klein (2007) emphasize the importance of obtaining appropriate approvals before collecting data from participants in research studies. This is a crucial ethical consideration to protect the rights and well-being of the individuals involved in the research process. In the context of design and development research, as well as with other research methodologies, researchers need to seek approval from relevant authorities, such as Institutional Review Boards (IRBs) or ethics committees (Richey & Klein, 2007). In this study, the researcher obtained approval from the Institutional Review Board (IRB) (see Appendix B) before contacting expert reviewers by email to invite them to participate.

As participants in the study, expert reviewers were involved in several activities (Ross et al., 2008). They thoroughly reviewed the instructional strategy selection guidelines, shared them in cloud document format, and used the evaluation rubric (survey) developed during the development phase (Richey & Klein, 2007). The reviewers assessed the guidelines based on organization, clarity, comprehensiveness, and relevance to the target audience and learning

environment. They provided detailed feedback and recommendations for improving the guidelines, highlighting any areas of concern, identifying gaps or omissions, and suggesting revisions to enhance the quality and applicability of the guidelines. The involvement of expert reviewers as participants in the study is instrumental in ensuring that the instructional strategy selection guidelines are robust, research-based, and relevant to the needs and challenges educators face in higher education online learning environments.

Instrumentation

In this study, a web-based survey serves as the primary instrument for collecting evaluation data, as Richey and Klein (2007) suggested. The survey takes the form of an evaluation rubric, encompassing both quantitative and qualitative components, allowing for a comprehensive assessment of the design, development effectiveness, and validity of the instructional strategy selection guidelines. This rubric survey details specific criteria and performance indicators that reviewers used to evaluate the guidelines' quality, relevance, and effectiveness. Using the rubric, reviewers were able to provide structured and consistent feedback, which is essential for validating the selection process and refining the guidelines based on expert input (Richey et al., 2004).

The quantitative portion of the survey features questions based on a Likert scale or yes/no questions. These questions enable the researcher to collect structured and measurable data regarding the expert reviewers' opinions and perceptions of the guidelines. This data aids in identifying trends and assessing the overall effectiveness of the guidelines, as explained in Chapter Five.

Additionally, the survey includes open-ended questions that will allow expert reviewers to share qualitative feedback. These open-ended questions enable reviewers to convey their

thoughts, opinions, and recommendations in more detail. This qualitative feedback will prove invaluable in identifying potential areas for improvement and understanding the reasoning behind the reviewers' opinions.

Data Sources

In this study, data were collected during two main phases: the analysis phase and the evaluation phase (Richey & Klein, 2007).

The Analysis Phase Data

As part of the analysis phase, a comprehensive literature review was conducted to gather relevant data (Richey & Klein, 2007; Ross et al., 2008). This process involves examining scholarly articles, books, conference proceedings, and other relevant publications to gather information on instructional strategies in online learning environments, factors influencing the effective selection of instructional strategies in higher education, and pertinent theories, pedagogical approaches, and design models. The literature review provides the researcher with essential background information and context, helping to identify gaps in existing knowledge and informing the development of the instructional strategy selection guidelines (Richey & Klein, 2007; Ross et al., 2008).

The Evaluation Phase Data

In the evaluation phase, data was collected from expert reviewers who evaluated and provided feedback on the instructional strategy selection guidelines. This feedback was gathered through a web-based survey consisting of both quantitative and qualitative components, such as Likert scale questions, yes/no questions, and open-ended questions. The expert reviewers' feedback helped to assess the design, development, effectiveness, and validity of the guidelines, allowing the researcher to refine them based on expert input (Richey & Klein, 2007). The

guidelines are subject to adjustment based on the feedback received from expert reviewers. This might involve adding new sections, clarifying ambiguous parts, or even removing redundant sections. The record of all revisions made and the reasons for them is documented and described in the result chapter of this study.

By collecting data during these two phases, the study will ensure that the guidelines are grounded in the current state of knowledge in the field and are effectively validated by experts in instructional design and online learning in higher education. In the results sections for this study, the researcher provides a more in-depth explanation of the findings, highlighting the specific changes made to the guidelines based on expert reviewers' feedback and the insights gained from the literature review.

Data Analysis

The data analysis process in this study involves examining and interpreting the data collected during the analysis phase (literature review) and the evaluation phase (expert reviewers' feedback) (Richey & Klein, 2007). The data analysis helps the researcher identify key findings, patterns, and insights that can inform the development and refinement of the instructional strategy selection guidelines.

By analyzing the collected data from both the analysis and evaluation phases, the researcher will be able to refine and improve the instructional strategy selection guidelines based on the current state of knowledge in the field and the valuable input from expert reviewers. The data analysis process also informs the results and discussion sections, where the researcher provides more detailed explanations of the research phases process and the implications for instructional design practice in online learning environments.

CHAPTER 4

GUIDELINES DEVELOPMENT

Introduction

This chapter explains the process of designing and developing guidelines to select appropriate instructional strategies for online learning environments in higher education. As explained in the previous chapter (methodology), this study falls under the category of tool development research (Type I) (Richey et al., 2004). For the design and development study, it is crucial to provide a detailed report of the development process. This report should include a comprehensive overview of various factors, such as the phases of the development and resources that were available (Richey & Klein, 2007). By providing extensive documentation of these processes, it is hopeful that others have a clear understanding of the context in which the tool was completed. This information can be used to guide future initiatives.

The study was divided into four phases, each with its own results that ultimately contributed to the final product. These four phases are the analysis phase, the design phase, the development phase, and the evaluation and validation phase.

During the analysis phase, a literature review was conducted to explore instructional strategies and identify the factors that influence the decision-making process for selecting instructional strategies in online learning environments. The data collected was then analyzed and used to create the guidelines' content.

During the second phase, the design phase, the outcomes that were gathered and collected from the analysis phase are carefully outlined, organized, and utilized to create the preliminary version of the guidelines. This phase involves synthesizing the findings from the literature review with the identified theoretical foundations and practical examples. The goal is to plan

coherent and structured guidelines, which will be built into a tool that outlines an overview of the various instructional strategies and the factors influencing the decision-making process for selecting instructional strategies in online learning environments.

The development phase started with developing an initial/prototype guide that is ready for evaluation and then developing a survey. The guidelines were further refined and developed, and a rubric was created to evaluate the effectiveness and usability of the guidelines. The guidelines and rubric were built according to phase two, the design plan and outlines.

The fourth phase, the validation phase, involves receiving feedback from expert reviewers to evaluate the guidelines' content validity, practicality, and effectiveness. This phase will be discussed in more detail in the following Chapter.

Study Procedure

Analysis Phase

As indicated in Chapter Three, the analysis phase aims to clarify the current research landscape and best practices in instructional strategy selection and identify existing gaps that the guidelines will address (Richey et al., 2004). Therefore, before the design and development of a product or tool for research, it is essential to conduct a thorough analysis. In this phase of the study, a thorough initial review of the literature was conducted to gain an overview of the instructional strategy and to identify the factors that influence the decision-making process for instructional strategy selection in online learning environments.

This phase also included a determination of the factors that have impacted the use of the tool, such as understanding how specific theoretical foundations influence the development of the guidelines. Therefore, the analysis phase sets the foundation for the design and development

of the product or tool (the guidelines) for research, ensuring that the end product is effective and efficient (Richey et al., 2004).

After defining the research scope of the literature, as mentioned in Chapter One, an identification of the relevant literature was conducted (Richey & Klein, 2007). During this process, the literature was gathered from scientific resources and databases such as academic databases, related published guidelines, books, peer-reviewed articles, academic journals, theses and dissertations, open-access journals, and many official higher education institutes and organization websites. The keywords and phrases that target each of the main areas of interest include:

- Instructional strategy
- Type of instructional strategy
- Instructional method/ approaches
- Example of instructional strategy/ method/ approach
- Learning theory for online learning
- Online learning
- Online learning design in higher education
- Learners' characteristics in higher education
- Online learning context in higher education
- Learning Domain
- Pedagogical approaches
- Learning outcomes and objectives

During this step, a thorough evaluation was conducted of the resources that were gathered. The assessment was carried out based on their quality, relevance to the instructional

strategy selection research problem, and the date of publication. This process enabled the researcher to carefully select the most suitable resources for this research.

Design Phase

As described by Richey and Klein (2007), the phases of tool development in the DDR method progress from foundational data collection in the analysis phase to a structured, actionable plan in the design phase. The goal is to plan coherent and structured guidelines, which will be built into a tool that outlines an overview of the various instructional strategies and the factors influencing the decision-making process for selecting instructional strategies in online learning environments.

This phase involves combining the findings from the literature review with the identified theoretical foundations and practical examples and organizing them in a way that serves the purpose of the guidelines. Additionally, the collected outcomes from the analysis are carefully organized and utilized to create the preliminary version of the guidelines. During this phase, the outcomes from the analysis phase, which include data, insights, and identified needs, are outlined and organized. This creates a clear, detailed picture of what the guidelines should include and achieve.

The researcher synthesized the findings from the comprehensive literature review, integrating these with the theoretical foundations and practical examples. These are relevant to the design of the guidelines in terms of topic, date, and historical relationship. This synthesis helps in understanding the broader context related to the instructional strategy selection decisions and in identifying best practices and research-based data.

Based on the synthesized information, preliminary guidelines outlines are created. These serve as the blueprint for the development process and include detailed descriptions of the desired features, functions, and the overall framework of the final guidelines document.

The content of the guidelines was organized into seven parts including six categories based on the analysis outcomes. These include:

- Purpose and use of instructional strategy selection guide
- Section One: Introduction to instructional strategies`
- Section Two: Analyzing the online learning context
- Section Three: Online delivery mode
- Section Four: Analyzing the learners' characteristics and needs
- Section Five: Identifying the learning outcomes
- Section Six: Learning theory and pedagogy.

The intent of including the first part in the guidelines is to provide users with a clear understanding of the main goal of these guidelines and how they can make the most of them. It explains the purpose and scope of the guidelines, as well as how users should approach and use them to achieve their objectives.

In the second part (starting from section one), the researcher aims to provide the user with an overview of the instructional strategy and provide them with the necessary introductory information. This is done to ensure that they have a solid background understanding before delving into the decision-making process and the various factors that may have an impact on their ultimate decision.

The following five sections of the guidelines were factors that influence the user's decision-making of instructional strategy. These factors were identified based on the literature

review and analysis. Detailed explanations of each factor are provided in the section dedicated to the development phase of this chapter.

In terms of content structure, the guidelines sections follow specific organization. They are structured using a series of questions to demonstrate content, with examples provided for clarification and support; resources and references are listed for further exploration alongside guiding questions for users to practice.

To effectively use the guidelines in the instructional strategy selection process, each section is organized as follows:

1. Definition (What?): Clearly define each factor of the instructional strategy. This involves describing the component and its role in the overall strategy selection.
2. Purpose (Why?): Explain the purpose of each factor, detailing why it is essential to the instructional strategy and its intended outcomes.
3. Instructional Application, Resource, and Example (How?): Provide instructional resources and examples of how the element has been used effectively. This could include links to resources or case studies demonstrating the successful implementation of the factor affecting strategy selection.
4. Guiding Questions for User Application: Offer guiding questions to help users apply the strategies in their instructional context. These questions should prompt educators to think about how they can adapt and implement the factors for selecting strategies in their own online teaching.

Once the guidelines' content and structure were planned and designed, the next step was to develop them into a tool to help select the appropriate instructional strategy. This phase

involved building the guidelines by incorporating the results of the literature review of instructional strategy and online learning from the analysis and the outlined content of the phase.

Finally, the design phase focuses on translating research and theory into a practical, detailed plan that can guide the subsequent development and evaluation phases, ensuring that the end guidelines are both theoretically sound and practically effective.

Development Phase

In this phase, the researcher started the development process by incorporating content for the categories created, which was collected from the literature and planned in the design phase. Six categories were created and presented alongside the purpose and use of instructional strategy selection guidelines. These categories include: *introduction to instructional strategies, analyzing the online learning context, online delivery mode, analyzing the learners' characteristics and needs, identifying the learning outcomes, and learning theory and pedagogy.*

Introduction to instructional strategies. Section 1 of the guidelines outlines three areas, including the definition of instructional strategy, the type of instructional strategy, and the introduction of the factors influencing instructional strategy selection in online learning.

It begins by defining instructional strategies as techniques and methods utilized by educators to deliver content and achieve learning objectives (Hill & Jordan, 2021) and how instructional strategies are also commonly referred to as teaching methods, techniques, and activities (Larson & Lockee, 2020; Reigeluth & Keller, 2009).

Based on the analysis of the literature, this part also categorizes instructional strategies into different types, such as teaching and learning strategies, with teaching strategies focusing on content delivery and learning strategies emphasizing student involvement in the learning process (Larson & Lockee, 2020). It further classifies these strategies based on their size (micro and

macro strategies) (Dick et al., 2015; Richey et al., 2010), function (content organization, media delivery, management) (Reigeluth, 1983; Smith & Ragan, 2005), and level of support (supplantive and generative strategies) (Smith & Ragan, 2005). In addition, Reigeluth and Keller (2009) classify organization strategy into three types: instructional approach, instructional component, and content sequencing, as presented in Table 2.

Table 2

Instructional Strategy Classification

Category	Definition & Classification	Source
Basic Classification	- Teaching strategies: approaches used by instructors focusing on content delivery. - Learning strategies: used by students to emphasize their role.	(Larson & Lockee, 2020)
Function Classification	- Content organization: Handles content presentation in a logical sequence. - Media delivery: Choosing the right medium and grouping learners. Related to the learning environment and mode. - Management: Coordinating instructional events and resources. Related to the learning context and management system.	(Reigeluth, 1983; Smith & Ragan, 2005)
Organization Strategy Classification	- Instructional approach: general direction and may include components (e.g., PBL, direct instruction, collaborative learning) - Instructional component: individually selected depending on the instruction situation (e.g., practice, coaching) - Content sequencing: used with both approach and component (e.g., easy-to-difficult sequencing)	(Reigeluth & Keller, 2009)
Size Classification	- Micro strategies: Specific tactics for certain objectives (e.g., using visual aids, leading discussions). - Macro strategies: Define the overall structure of a lesson (sequence and goals).	(Dick et al., 2015; Richey et al., 2010)

(continued)

Table 2 *(cont.)*

Category	Definition & Classification	Source
Support Based Classification	- Supplantive strategies: Provide more guidance; benefit novice learners or complex tasks - Generative strategies: Allow learners autonomy and promote engagement and critical thinking.	(Smith & Ragan, 2005)
Consideration	Generative strategies can be better for knowledgeable learners but might overwhelm some learners. Supplantive strategies offer more support but may be less engaging. (level of scaffolding)	(Dabbagh, 2003; Smith & Ragan, 2005)

This section highlights the importance of a balanced approach in instructional design, considering factors such as learner characteristics and content complexity. It provides insights into different types and classifications of instructional strategies for online learning environments.

Educators will find this section useful as it defines instructional strategies and differentiates between teaching and learning strategies, offering a clear perspective on content delivery and student engagement. The section also classifies instructional strategies into types based on their size, function, and level of support, enabling educators to select appropriate strategies for different learning objectives and contexts.

The conclusion of this section discusses the various factors that influence the choice of instructional strategies in online learning. These factors include the context of the online learning environment, the mode of online learning, learner characteristics, learning outcomes, and learning theory and pedagogy. These factors are based on instructional design literature from various sources, including Driscoll (2014), Hill & Jordan (2021), Hirumi (2021), Larson & Lockee (2020), Richey et al. (2010), Smith & Ragan (2005). The following sections, then, were designed to explain each factor in more detail.

The purpose of this section is to provide a concise yet comprehensive understanding of instructional strategies. This knowledge is necessary to understand the subsequent sections of the guidelines.

Analyzing the online learning context. As planned during the design phase, the structure of this part and the following four sections were arranged to adhere to a specific template. The template includes a set of questions aimed at illustrating the content's "what, why, and how" aspects, supported by examples for better comprehension. Additionally, resources and references were included for further exploration, alongside guiding questions to help users practice. This template was selected to organize content and engage the user.

This is the second section of the guidelines. It started with an explanation of what learning context analysis is (what part). The content refers to the process of learning context or environmental analysis, which involves examining the physical and functional aspects of instructional systems (Tessmer & Richey, 1997). This analysis is crucial in shaping strategies and activities that promote learning and understanding (Tessmer, 1990). Understanding its nature allows educators to make informed decisions about fostering learning and achieving desired outcomes (Larson & Lockee, 2020).

The following part discusses how instructional strategies and activities can affect the learning context and the technologies used for delivery in online learning environments. It highlights that online learning environments have different contextual features compared to traditional in-person settings and may not need to consider factors such as classroom size, seating arrangements, lighting, and projection facilities (Cheuk, 2021). Instead, the focus may be on the physical environments where students may be learning, such as the workplace or home, along with the features of these settings. It was also noted that instructional contexts might

encompass physical, temporal, and social aspects that influence learning, as discussed in various studies (Dick et al., 2015; Smith & Ragan, 2005; Tessmer & Richey, 1997).

Similar to in-person learning context (Tessmer & Richey, 1997), the general elements of online instructional contexts may include (Cheuk, 2021):

The physical aspects:

- Consider advising learners to have a specific location and space to complete online courses successfully.
- Consider the learner space to be functional and comfortable and allow the control of temperature, noise, lighting, and air quality.
- A proper computer workstation setup includes an eye-level screen and a keyboard and mouse at elbow height to avoid physical discomfort.

The social aspects:

- Provide the learners with the opportunity to interact with peers.
- Provide the learners with the opportunity to communicate or collaborate with colleagues\ communities of practice.
- Provide the learners with the opportunity to communicate with the instructor.

The technological aspects:

- Consider learners' access to reliable internet, wireless connection, power outlets, and a variety of computer devices. It is important to note that internet access and functionality vary based on location and device.
- Inform the learners of any supporting software, program, and device needed or required.

- Consider learners' access to learning management systems and communication channels.
- Consider technical support for any technical issues.

Furthermore, analyzing the online learning context involves understanding the resources, constraints, and other factors that impact the learning process. Dick et al. (2015) have proposed four key aspects to consider, factors which can be included when analyzing the online learning context as follows in Table 3:

Table 3

Online Learning Context Analysis Elements

Element	Description	Source	Example
Compatibility of Site with Instructional Requirements	Ensure the online learning platform, like a learning management system (LMS), supports essential tools and resources for effective instruction. Check compatibility with various devices, accessibility features for disabled students, and multimedia resource availability.	(Cheuk, 2021; Hodges et al., 2020).	Learning management tool -LMS (Canvas, Blackboard) - Accessibility features Canvas Voluntary Product Accessibility Template
Adaptability of Site to Simulate Workplace	Simulate workplace aspects using virtual tools, case studies, real-world projects, or online collaboration tools. Consider incorporating interactive simulations or virtual labs for learners to practice skills in a safe, controlled environment resembling their future workplace.	(Georgiou et al., 2007; Jowsey et al., 2021; Martin & Bolliger, 2018).	-Interactive simulation: The decision-making process for supporting sales associates. -Virtual labs: Online chemistry lab

(continued)

Table 3 *(cont.)*

Element	Description	Source	Example
Adaptability for Delivery Approaches	Online platforms should support various instructional strategies and delivery approaches, such as synchronous and asynchronous learning, video lectures, interactive modules, discussion boards, and group projects. Be mindful of students' diverse learning preferences and ensure adaptability to these needs.	(Cheuk, 2021; Hodges et al., 2020; Shank, 2007; Tessmer & Richey, 1997)	Canvas Blackboard Moodle Google Classroom
Learning Site Constraints Affecting Design and Delivery	Analyzing constraints in an online learning context, consider factors like internet connectivity, device compatibility, and learners' digital literacy. Identify organizational policies or decisions affecting online instruction design and delivery, such as the required use of specific technologies or platforms.	(Cheuk, 2021; Dick et al., 2015; Shank, 2007; Tessmer & Richey, 1997)	Constraints in an online learning context

This section concludes with a list of guiding questions. The guiding questions can be used to design and evaluate online learning, including the learning management system (LMS) for a course or lesson. The questions address various aspects of the learning environment, such as physical, social, and technological factors. They also focus on the management strategy or learning management system for the course or lesson and how it can be modified to simulate a workplace environment.

The guiding questions for this section are:

a) What are the physical, social, and technological aspects of the learning environment?

b) What is the management strategy or learning management system for this lesson or course?

c) How is the site (LMS) compatible with the instructional requirements?

d) How can the site (LMS) be modified to simulate a workplace environment?

e) How does the site (LMS) support various instructional strategies and delivery approaches?

f) What are the possible learning site (LMS) constraints that would affect design and delivery?

Online delivery mode. This is the third section of the guidelines and starts with a brief explanation of what is an online learning mode. It refers to online learning as a mode of education that enables instructors to deliver instruction to students who are geographically separated from the instructor(s) (Singh & Thurman, 2019). Online Learning supports regular and substantive interaction between students and instructor(s). The class can be conducted either synchronously or asynchronously, with synchronous requiring students to participate at a specific time each week and asynchronous allowing them to view instructional materials at any time during the week. Various technologies could be utilized for instruction in online learning, such as the Internet, audio conferencing, video cassette, DVDs, CD-ROMs, one-way and two-way transmissions through open broadcasts, closed circuit, cable, microwave, broadband lines, fiber optics, satellite, or wireless communication devices (Singh & Thurman, 2019).

The following section explains why it is important to choose and prepare for online learning. The section discusses the importance of online learning in higher education and how it can make education more accessible to a broader range of learners (Dennen, 2019; Means et al., 2014; Shank, 2007). It emphasizes the need for careful planning and instructional design to ensure the quality of online learning (Hodges et al., 2020). The part also highlights the factors that influence the decision to choose online delivery mode as well, such as learning needs,

learner characteristics, and the learning context (Lockee et al., 2022). It suggests that instructors can adjust the online delivery mode during the course based on student engagement, learner needs, and their own teaching experience (Lockee et al., 2022).

The how part of this section discusses the two main modes of online course delivery, synchronous and asynchronous modes, and how they affect the timing of class activities and student interactions (Dennen, 2019; Shank, 2007). It emphasizes the importance of understanding the benefits and challenges of both modes in order to choose the most appropriate approach for a given situation. Additionally, Table 4 provides a comparison of these delivery modes.

Table 4

Comparison Between Synchronous and Asynchronous Modes:

Type	Definition	Interaction	Meeting	Learners
Synchronous (Fordham University, 2023)	Type of delivery mode that takes place online in real time. Students are provided with content and assignments and are given a time frame to complete coursework and exams.	Interact online in real time simultaneously, and participants can interact through text, video, or audio chat.	Classes are held on a regular basis, either daily or weekly.	For students to participate in a course from a distance in real time.
Asynchronous (Hrastinski, 2009)	The type of delivery mode does not take place in real time. Students are provided with content and assignments and are given a time frame to complete coursework and exams.	Interaction usually takes place through discussion boards, blogs, wikis, and email.	There is no scheduled class meeting time. The course is self-paced.	For students with time constraints or busy schedules

There are some challenges and limitations in planning and designing an online course due to the remote location. Therefore, effective communication and collaboration among learners and

instructors are important. This part highlights the Theory of Transactional Distance, developed by Michael G. Moore, which emphasizes the significance of interactions and communication in online learning environments to bridge the psychological and communicative gap between learners and instructors (Moore, 1993). The theory also promotes the use of adaptable content delivery and timely feedback to enhance engagement and learner autonomy (Moore, 1993). Adopting the Theory of Transactional Distance involves strategies tailored to both synchronous and asynchronous modes of learning. The content concludes by noting the importance of instructional strategies and appropriate media use in course delivery. The quality of instruction depends heavily on the teaching methods and learning materials used, regardless of the delivery mode (Head et al., 2002). Instructors should consider the affordance and limitations of online learning when selecting a strategy (Lockee et al., 2022). Table 5 provides a description of the types of online learning modes available.

Table 5

Online Learning Mode Description

Mode	Description
Synchronous	Enhances real-time interaction between instructors and students through live discussions, immediate feedback, and interactive activities like polls or group work. Utilizes video conferencing tools for real-time dialogue and collaboration, reducing transactional distance and fostering community.
Asynchronous	Adapts by structuring course materials and activities to promote learner autonomy while maintaining connection. Includes discussion forums, recorded lectures with embedded questions, and timely feedback. Facilitates ongoing dialogue and caters to diverse learning preferences and schedules.

The guiding questions for this section are:

a) What type of online delivery mode of learning is going to be implemented?

b) What is the course communication and interaction plan? Which online platform best supports interactive features and real-time communication?

c) How user-friendly and accessible is the chosen platform for all learners?

d) What balance of recorded versus live sessions will be offered to accommodate different learning needs?

e) What tools and technologies can be integrated to enhance learner engagement and interaction?

f) How can technology be used to provide timely and effective feedback to students?

g) What strategies can be employed to encourage open dialogue and interaction among students and between students and instructors?

h) How can virtual collaboration be facilitated to ensure effective peer-to-peer learning?

Analyzing learners' characteristics. The fourth section of these guidelines analyzes learners' characteristics, which also influence the decision of instructional strategies in online learning. The what part in this section defines learner analysis as the process of identifying critical aspects of a learner, such as demographics, prior knowledge, and social needs (Fulgencio & Asino, 2021). Understanding the target audience's demographics, prior knowledge, and social needs is crucial for instructional designers to analyze in order to create instruction that is shaped to the learners' needs. The characteristics of learners, such as their beliefs, attitudes, and mental models, have an impact on motivation, learning, and knowledge transfer (Richey et al., 2010).

The why part refers to the importance of understanding the attributes of learners when designing effective instruction. This means that in order to create effective learning experiences, it is important to understand the characteristics of the people who will be learning. This understanding can help teachers and instructional designers to choose appropriate teaching

strategies, examples, and delivery methods to engage and motivate learners (Smith & Ragan, 2005), and to adapt instruction to the needs of individual students. By considering the unique characteristics of learners, educators can create more meaningful and effective learning experiences that can help students to better understand and retain new information (Richey et al., 2010). Table 6 shows some components of the learners' analysis.

Table 6

Components of Learners' Analysis

General Learner Characteristics	Component	Source
Demographic	Gender, Age, Race, Education, Employment, Work Experience	(Richey et al., 2010)
Beliefs and attitudes towards learning	Motivation, Value, Attitudes Toward Content and Delivery, Group Characteristics, Learning Preferences	(Dick et al., 2015)
Academic	Grades, Courses, Degrees, Locality, Literacy, Training	(Doolittle, 2023)
Subject related	Entry Skills, Prior Knowledge, Attitudes Toward Content and Delivery	(Dick et al., 2015)
Individual differences	Culture, Interests Attributions, Special Needs, Belief Systems, Emotional State	(Doolittle, 2023)
Access to Technology	Accessibility to technology Accessibility to learning materials. Technological support	(Fulgencio & Asino, 2021)

The how part discusses the various methods through which data about diverse learner characteristics can be gathered, including observations, surveys, interviews, learning analytic tools, assessments, reviewing existing data, research, and consulting with colleagues (Dick et al.,

2015; Doolittle, 2023; Fulgencio & Asino, 2021). It also highlights the significance of considering diverse learner characteristics when designing courses, creating inclusive content, accommodating various learning preferences, and fostering motivation and engagement (Smith & Ragan, 2005). An example of learner analysis conducted by Justice (2003) was provided that considered various categories such as entry behaviors, prior knowledge, attitudes, motivation, education and ability, learning preferences, attitudes toward organization, and group characteristics. The data for the analysis was sourced from surveys, interactions with students, observations, and discussions with other instructors.

The guiding questions for this section are:

a) Who are the learners (age, gender, cultural background)?
b) What is the educational and professional background of the learners?
c) What pre-existing knowledge and skills do learners possess related to the course content?
d) Are there any gaps in knowledge that the course needs to address?
e) What are the learners' attitudes and beliefs towards the subject matter?
f) What motivates these learners to engage in the learning process?
g) How proficient are the learners in using the technology required for the course?
h) What technological support might be necessary for them?
i) What potential barriers or challenges could learners face in the learning process?
j) How can the course design address these challenges?
k) Are there any special needs or accommodations that should be considered?
l) How can the course be made accessible to all learners?

Identifying the learning outcomes. This is the fifth section of the guidelines. The first part of this section is about the essential terms used in course design and planning, including learning goals (Fink, 2013), learning objectives (Mager, 1962), and learning domains (Gagné, 1972). It explains the difference between learning goals and learning objectives and how they relate to each other. It also covers the different types of learning domains and outcomes that exist and how they impact the selection of appropriate instructional strategies. See Table 7 for a description and resources of learning goals, objectives, and outcomes.

Table 7

Description and Resources of Learning Goals, Objectives, and Outcomes

Type	Definition	Components	Example
Learning Goal	Describes what students should learn by the end of the course. (Fink, 2013)	General course outcomes	Course goal
Learning Objectives	An observable and measurable statement explaining the learners' achievement by the end of the instruction or lesson. (Richey et al., 2010)	Intended performance, the conditions related to the demonstration, and the criteria used to evaluate performance.	Bloom's Taxonomy as a framework for writing learning objectives

(continued)

Table 7 *(cont.)*

Type	Definition	Components	Example
Learning Domains and Learning Types	Categories that describe the different areas of learning and development. (see Gagné, 1972) Different subjects require different learning domains for measuring outcomes.	Often divided into three primary types: cognitive, affective, and psychomotor.	Bloom's Taxonomy of Learning Domains Gagne's categories of learning: Verbal information Intellectual skills: • Discrimination • Concepts • Rule application • Higher order Cognitive strategies Motor skills Attitudes

The why part of this section is about the importance of setting clear learning objectives and performing appropriate assessments for effective online learning (Hirumi, 2014). It emphasizes the need for educators to classify objectives based on the type of learning process and ensure alignment among these elements to select the proper instructional strategy (Larson & Lockee, 2020).

The application section is about the process of effectively creating learning objectives based on the literature (Dick et al., 2015; Driscoll, 2014; Larson & Lockee, 2020; Richey et al., 2010; Smith & Regan, 2005). It provides a step-by-step guide to creating clear and concise statements that outline what learners should achieve after completing a specific instruction segment. It also emphasizes the importance of aligning the learning objectives with the course goal and provides tips for enhancing the skill statements by adding relevant conditions and criteria, considering attitudinal objectives, and specifying evaluation criteria. Additionally, the section recommends utilizing Gagne's (1972) categorization of learning outcomes to guide

instructional strategy. Finally, the section provides an example of an Alignment Matrix, as shown in Table 8, to help instructors choose strategies that align with their values and help students achieve learning objectives.

Table 8

Alignment Matrix

Course Goal Example	Learning Objective	Type of Learning	Example of Instructional Strategy
Psychology: To develop a comprehensive understanding of modern psychological theories	The learner will be able to analyze five key psychological theories using evidence-based research	Cognitive Learning Cognitive Strategies	Engage students in research activities that require the analysis of psychological literature, case studies, and peer-reviewed articles. Incorporate critical thinking exercises that focus on contrasting psychological theories.
Communication: Gain proficiency in written and oral communication skills	The learner will deliver a 10-minute presentation on a chosen topic that demonstrates clear organization and persuasive communication.	Affective Learning Intellectual Skill (application)	Implement a series of public speaking exercises, including peer review feedback sessions. Utilize video recording for students to self-assess their presentation skills.
Computer Science: Understand the principles of human-computer interaction.	The learner will design a user interface for a mobile app that adheres to best practices in usability and accessibility.	Psychomotor Learning Cognitive Strategies	Use cloud-based development environments that allow students to code and test applications remotely. Create guided tutorials with step-by-step instructions for using development tools and frameworks relevant to mobile app development. Assign practical tasks that involve using these tools to build app components.

The guiding questions for this section include:

a) What is\are the course's overall learning goal(s)?

b) What is\are the lesson or class learning objectives? Or What specific skills or knowledge should learners acquire by the end of this class?

c) How do these learning objectives align with the overall goals of the course?

d) What is the learning objectives domain of learning or type of outcome?

e) How do these learning objectives reflect the intended learning outcomes?

f) Which of Gagne's learning outcomes categories are most relevant to this lesson's objectives?

g) How can instructional strategies be chosen to address these specific categories effectively?

Learning theory and pedagogy. The final factor that influences the instructional strategy selection in these guidelines is applied learning theories. The content included in this section is about learning theory, which is a branch of psychology that focuses on understanding how people learn and acquire new skills and knowledge (Picciano, 2021). It explores various aspects of human behavior, cognition, and mental processes that are involved in the learning process (Picciano, 2021). The section explains how people acquire new information, retain it, and use it to improve their performance in different domains that can influence the educator's diction of instructional strategy.

The following part of this section is about the importance of learning theories in guiding instructional strategy selection. It explains how foundational knowledge about individual learning can help educators choose appropriate strategies and how learning theories can guide the decision-making process to ensure that teaching methods align with our understanding of

how learning best occurs (Hirumi, 2021). It also highlights how understanding the principles of learning theory can help develop effective instructional methods and strategies that enable learners to acquire and apply new knowledge and skills effectively (Larson & Lockee, 2020; Driscoll, 2014).

The application part of this section is about operationalizing learning theory into instructional strategies for teaching and learning. It suggests and discusses the process of identifying relevant theories, breaking down theories, developing strategies, implementing those strategies, and continuously evaluating and gathering feedback to improve learning outcomes. The section also provides an example of how an instructor might employ strategies based on the constructivist learning theory approach. Additionally, it presents a table of instructional strategies based on various learning theories. Please refer to Appendix A for further details about this table.

The last segment of this section contains the guiding questions. It involves:

a) Which learning theory (or theories) best aligns with the learning objectives, characteristics of the student, and learning environment?
b) How might elements from different theories be integrated to address diverse learning needs?
c) What instructional strategies align with these theories?
d) What kinds of learning activities and assessments would align with the learning outcomes and the principles of the chosen learning theories?
e) How would these strategies be implemented in an online environment?
f) How could the effectiveness of the selected strategies be evaluated and revised?

Survey Development

In this research method, it is crucial to ensure that the guidelines are not only theoretically sound but also practically valuable and applicable to real-world online educational settings. To do that, part of the development phase is developing a survey for expert reviewers to evaluate and validate the guidelines. Richey and Klein (2014) suggest that experienced participants typically validate a tool or product. In line with this, a survey tool was developed to gather feedback from the expert reviewers (the participants). This survey aimed to ensure the validity and improve the quality of the guidelines designed and enhance it for future use.

This survey had three parts. The first part includes questions about the guidelines' overall design and organization. The second part focuses on the content of the guidelines, which include a total of six sections. The first section is the instructional strategy introduction. This is followed by the five factors to consider when selecting instructional strategies for online teaching and learning, including the online learning context, online learning mode, learners' characteristics and needs, learning outcomes, and learning theory and pedagogy. In the guidelines, each factor has its own section that includes a definition (what), purpose (why), usability (how), and guiding questions (application) supported by relevant resources and examples. The third part of the survey discusses the practicality, effectiveness, and potential real-world limitations of using guidelines to select instructional strategies in online higher education.

The survey was created using Google Forms and included both Likert scale and open-ended questions, which are available in Appendix F. The Likert scale questions had five response options, including strongly agree, agree, neutral, disagree, and strongly disagree. Participants could also rate the guidelines on a scale of 1–5, indicating their level of agreement or disagreement with the items indicators, with (1) representing strongly disagree and (5) strongly

agree. In addition to this, the reviewers had the option to provide further feedback on the guidelines through open-ended questions.

In addition, a consent form was developed and sent to the participants. Like in any research, participants must be fully informed of the nature of the research, their rights to participate voluntarily and be assured of data confidentiality and anonymity, as research ethics require (Richey & Klein, 2007).

The study-related documents, including the consent form, the guidelines, and the survey, were compiled by topic and stored in a project folder. The document was created with Microsoft Word processing software and then saved in OneDrive cloud. A shared link and a brief description of each document were organized and included in the project folder and shared for the expert reviewers to access. The project folder was sent to the participant via email.

Conclusion

In conclusion, the process of designing and developing guidelines to select appropriate instructional strategies for online learning environments in higher education is a complex and detailed process that requires extensive documentation. This chapter has provided a comprehensive overview of the three phases of the process, including the analysis phase, the design phase, and the development phase. By conducting a literature review, synthesizing findings, and developing initial guidelines and rubrics, this study has produced a tool for educators and instructional designers. Future initiatives can use this tool to guide their processes of selecting instructional strategies for online learning environments.

Next, the evaluation and validation phase, which involves expert reviewers' feedback, to ensure the guidelines’ content validity and effectiveness in practice. The expert feedback results

and recommendations will be discussed, followed by the revisions made to the original initial guidelines. A detailed discussion of this phase will be provided in the subsequent chapter.

CHAPTER 5

EVALUATION AND REVISION

Introduction

This chapter presents a report describing the validation and evaluation phase of this study, a phase that includes the expert review of the guidelines for instructional strategy selection for online learning. The report provides an overview of the expert reviewers, their overall perspectives, highlights the common themes found in their responses, and showcases guideline revisions based on their feedback.

As part of the validation phase, expert reviewers were invited to provide feedback and evaluation to ensure the validity and quality of the instructional strategy selection guidelines for online learning in higher education. Five experts with experience in course development, instructional design, online learning, and faculty training were contacted. After receiving approval from Virginia Tech's Institutional Review Board (IRB) (see Appendix B), a recruitment email was sent to five experts (see Appendix C), resulting in acceptance of participation from all of them.

Participants were provided with the necessary information and steps to complete the review process and received a link to the project documents. This information included the study details with informed consent (see Appendix E), the guidelines to be reviewed (see Appendix A), and the online evaluation rubric (survey) (see Appendix F). The reviewers were asked to use the provided rubric for their evaluation. They also had the option to disclose their identity or participate anonymously. The expert reviewers were asked to complete their reviews in two weeks, and they were sent a reminder email after the first week (see Appendix D).

A brief profile for each expert reviewer was collected, including their professional background and area of expertise in their respective fields. The following are the expert reviewers' profiles of those who participated in the study:

Dr. Brooke Marton McGowin is an instructional designer for Technology-enhanced Learning and Online Strategies (TLOS) at Virginia Tech. Her primary responsibility is to assist faculty members in their professional development by designing and developing training programs on various topics, including educational technology and online learning. She also provides support to faculty members in redesigning their courses. She has designed workshops for faculty members' professional development and developed online training modules. Her research interests are online learning, immersive virtual reality in higher education, cognitive theory of multimedia learning, and flexible learning environments.

Dr. Eunice Ofori is a Senior Instructional Designer with the Center for Engaged Learning and Teaching (CELT) at Tulane University. Her professional experience revolves around promoting the use of instructional technology and effective teaching strategies in education. She possesses a strong background in instructional design, teaching, training, supervising, leading, mentoring, and coaching in various roles in higher education, K-12, and industry. She actively designs engaging and effective instruction for learners in traditional classrooms, online, and blended learning environments.

Dr. Mingyu Li is an Instructional Designer at California College of the Arts (CCA). Previously, he worked at Virginia Tech's Office of Instructional Technology, where he supported faculty, staff, and students in using technology for teaching and learning. Additionally, at the Center for Instructional Technology Solution, he facilitated and graded several online courses for faculty and students pursuing a master's degree or a graduate certificate in Instructional Design

and Technology. At CCA Libraries, he assists faculty in providing quality instructional services and manages the Path to Approval for Hybrid/Online Teaching certification program.

Dr. Miko Nino is an expert in instructional design, adult education, and online learning. He currently holds the position of Assistant Vice President for Adult and Online Education at Rhode Island College. Prior to this, he served as the Director of Online Learning at the University of North Carolina Pembroke. Dr. Nino's research interests include digital game-based learning, gamification, ePortfolios, online learning, and professional development.

Dr. Samantha J. Blevins is an experienced Instructional Designer & Learning Architect currently working at Radford University's Center for Innovative Teaching & Learning. She has a diverse background in teaching and designing in K-12, higher education, and professional development settings. Her research focuses on electronic portfolio implementation, distance learning, improving assessment, and high-impact practices. She has expertise and publications in eLearning, faculty development, instructional technology, and pedagogy. Dr. Blevins is committed to enhancing learners' classroom experiences by utilizing technology-enhanced learning tools and promoting critical thinking.

As explained in Chapter 4, the survey was developed with three parts, consisting of 50 questions. The first part of the survey focused on the design and organization of the guidelines. The second part concentrated on the content of the guidelines, which were divided into six sections. These sections included an introduction to instructional strategy, five factors to consider when selecting instructional strategies for online teaching and learning, and a definition, purpose, usability, and guiding questions for each factor. The third part of the survey discussed the practicality, effectiveness, and potential limitations of using guidelines to select instructional strategies for online higher education. The survey was created using Google Forms and included

Likert scales and open-ended questions. Participants rated the guidelines on a scale of 1-5 and were also able to provide further feedback through open-ended questions. The survey aimed to gather feedback on the guidelines for instructional strategies in online higher education.

The following section contains responses from expert reviewers to the survey and includes open-ended questions. All feedback, comments, and result discussions here were provided anonymously by the expert reviewers. It is essential to note that the order in which the feedback is presented does not reveal the reviewer's identity. To ensure anonymity, each expert reviewer is assigned a number (such as Reviewer One, Reviewer Two, etc.), and their input is not linked to their name.

Overall Expert Reviewer Perspective

Expert reviewers have given positive feedback on the guidelines for selecting instructional strategies for online teaching and learning in higher education. They believe the framework is relevant and will contribute to advancing the field. However, reviewers suggest that there is room for improvement. Some propose that the guidelines could be more user-friendly and actionable. For instance, a worksheet could be created for educators to fill in information based on the factors outlined in the guidelines. Another suggestion is to create a simplified version of the guidelines, such as a one-page job aid or action plan with guiding questions for each category. This would help instructors follow the guidelines more easily and have a clear plan to take away when finished. Overall, the reviewers appreciated the comprehensive nature of the guidelines but suggested some improvements to enhance their practical value and ease of use.

Although the expert reviewers' comments were generally positive, they also provided useful feedback for improving the guidelines, which were integrated into the revised version (see

Appendix G). The feedback, including suggestions and opinions given by the expert reviewers, was carefully analyzed and taken into account in order to enhance and revise the guidelines. In the following, the evaluation and validation results are discussed in detail, with a focus on presenting each section of the rubric used to assess the guidelines. The rubric sections were as follows: part 1) the guidelines' overall design and organization, part 2) the application and content of the guidelines, and part 3) the effectiveness, practicality, and possible real-world constraints. The outcomes of each individual question in each section are presented in the results. To examine the questions, please refer to the evaluation rubric (see Appendix F). For each section of the assessment rubric, the expert reviewers' recommendations are provided, followed by a response on how those suggestions were utilized to revise and enhance the final version of the guidelines.

Part 1: Reviewer Feedback for the Guidelines Overall Design

The first part of the rubric includes questions about the guidelines' overall design and organization. The expert reviewers were also asked to provide any comments they may have regarding the overall design.

When the reviewers asked if the guidelines provided a clear and detailed description of its purpose and intended usage, all the experts strongly agreed. Some of the experts also provided additional suggestions to improve the general design principles considerations. Reviewer One stated that: “I think the opening section clearly articulates the intended purpose and audience for the proposed framework.” Reviewer Three added, “This is a very comprehensive and well-structured guide that provides many useful strategies that educators or designers can utilize for teaching and designing online learning experiences. The inclusion of guiding questions at the end of each category is very helpful for prompting reflection and application.” Reviewer Four wrote:

“These guidelines are extremely thorough and laid out for those who will be using them.” Reviewer Five noted: “I also see how this guide can have implications for research, not only for practitioners. As a researcher, practice informs a lot of my research. So, I think you could add that consideration.”

When asked if the instructions provided for using the guidelines are clear, sufficient, and easy to understand, experts either strongly agreed or agreed. Reviewer One stated, “The instructions were clear and detailed. The organization and flow make sense and provide not just the "what" but the "why" and "how" of the sections. I think that makes sense”. Reviewer Three suggested that, “The instructions are clear; it might be helpful if you provide step-by-step simplified steps on how to use the tool.” Reviewer Four also recommended, “I'm not sure I saw explicit instructions in the guidelines. You could take this one step further and create some action planning pages for users (now or after you finish). This would be something tangible that readers/users could fill out and take with them.” Reviewer Five added, “I think it would be stronger if you add a "How to Use this Guide" checklist or numbered list, that instructors and instructional designers could follow. It would be a summary of the whole guide in easy-to-follow steps. This can be included at the beginning or end of this guide.”

When asked if the guidelines' organization and format effectively serve their purpose and use, experts either strongly agreed or agreed. Reviewer Three also suggested, “including a sampled version of the guidelines in one place (one page). This way, if one takes it, they can quickly access the guidelines. I would definitely still include the detailed version of the guidelines.” Reviewer Five suggested adding more examples: “I think the guideline is concise and clear. I like the use of examples to illustrate certain concepts; however, I think more examples can be used”.

For additional feedback and suggestions to improve the guidelines overall design, and similar to previous reviewer recommendations, Reviewer Two provided feedback on the instructional strategy selection guidelines, suggesting that the document should include instructions on how to use the guidelines effectively. They recommended adding a more detailed table of contents with links to specific pages and a simplified handout or job aid. These additions could help educators in higher education use the guidelines more efficiently and effectively. Reviewer Five has emphasized the importance of adding examples in the section on analyzing learners' characteristics and identifying learning outcomes and specifically noted: “I think that you can add links or examples of rubrics and protocol to provide stronger examples.”

In response to the recommendations of this part, there are several similarities among recommendations, including adding a table of contents with links to specific pages, creating some action planning pages for users, adding sampled versions of the guidelines in one place or a job-aid, and adding a "How to Use this Guide" checklist or numbered list. To address that, first, links were added to each title in the table of contents for easy access and navigation. Furthermore, the how-to-use part of this document was modified to involve a checklist that users can follow. Then, a job aid that includes all the factors in one place was created and added to the guidelines. In regard to the suggestion of adding more links or examples of rubrics and protocols will be considered in future versions of the guidelines, due to the purpose, audience, and time constraints of this study.

Part 2: Reviewer Feedback for Application and Content of the Guidelines

This part focuses on the content of the initial guidelines, which include a total of six sections. The first section is the instructional strategy introduction. The following parts are the five factors to consider when selecting instructional strategies for online teaching and learning,

including the online learning context, online learning mode, learners' characteristics and needs, learning outcomes, and learning theory and pedagogy. As mentioned before, in the guidelines, each factor has its own section that includes a definition (what), purpose (why), usability (how), and guiding questions (application) supported by relevant resources and examples. The organization of this part has changed in the revised version of the guidelines.

Section 1: The Introduction to Instructional Strategies. When the reviewers were asked if the key components of the Introduction to Instructional Strategies section were both appropriate and sufficient, three strongly agreed, one agreed, and one selected neutral. Reviewer Three suggested: "Consider adding a brief definition of each of the 5 instructional strategies upfront in this section. This would help frame the purpose and content of the document for readers who may not be familiar with the terminology". Reviewer Five added: "Even though this first section provides useful information, it can be confusing. This is really providing context and a review of the literature, but it is not part of what an instructor or practitioner will use to implement." To address the first consideration and help readers who may not be familiar with the terminology, a brief definition of each factor is added to frame the purpose and content of the document. For the second suggestion, a note about the relevance of this part was added. It is essential to provide some background to explain the names, types, and differences of instructional strategies. As stated in the introduction chapter of this study, many educators do not have enough knowledge related to pedagogy and strategies. This part is especially important for beginners who need guidance in this area. However, experts can skip this section and go straight to the intended section of the guideline.

When the reviewers were asked if the content of the Introduction to Instructional Strategies section was clear and easy to understand, three strongly agreed, one agreed, and one

selected neutral. Reviewer One provided feedback on the need to add more examples to illustrate supplantive vs generative, which “would add more depth and clarity.” They also suggested aligning Table 1 with the order described in the text. And also suggested adding a visual element, such as a graphic, to help instructors visualize the framework as a whole, as noted for “having a way for them to view it in its entirety could help them visualize as well as prepare them for the subsequent sections as they read. This also makes it more accessible.” In response to these suggestions, examples were added for clarity; the table was aligned with the order of description, and a visual for the element was created and added.

In addition, Reviewer Five suggested: “if the reader is advised that this is a connection to relevant research or a review of relevant literature, it would be more clear.” This concern was addressed and modified with a note explaining the relevance of this part.

When the reviewers were asked if the content of the first section, the Introduction to Instructional Strategies, was based on relevant research and essential practices for selecting appropriate instructional strategies, all the reviewers strongly agreed. In regard to the content organization of this section, Reviewer Five suggested that the current section can be included with the introduction, and therefore it could be separated from the other five factors. They proposed two options: “So, I would create two big sections: introduction and factors (then, in this section, you cover the five factors). Or, you could have this first section as part of the introduction. And then have only five sections (one for each factor).” This suggestion makes more sense. Thus, a change was made to create two main sections: one for the introduction, including this part, and another section for the five factors. As a result, the revised guidelines have a slightly different content naming and organization compared to the initial version.

Section 2: Analyzing the Online Learning Context. When the reviewers were asked if the key components of analyzing the online learning context section were both appropriate and sufficient, all reviewers either strongly agreed or agreed. Reviewer Five suggested:

I would add in this section a consideration about the space where the learner is going to take the course from. Besides telling the learner what they need in terms of technology, they should know what is an ideal or suggested space to take online courses and complete online assignments and activities. For instance, an online course should be taken in a private space with the least number of disruptions. Certain activities can be completed in a public space, but conducting synchronous learning from those is not ideal.

This suggestion is addressed within the physical aspect of the learning space. However, a change was made to clarify the explanation for users.

When the reviewers were asked if the content was clear and easy to understand for analyzing the online learning context section, four reviewers strongly agreed, and one disagreed. Reviewer One indicated that:

I think in the How section, you could be more descriptive and tie/align it more to the table. The how sections jump right into some really good aspects, but maybe introducing it first. Because of the comprehensiveness of the framework, presenting the guiding questions in a more actionable way would help instructors use them. For example, by presenting the guiding questions as a table for each section, maybe aligned to concrete examples or other information from your existing tables as appropriate.

In response to this recommendation, a paragraph introducing the content of the How section was added. For the second part of this recommendation, the guiding questions will align with the job aid content. Reviewer Five added: “The guiding questions are excellent. I would just

add some questions related to how the learner can prepare their physical space to effectively complete an online course." To address that, a question was added.

When the reviewers were asked if analyzing the online learning context section content was based on relevant research and essential practices for selecting appropriate instructional strategies, all the reviewers strongly agreed. Reviewer Three stated: "Great breakdown of key contextual elements to analyze. To make it even more user-friendly, consider formatting it into a checklist that summarizes the key questions." This recommendation was mentioned in the previous question, and therefore, the guiding questions will be added and aligned with the job aid content. Reviewer Five noted: "Access and accessibility are not the same. I suggest to revise that in this section and throughout the whole guide. I think in some instances you meant access and not accessibility." It is true that the term accessibility has been used for understanding accessibility and the significance of providing equal opportunities to everyone, regardless of their background or circumstances and what is meant here is having access. I agree that this distinction is crucial, and as a result, the word "access" has replaced "accessibility" in this context.

Section 3: Online Delivery Mode. When reviewers asked if the key components of the online delivery mode section were both appropriate and sufficient, all reviewers either strongly agreed or agreed. Reviewer One suggests adding more information on the technological considerations in the framework. They ask how instructors can leverage technology and select appropriate tools to support the strategy. They stated: "How do instructors do that? How do they select the appropriate tool to support the strategy? (SAMR, TPACK)?" Reviewer One recommends aligning specific types of tools to strategy and mode, which could be presented in a

table as guidance. In response to these recommendations, the following updates were made to the document:

- An explanation of technology selection was added.
- An example of SAMR and TPACK models was included.
- Examples and strategies were added with technology tools.

The process of selecting technology is equally important and may have similar processes, but additional guidelines may be necessary to explain it. However, this paper does not cover the selection process in depth, and it may be included in future versions of the document.

Reviewer Five recommended including blended as a delivery mode in this context. They noted: “I think you should include blended (when a course has synchronous and asynchronous components) and possibly hybrid (when a course has face-to-face and online components). It's possible that you don't want to include hybrid (if you solely want to focus on online). In regard to this consideration, blended mode was added only, because the focus of this study is on online learning.

When asked if the content of the online delivery mode section was clear and easy to understand, all reviewers either strongly agreed or agreed. Reviewer One appreciated the inclusion of the online modes and their challenges in the context of online learning. They suggested adding "synchronous or asynchronous" under the first guiding question for more clarity. They also suggested considering mentioning the blended mode of synchronous vs. asynchronous delivery and how to select appropriate strategies for blended modes. They recommended: “Adding in some specific examples could help instructors conceptualize more clearly.” For that, a modification to the guiding questions was made, the blended mode was added, and examples were provided to help instructors conceptualize more clearly.

When asked if the content of the online delivery mode section was based on relevant research and essential practices for selecting appropriate instructional strategies, all reviewers strongly agreed. Reviewer Three asked about other modalities of online learning: " Where will hybrid and Hyflex fit into this context?" To answer this question, as mentioned before, this study focuses solely on online learning; therefore, other modes that incorporate in-person along with online learning are outside the scope of this study. Reviewer Five suggested: "adding a guiding question, you can add one "about how learners in asynchronous course can interact and get feedback from the content." They also added regarding asynchronous learning: "It's important to let the system or technology to also interact and provide feedback to the learner, since interaction with the instructor is more limited and does not take place in real time." To address these suggestions, an explanation of the interaction options available in asynchronous learning mode was added, along with a guiding question for that point.

Section 4: Analyzing the Learners' Characteristics. When reviewers asked if the key components of analyzing the learners' characteristics section were both appropriate and sufficient, four reviewers strongly agreed, and one selected neutral. Reviewer Five noted that while it's important to know about learners when designing instruction, it may not always be realistic or possible to gather detailed information. Instead, it suggested: "to just add in this section realistic data points that an instructor has as considerations." They indicated that the guide should focus on these data points that require less additional research from the instructor. In response to this concern, I agree that this is an insightful idea based on actual experience, and it was mentioned and included in the guideline. While some data about the learners can be easily retrieved from the system, there is other information that may require pre-class surveys to collect. Eventually, instructors can determine which data is necessary for their course needs.

When asked if analyzing the learners' characteristics section content was clear and easy to understand, all reviewers strongly agreed.

When asked if analyzing the learners' characteristics section content was based on relevant research and essential practices for selecting appropriate instructional strategies, all reviewers either strongly agreed or agreed. Reviewer Three recommended: "One additional element that could be useful is accessibility needs and disabilities that should be accommodated in course design." They also suggested: "Consider moving this section up because I believe knowing who your learners determines every other strategies you would use of your online course". As a result, accessibility needs and disability were included as one component of the learners' characteristics. In addition, this factor was moved to become the first in these guidelines, as suggested. Reviewer Five also suggested increasing focus on accessibility and universal design in the development of online courses. They recommend developing courses that can be universally taken by anyone rather than conducting a detailed analysis of each learner. Accordingly, a note and explanation about accessibility and Universal design were added to the guidelines.

Section 5: Identifying the Learning Outcomes. When reviewers asked if the key components of identifying the learning outcomes section were both appropriate and sufficient, all reviewers strongly agreed.

When asked if the content of identifying the learning outcomes section was clear and easy to understand, four reviewers either strongly agreed or agreed, and one selected neutral. Reviewer One recommended "taking the guiding questions and aligning them in a table with some resources or info to help them answer that question. This could also take the form of a document in the Appendix." Reviewer Five provided feedback suggesting the use of "the ABCD

of learning objectives: audience, behavior, condition, and degree", followed by the incorporation of Bloom's and Gagne's work within the behavior section to improve the organization and clarity of the content. It seems that the content here requires more organization to improve its clarity. Consequently, an explanation under the How section and guiding questions about the ABCD approach were provided for more clarity and organization.

When asked if the content of identifying the learning outcomes section was based on relevant research and essential practices for selecting appropriate instructional strategies, all reviewers strongly agreed. Reviewer Three indicated that: "The alignment matrix is an excellent tool to demonstrate connecting outcomes to strategies." Reviewer Five noted: "Evaluation and assessment are not the same" and suggested making revisions in this section to properly use the terms. Therefore, a revision was made to change the terms from evaluation to assessment.

Section 6: Learning Theory and Pedagogy. When reviewers asked if the key components of the learning theory and pedagogy section were both appropriate and sufficient, all reviewers strongly agreed. Reviewer Five added: "I think people should know that there are more learning theories, but these are the most used and provide the foundations for others. Some readers might assume these are the only three." Hence, an explanation regarding the foundation learning theories and other available and integrated theories was added.

When asked if the learning theory and pedagogy section content is clear and easy to understand, all reviewers strongly agreed or agreed. Reviewer One suggested creating a visual for the steps presented in the "How" section and asking, " How did the instructor decide on constructivism?" They suggested walking the reader through the decision-making process of choosing constructivism as an example. To clarify the process, a visual graph was created and added, along with a description of what can influence the instructor's choice of learning theory.

When asked if the learning theory and pedagogy section content is based on relevant research and essential practices for selecting appropriate instructional strategies, all reviewers strongly agreed or agreed. Reviewer Three Added: “To make this section even more simplified, consider formatting theories and strategies into a comparison table. This would clearly visualize the relationships between theories and corresponding strategies at a glance.” In response to this suggestion and as mentioned previously, a visual showing the application process of learning theory in practice was added beside a comprehensive table, providing readers with examples of theories and corresponding strategies. This will help readers to better understand and implement the content.

Part 3: Reviewer Feedback for The Effectiveness, Practicality, and Possible Real-World Constraints

This final part discussed the practicality, effectiveness, and potential real-world limitations of using the guidelines to select instructional strategies in online higher education. The reviewers were asked to rate their level of agreement with several indicators about the guidelines on a scale of 1 to 5, with 1 representing strong disagreement and 5 representing strong agreement. The result is illustrated in Table 9.

Table 9

Summary of the Reviewer Feedback for Indicators Related to the Use of the Guidelines

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
Usefulness				1	4
Functionality					5
Feasibility				3	2
Relevant					5
Easy to understand			1	1	3
Reliable					5
Adequate					5

The table represents the reviewers' responses and feedback to the guidelines’ indicators. The indicators are divided into six categories: usefulness, functionality, feasibility, relevance, ease of understanding, and adequacy. Each category has a number assigned to it based on the number of responses by the reviewers.

Regarding the first category, the guidelines' usefulness, four reviewers strongly agreed, and one agreed that the guidelines are useful for practical application. The next category is the functionality category, with five responses indicating that all reviewers strongly agreed the guidelines support their intended purpose. The feasibility category has a selection with two reviewers strongly agreeing and three agreeing that the guidelines are feasible and can be implemented in real-world scenarios.

For relevance, all reviewers strongly agreed, indicating that the guidelines are appropriate for educators in higher education. For ease of understanding, three reviewers responded strongly agree, one agreed, and one selected neutral, indicating that the guidelines are almost clear and

easy to follow. Finally, in the adequacy category, all reviewers strongly agreed that the guidelines are comprehensive and sufficient.

The reviewers were asked to indicate the extent to which they believed the provided factors, including a) budget, b) time, c) complexity of the procedure to be taught, d) technical nature of the content to be developed, and e) level of expertise could impact guideline use. The results are shown in Table 10.

Table 10

Summary of the Reviewer Feedback for Factors that Could Impact the Guidelines' Usage

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
Budget			2	2	1
Time				1	4
Complexity of the procedure to be taught				2	3
Technical nature of the content to be developed				2	3
Level of expertise could impact guideline use				2	3

Regarding the effect of the first indicator, the budget, on the usability of the guidelines, one reviewer strongly agreed, two agreed, and two remained neutral. For the effect of the second indicator, time, on the usability of the guidelines, four reviewers strongly agreed, and one agreed that time can impact the guidelines' usage. Based on the feedback of the five reviewers, the third indicator suggests that the usability of the guidelines can be greatly influenced by the complexity

of the procedure being taught. Three reviewers strongly agreed with this statement, while two reviewers agreed. For the technical nature of the content to be developed indicator, three reviewers strongly agreed with this statement, while two reviewers agreed the usability of the guidelines could be greatly influenced. For the level of expertise indicator, three reviewers strongly agreed that the usability of the guidelines could be impacted by it, while two reviewers agreed.

When asked how effective they think the guidelines were in achieving their goal of providing instruction to select an instructional strategy for online learning in higher education, four reviewers think it was very effective, while one thought it was somewhat effective.

Reviewer One, who selected is somewhat effective, explained: “As per feedback in previous pages, some more clarity, concrete examples, and a way to condense and make actionable the guiding questions aligned to relevant info so they do not have to search to be able to answer the question.”

When asked if the guidelines were presented in an organized manner that supports their goal and intended use, all reviewers responded with yes.

When asked for additional suggestions on improving the guidelines for selecting instructional strategies in higher education online teaching and learning, the recommendations received as follows:

Reviewer One:

I think overall, this framework will contribute and advance the field. There is a need for this framework to help instructors think more strategically about meaningful online strategies, and so it is relevant and topical. I think just a few adjustments with how it is presented to make it more actionable will help make it more useable to the intended user. Good job!

Reviewer Two:

As mentioned previously, I believe there are some measures that could still be done to enhance the ease of use of the guidelines. I'd like to add another idea here for consideration, although this idea is more about generating a tool based on the guidelines. Being an Instructional Design professional in higher education who frequently communicates with faculty and research other institutions' learning design support resources, I know that many educators in higher education have access to guides such as course planning or design worksheet or in general appreciate such worksheets that they can use conveniently. Therefore, to enhance the practical value of the guidelines, I believe a worksheet that allows educator to fill information in could be useful. For example, you could have columns that correspond to the factors, such as "Online learning context", "Delivery mode", "learners' characteristics and needs", with guiding questions, and space for educators to reflect on and put thoughts and considerations into writing. I hope this helps.

Reviewer Three:

Overall, outstanding work! As mentioned at the beginning, this is a very comprehensive and well thought out strategy list. It would be very helpful if you have a simplified version e.g. one pager like the QM rubric for each category at a go. You can include the detailed document with guiding questions for further information.”

Reviewer Four:

“This is a very big document. Action planning pages, as I mentioned earlier, might help those planning to use the guidelines follow them more easily and they will have a clear plan they can take away when finished.”

Reviewer Five:

I still think some sections could have better organization. I included those comments in each section. Also, a big consideration should be how much time and resources the instructor has to follow such a guide. I think if there are limitations or conditions that the instructor needs to face or meet, it should be included in the guide.

Summary

Overall, the reviewers provided positive comments besides recommendations and suggestions on how to improve the guidelines for selecting instructional strategies for higher education online teaching and learning. The reviewers mostly agreed that the framework is relevant, current, valid, well-organized, practical, and effective. Nonetheless, some adjustments were suggested to make it more accessible, actionable, and usable. The recommendations include creating a worksheet to allow educators to fill in the information, simplifying the guidelines to one page, or including action planning pages. Additionally, some suggestions indicate revision to some sections for better organization and clarity. As a result of the feedback and recommendations provided, revisions and modifications were made to improve the content, access, clarity, and organization of these guidelines (see Appendix G).

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

The final chapter concludes with a brief summary and review of the study. This section additionally presents a practical contribution to the study, highlighting its potential practical and theoretical contributions. It also covers the limitations of the research and provides recommendations for future applications, outlining the subsequent steps to be taken.

Summary and Review of the Study

The COVID-19 pandemic caused significant changes and disruptions in the higher education sector, emphasizing the need for better preparedness in the future. Institutions can apply the lessons learned from the pandemic to better prepare for current online teaching and future disruptions and ensure quality education under any circumstances (Johnson et al., 2020; Pelletier et al., 2022). The experience of (ERT) provided faculty members with valuable insights and skills for current and future online learning transitions (Pelletier et al., 2022; Schmidt et al., 2020).

As a result, institutions are still undergoing substantial transformation (Caron, 2023). Recent studies show a significant increase in demand for online instructors in higher education (Berry, 2019; Gao et al., 2022). Institutions are planning to continue using online education to meet this demand, but it is crucial for instructors to be adequately prepared for effective online teaching (Schmidt et al., 2020). However, professional development has mostly focused on technological training, overshadowing the importance of online pedagogy (Berry, 2019; Gao et al., 2022). Thus, this research aims to provide evidence-based guidance to higher education instructors on selecting effective instructional strategies in online learning environments. Due to

the rapid growth of online education, developing such guidance has become increasingly important in preparing instructors for online teaching (Gao et al., 2022; Schmidt et al., 2020).

This study employs the design and development research (DDR) methodology (Richey & Klein, 2014) to create an instructional strategy selection guide for online courses in higher education. The main goal of this study is to contribute to the knowledge base for instructional strategy selection in online learning environments within higher education. The outcome of this study is guidelines that can be used as an instructional tool to help educators make decisions about which instructional strategy, they should use to enhance the online learning experience of their students. The DDR methodology involves a systematic and empirical approach to developing and evaluating instructional and non-instructional products, tools, and models (Richey & Klein, 2007). The guidelines were created in four phases: analysis, design, development, and evaluation and validation. Each phase had a specific purpose in creating and refining the guidelines.

In the analysis phase, a literature review was conducted to explore instructional strategies and identify the factors influencing the decision-making process for selecting instructional strategies in online learning environments. The data collected was analyzed and used to create the guidelines' content. The outcomes gathered from the analysis phase were carefully outlined, organized, and utilized to create the preliminary version of the guidelines during the design phase. This phase involved synthesizing the findings from the literature review with the identified theoretical foundations and practical examples. The goal was to plan coherent and structured guidelines built into a tool that outlines the various instructional strategies and the factors influencing the decision-making process for selecting instructional strategies in online learning environments.

During the development phase, an initial/prototype guide was developed and evaluated, and a survey was created. The guidelines were further refined and developed, and a rubric was created to evaluate their effectiveness and usability. The guidelines and rubric were built according to the design plan and outline created in Phase 2. The fourth phase, the validation phase, involved receiving feedback from expert reviewers to evaluate the guidelines' content validity, organization, practicality, and effectiveness.

As a result, the developed guidelines prioritize pedagogical approaches to support faculty in selecting appropriate instructional strategies for online learning. In the guide, the first section explains the definition of instructional strategy, its types, and the factors that influence the selection of instructional strategy in the online learning environment. The following sections explain each factor, including the online learning context, online learning mode, learners' characteristics and needs, learning outcomes, and learning theory and pedagogy. The primary focus of this guide is to walk through the elements of selecting instructional strategies, along with practical examples supported by resources.

Practical Contributions of Study

This study makes several valuable contributions to research and content development. Teaching strategies have been studied extensively in traditional classrooms to create effective methods (Cayubit, 2022; Reiser, 2001). As online learning has become more prevalent and needed, researchers now focus on effective online instruction. Well-planned strategies are critical for quality online education. One of the main practical contributions of this study is the development of evidence-based guidelines that instruct educators on how to select effective instructional strategies for online learning environments. These guidelines are based on a

thorough literature review and empirical research, ensuring they are grounded in best practices and research-based evidence.

Studies show that the focus in professional development has often been on technological training, overshadowing the critical aspect of online pedagogy (Berry, 2019; Gao et al., 2022). Another practical contribution of this study is prioritizing pedagogical approaches in the guidelines. This ensures that educators are encouraged to consider the learning outcomes they want to achieve and select instructional strategies that best match those outcomes. By integrating pedagogy alongside technology, educators can create more effective and engaging online learning experiences for their students.

Even though many educators have acquired experience in online teaching due to the sudden impacts of the pandemic, the literature shows several limitations in the skills related to choosing appropriate, well-planned instructional strategies for achieving learning goals (Jeffery & Bauer, 2020; Shim & Lee, 2020). The COVID-19 pandemic has highlighted the need for better preparation in the higher education sector for disruptions to traditional learning environments. One of the practical contributions of this study is to provide guidance for educators and institutions to prepare for future disruptions by offering evidence-based guidelines for effective online instruction. These guidelines provide a framework for educators to follow, which can help to provide quality education even under challenging circumstances.

The guidelines would contribute to the field and practice of instructional design and online learning. One final reason for this is the positive feedback and comments received from expert reviewers who evaluate and validate the tool. These reviewers are highly experienced in the field, having worked with higher education instructors and designed online learning instructions. As Reviewer One indicated, "I think overall, this framework will contribute and

advance the field. There is a need for this framework to help instructors think more strategically about meaningful online strategies, and so it is relevant and topical. Reviewer Two added, "The guidelines are extremely detailed, informational, and provide significant practical value." Reviewer three stated, "Overall, outstanding work! As mentioned at the beginning, this is a very comprehensive and well-thought-out strategy list."

Theoretical Contributions of Study

Doctoral dissertations can frequently include reports on the progress of projects and products under research (Richey & Klein, 2007). These reports describe the complete lifecycle of the product development process in great detail (Richey & Klein, 2007). As an example, this study of developing guidelines as a tool can be a valuable resource for scholars seeking information on its progress and relevant literature.

While the design and development research method is mostly applied in the instructional design field, this study is an example of using it in practical settings. It contributes to design and development research by creating guidelines that help instructors and designers consider instructional strategies during the decision-making process in the online environment.

The study followed a four-phase procedure for tool research, including analysis, design, development, and evaluation. Then, within the evaluation phase, the study addressed some of the validity issues that could affect the tool's use by employing a survey (Richey & Klein, 2007). As part of the DDR research method, the tool was evaluated and validated by expert reviewers in the field using a survey (Richey et al., 2011). The reviewers' results were used to enhance and revise the final version of the tool.

In addition, this study's findings provided validated practical guidelines for selecting instructional strategies in online higher education. The guidelines produced from this study will

be utilized as a tool to help support and facilitate the teaching and learning processes (Richey & Klein, 2014). The guidelines will contribute to the research by providing evidence-based guidance to higher education instructors on selecting effective instructional strategies in online learning environments. From pedagogical and practical perspectives, this area of study has not been thoroughly researched and lacks relevance to effective instructional design and literature. As online education grows rapidly, it becomes increasingly important to provide designers and instructors with this guidance tool.

Study Limitations

Although experts have reviewed and validated this tool, it is still important to test it with actual users to ensure that it meets their needs and expectations. Furthermore, based on the feedback received from the users during the testing phase, the tool may need to be revised and improved to make it more effective and user-friendly.

In addition, many integrated factors also need guidance and explanation, such as the process of writing learning outcomes, the process of selecting appropriate technology tools, and the process of selecting and applying learning theories. Besides this guidance in selecting instructional strategies for online learning, various integrated factors require more detailed guidance and explanation in the online environment, as they were briefly described for the purpose of this study. For instance, crafting effective learning outcomes demands a clear and concise understanding. Similarly, selecting appropriate technology tools that align with the learning objectives and strategy would need further guidance. Also, choosing and applying proper learning theories that reflect the needs of the learners and the learning context is another critical aspect of educational planning that necessitates a thorough explanation.

Recommendations for Further Research Practice

The results of DDR research offer valuable insights that can enhance design and development practices, expand the knowledge base, and inspire new research (Richey & Klein, 2007). As a result, this research may lead to the discovery of new problems and questions for further investigation. The interpretation of research findings can result in new explanations of events, which require additional empirical verification. For example, as mentioned earlier, there is still a need for further research on related factors, such as the process of creating effective learning outcomes in online learning, which require a clear and concise understanding. Similarly, the process of selecting appropriate technology tools that align with the learning objectives and strategy would require more research. Additionally, choosing and applying suitable learning theories that reflect the needs of the learners and the learning context is another critical aspect of online education planning that future research would contribute to the field and practice.

Furthermore, more research and exploration are required for other online modes that were not included in this study, such as hybrid, hyflex, and blended in-person and online modes.

According to the design and development methodology (Richey et al., 2004), the guidelines were reviewed and approved by a panel of five expert reviewers. The feedback provided by the reviewers was constructive and practical, focusing on the document's clarity, organization, relevance, and comprehensiveness, which resulted in modifications to improve the validity of the tool. Although the guidelines are a valuable contribution to the field, additional refinement and enhancement can be achieved through field study or pilot testing with intended users, such as higher education instructors, as noted previously. This field test will be essential to validate the use of the guidelines (Richey & Klein, 2007). Therefore, it may also result in more revision considerations and changes to be implemented to improve the tested guidelines.

Conclusion

In conclusion, this chapter summarizes the study's main findings and practical contributions, highlighting the importance of preparing higher education instructors for effective online teaching. The study developed evidence-based guidelines for instructional strategy selection in online learning environments, using the design and development research methodology. The guidelines prioritize pedagogical approaches and provide practical examples supported by resources. The study's practical contributions include providing a tool for educators to enhance the online learning experience of their students and offering insight into the factors influencing the decision-making process for selecting instructional strategies in online learning environments. Finally, this chapter provides recommendations for future research and applications, emphasizing the need for continued professional development for instructors' effective online teaching.

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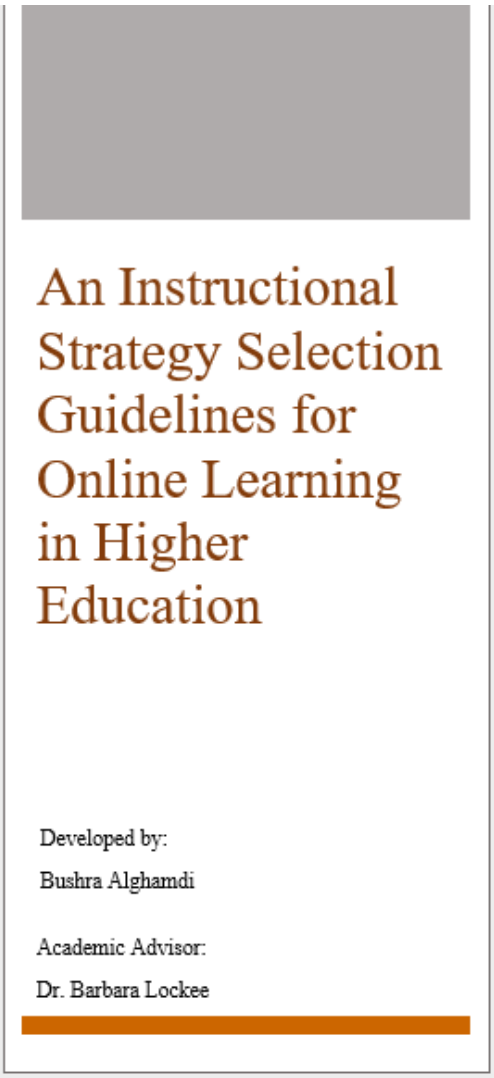
APPENDIX A

INITIAL GUIDELINES


An Instructional Strategy Selection Guidelines for Online Learning in Higher Education

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Purpose and Use of Instructional Strategy Selection Guidelines

The COVID-19 pandemic has highlighted the need for better infrastructure and training to support remote learning in higher education. As the demand for online instructors increases, it is crucial for them to be well-prepared to teach effectively in the online environment. To ensure the quality of online education, faculty members need to adopt pedagogical approaches and develop the necessary skills to succeed in the virtual classroom.

Instructional strategy selection is a vital pedagogical component of online learning as it directs the effective teaching and learning process. The rapid growth of online education has also led to an increased demand for effective instructional strategies in online learning environments. However, selecting appropriate instructional strategies for online teaching and learning can be a complex and challenging process.

To address this process, this guide aims to provide evidence-based direction to educators in higher education for selecting effective instructional strategies in online learning environments. The guidelines will equip faculty with valuable resources to engage students effectively in remote settings and better accommodate diverse student populations, thereby contributing to improving the quality of online education.

This guide will prioritize pedagogical approaches and support faculty in selecting appropriate instructional strategies for online learning. In this guide, the first section explains instructional strategy definition, types, and the factors influencing the selection of instructional strategy in the online learning environment. The following sections explain each factor, including the online learning context, online learning mode, learners' characteristics and needs, learning outcomes, and learning theory and pedagogy. The primary focus of this guide will be on selecting instructional strategies with a suggestion of practical examples and resources.

Instructions on How to Use the Guidelines:

To effectively use the guidelines in the instructional strategy selection process, each factor should be organized as follows:

5. Definition (What?): Clearly define each factor of the instructional strategy. This involves describing the component and its role in the overall strategy selection.
6. Purpose (Why?): Explain the purpose of each factor. This includes detailing why the element is essential in the instructional strategy and its intended outcomes.
7. Instructional Application, Resource, and Example (How?): Provide instructional resources and examples of how the element has been used effectively. This could include links to resources or case studies demonstrating the successful implementation of the factor affecting strategy selection.
8. Guiding Question for User Application: Offer guiding questions to help users apply the element in their context. These questions should prompt educators to think about how they can adapt and implement the factors for selecting strategies in their own online teaching.

Section1: Introduction to Instructional Strategies

What is an Instructional Strategy?

An instructional strategy describes the techniques and methods teachers or instructors use to deliver content and achieve learning objectives (Hill & Jordan, 2021). In essence, these strategies are the methods used to ensure that students understand and learn academic content. The primary goal of instructional strategies is to facilitate effective teaching and learning, enabling students to achieve specific learning outcomes and engage students in the learning process.

Instructional strategies are also commonly referred to as methods, techniques, and activities. These terms, while sometimes used interchangeably, may have nuanced differences depending on the context or specific educational framework in which they are used. However, they all pertain to the approaches, methods, and techniques educators employ to deliver content and facilitate learning.

Type of Instructional Strategy:

Instructional strategies encompass a wide range of teaching and learning activities. Larson and Lockee (2020) define these as activities, exercises, and methods that facilitate learning. The distinction between teaching and learning strategies is crucial: teaching strategies are approaches used by instructors, focusing on the delivery of content, while learning strategies are employed by students, emphasizing their role in the learning process.

There are several ways to classify instructional strategies. One classification, by Dick et al. (2015) and Richey et al. (2010), divides strategies into micro and macro. Micro strategies are specific tactics employed by instructors for certain learning objectives, like using visual aids or leading discussions. Macro strategies, however, define the overall structure of a lesson or unit, setting the sequence of events and goals. Another name for this type is an instructional framework, which serves as an organizational structure that coordinates various instructional strategies, such as cooperative learning, reciprocal teaching, and think-pair-share. The line between strategies and structures can sometimes be unclear (Doolittle, 2023). For example, using lectures, group work, flipping classes, and problem-based structures (Doolittle, 2023).

Reigeluth (1983) categorizes strategies based on their function, naming three key components: content organization, media delivery, and management. Organizational strategies handle content presentation, ensuring a logical sequence. Delivery strategies are about choosing the right medium and grouping learners appropriately. Management strategies, as explained by Smith and Ragan (2005), oversee these other strategies, coordinating instructional events and resources. This classification can be considered as a framework for instructional strategies.

Organizational Strategy

Reigeluth and Keller (2009) classify organization strategy into three types: instructional approach, instructional component, and content sequencing, as presented in Table 1. First, when designing an organization's strategy, it is essential to consider the instructional approach, which provides a general direction for teaching, such as project-based learning, direct instruction, or

collaborative learning and learning, and this type may include components strategy such as practice. Second, it is crucial to select appropriate instructional components depending on the specific situation, such as providing opportunities for practice or coaching. Third, content sequencing should be considered, which involves organizing the learning material logically and coherently, such as by organizing it from easy to difficult. These factors work together to create an organization's comprehensive and effective strategy for teaching and learning.

Smith and Ragan (2005) introduce another classification based on the level of support: supplantive and generative strategies. Supplantive strategies provide more guidance and structure, benefiting novice learners or complex tasks. Generative strategies, on the other hand, allow learners more autonomy in their learning, promoting active engagement and critical thinking.

Both supplantive and generative strategies have their merits. While generative approaches can yield better outcomes for knowledgeable learners, they might overwhelm others. Supplantive strategies offer more support but might be less engaging for some (Dabbagh, 2003). A successful instructional design considers the balance between these strategies, taking into account factors like learner characteristics and content complexity.

Table 1

Instructional Strategy Classification

Category	**Definition & Classification**	**Source**
Basic Classification	- Teaching strategies: approaches used by instructors focusing on content delivery. - Learning strategies: used by students to emphasize their role.	Larson & Lockee (2020)
Function Classification	- Content organization: Handles content presentation in a logical sequence. - Media delivery: Choosing the right medium and grouping learners. Related to the learning environment and mode. - Management: Coordinating instructional events and resources. Related to the learning context and management system.	Reigeluth (1983), Smith & Ragan (2005)
Organization Strategy Classification	- Instructional **approach**: general direction and may include components (e.g., PBL, direct instruction, collaborative learning) - Instructional **component**: individually selected depending on the instruction situation (e.g., practice, coaching)	(Reigeluth & Keller 2009)

	- Content **sequencing**: used with both approach and component (e.g., easy-to difficult sequencing)	
Size Classification	- Micro strategies: Specific tactics for certain objectives (e.g., using visual aids, leading discussions). - Macro strategies: Define the overall structure of a lesson (sequence & goals).	Dick et al. (2015), Richey et al. (2010)
Support Based Classification	- Supplantive strategies: Provide more guidance; benefit novice learners or complex tasks - Generative strategies: Allow learners autonomy and promote engagement and critical thinking.	Smith & Ragan (2005)
Consideration	Generative can be better for knowledgeable learners but might overwhelm some learners. Supplantive offers more support but may be less engaging. (level of scaffolding)	Dabbagh (2003), Smith & Ragan (2005)

What Factors Influence Instructional Strategy Selection in Online Learning?

According to instructional design literature, several variables influence the selection of instructional strategies, including:

1. Online learning context
2. Online learning mode
3. Learners' characteristics and needs
4. Learning outcomes
5. Learning theory and pedagogy

In order to make informed decisions about our online strategy, it is essential to understand the impact of each element on course design and development. By doing so, we can effectively incorporate these elements into our courses and achieve better outcomes. The following details each element, why it is essential to the strategy selection process, and provides guidance on how to integrate it into online course design and development.

Section 2: Analyzing the Online Learning Context

What?

Learning context\ Environmental analysis involves examining the physical and functional aspects of instructional systems.is crucial in shaping strategies and activities that promote learning (Tessmer, 1990). Understanding its nature allows educators to make informed decisions about fostering learning and achieving desired outcomes (Larson & Lockee, 2020).

Why?

Instructional strategies and activities can also influence the learning context and technologies used for delivery. Analyzing the context aspects of an online learning environment differs from traditional in-person settings. For instance, online learning lacks the traditional room size, lighting, and projection facilities. Instructional contexts may encompass physical, temporal, and social aspects that influence learning (Dick et al., 2015; Smith & Ragan, 2005; Tessmer & Richey, 1997).

How?

General Elements of Online Instructional Contexts

What are the physical aspects?

- Consider advising learners to have a specific location and space to complete online courses successfully.
- Consider the learner space to be functional and comfortable and allow the control of temperature, noise, lighting, and air quality.
- A proper computer workstation setup includes an eye-level screen and a keyboard and mouse at elbow height to avoid physical discomfort.

What are the social aspects?

- Provide the Learners with the opportunity to interact with peers.
- Provide the Learners with the opportunity to communicate or collaborate with colleagues\ communities of practice.
- Provide the Learners with the opportunity to communicate with the instructor.

What are the technological aspects?

- Consider learners' accessibility to reliable internet, wireless connection, power outlets, and a variety of computer devices. It is important to note that internet access and functionality vary based on location and device.
- Inform the learners of any supporting software, program, and device needed or required.
- Consider Learners' accessibility to learning management systems and communication channels.

Consider technical support for any technical issues (Cheuk, 2021). Analyzing the online learning context involves understanding the resources, constraints, and other factors that impact

the learning process. Dick et al. (2015) have proposed four key aspects to consider; we can apply these elements to analyze the online learning context as follows in Table 2:

Table 2

Online Learning Context Analysis Elements

Element	Description	Source	Example
Compatibility of Site with Instructional Requirements	Ensure the online learning platform, like a learning management system (LMS), supports essential tools and resources for effective instruction. Check compatibility with various devices, accessibility features for disabled students, and multimedia resource availability.	(Cheuk, 2021) (Hodges et al., 2020).	Learning management tool -LMS (Canvas, Blackboard) - Accessibility features Canvas Voluntary Product Accessibility Template
Adaptability of Site to Simulate Workplace	Simulate workplace aspects using virtual tools, case studies, real-world projects, or online collaboration tools. Consider incorporating interactive simulations or virtual labs for learners to practice skills in a safe, controlled environment resembling their future workplace.	(Georgiou et al., 2007) (Jowsey et al., 2021) (Martin & Bolliger, 2018).	-Interactive simulation: The decision-making process for supporting sales associates. -Virtual labs: Online chemistry lab
Adaptability for Delivery Approaches	Online platforms should support various instructional strategies and delivery approaches, such as synchronous and asynchronous learning, video lectures, interactive modules, discussion boards, and group projects. Be mindful of students' diverse learning preferences and ensure adaptability to these needs.	(Cheuk, 2021) (Hodges et al., 2020) (Shank, 2007) (Tessmer & Richey, 1997)	Canvas Blackboard Moodle Google Classroom
Learning Site Constraints Affecting Design and Delivery	Analyzing constraints in an online learning context, consider factors like internet connectivity, device compatibility, and learners' digital literacy. Identify organizational policies or decisions affecting online instruction design and delivery, such as the required use of specific technologies or platforms.	(Cheuk, 2021) (Dick et al., 2015) (Shank, 2007) (Tessmer & Richey, 1997)	Constraints in an online learning context

Note. In higher education, almost every college and university, around 99%, uses a learning management system (LMS) to manage the online learning processes (Brown et al., 2015). Therefore, it is expected that educators will utilize this tool to facilitate the learning experience.

Guiding Questions:

What are the physical, social, and technological aspects of the learning environment?

What is the management strategy or learning management system for this lesson or course?

How is the site (LMS) compatible with the instructional requirements?

How can the site (LMS) be modified to simulate a workplace environment?

How does the site (LMS) support various instructional strategies and delivery approaches?

What are the possible learning site (LMS) constraints that would affect design and delivery?

Section 3: Online Delivery Mode

What?

Online Learning is a mode of education that enables instructors to deliver instruction to students who are geographically separated from the instructor(s). Online Learning supports regular and substantive interaction between students and instructor(s). The class can be conducted either synchronously or asynchronously, with synchronous requiring students to participate at a specific time each week and asynchronous allowing them to view instructional materials at any time during the week. Various technologies could be utilized for instruction in Online Learning, such as the Internet, audio conferencing, video cassette, DVDs, CD-ROMs, one-way and two-way transmissions through open broadcasts, closed circuit, cable, microwave, broadband lines, fiber optics, satellite, or wireless communication devices (Singh & Thurman, 2019)

Why?

Online learning makes higher education more accessible to a broader range of students, including those with disabilities, those living in remote areas, or those who cannot attend traditional classes due to various constraints. In higher education, the decision on the online delivery mode is often made before the course begins and is based on considerations such as learning needs, learner characteristics, and the learning context (Lockee et al., 2022). It should also align with the organization's infrastructure, values, and management strategies (Lockee et al., 2022; Moore, 2020). However, instructors can adjust the online delivery mode as the course progresses based on student engagement, learner needs, and their own teaching experience (Lockee et al., 2022).

How?

Online courses can be presented in synchronous or asynchronous modes (Dennen, 2019; Shank, 2007), impacting the timing of class activities and the nature of student interactions. Understanding the benefits and challenges of both synchronous and asynchronous delivery assists instructors in choosing the most appropriate approach, or a combination of both, for a given situation (Shank, 2007). See Table 3.

Table 3

Comparison Between Synchronous and Asynchronous Modes

Type	Definition	Interaction	Meeting	Learners
Synchronous	Type of delivery mode that takes place online in real time. Students are provided with content and assignments and are given a time frame to complete coursework and exams.	Interact online in real time simultaneously, and participants can interact through text, video, or audio chat.	Classes are held on a regular basis, either daily or weekly.	For students to participate in a course from a distance in real time.
Asynchronous	The type of delivery mode does **not** take place in real time. Students are provided with content and assignments and are given a time frame to complete coursework and exams.	Interaction usually takes place through discussion boards, blogs, wikis, and email.	There is no scheduled class meeting time. The course is self-paced.	For students with time constraints or busy schedules

Planning and designing an online course can be a complex task that involves various aspects, such as content creation, selecting the right platform, and leveraging technology. It is crucial to keep in mind that creating a successful online course requires careful planning and execution. One of the limitations of online learning is the communication gap that may exist between the learner and the instructor or among learners. This gap could hinder the learning process and make it difficult for instructors to provide the necessary support and guidance to learners. Therefore, it is essential to use the appropriate tools and strategies to facilitate effective communication and collaboration among learners and between learners and instructors.

To address the psychological and communicative gap between instructors and students in distance learning, notably online education, Michael G. Moore developed the Theory of Transactional Distance (Moore, 1993). This theory guides educators in choosing effective instructional strategies that promote learner autonomy and accommodate diverse learner needs. The emphasis is on dialogue and interaction, highlighting the role of communication tools and collaborative platforms for effective online engagement. By providing adaptable content delivery, such as a mix of recorded and live sessions, educators can cater to varying learner preferences. Furthermore, timely feedback is crucial to counteract the potential isolation in online learning environments. The theory also encourages educational institutions to provide robust support systems to mitigate transactional distance. Overall, this theory aids educators in navigating the complexities of online learning, promoting strategies that enhance engagement, learner autonomy, and overall educational effectiveness.

Adapting the Theory of Transactional Distance (Moore, 1993), in online learning involves strategies tailored to both synchronous and asynchronous modes. See the description of each mode in Table 4.

Table 4

Online Learning Mode Description

Mode	**Description**
Synchronous	Enhances real-time interaction between instructors and students through live discussions, immediate feedback, and interactive activities like polls or group work. Utilizes video conferencing tools for real-time dialogue and collaboration, reducing transactional distance and fostering community.
Asynchronous	Adapts by structuring course materials and activities to promote learner autonomy while maintaining connection. Includes discussion forums, recorded lectures with embedded questions, and timely feedback. Facilitates ongoing dialogue and caters to diverse learning preferences and schedules.

Finally, the delivery mode of a course is essential, but it should not be prioritized over instructional strategies and appropriate media use. The type of instructional strategy used should be considered when selecting a delivery mode, as the two are interconnected. Regardless of whether a course is delivered online synchronously or asynchronously, the quality of instruction depends heavily on the teaching methods and learning materials used. Furthermore, when planning instruction and selecting a strategy, instructors should consider the affordance and limitations of online learning. The following sections will provide more detailed information and guidance regarding strategy types and selection.

Guiding Questions:

What type of online delivery mode of learning is going to be implemented?

What is the course communication and interaction plan? Which online platform best supports interactive features and real-time communication?

How user-friendly and accessible is the chosen platform for all learners?

What balance of recorded versus live sessions will be offered to accommodate different learning needs?

What tools and technologies can be integrated to enhance learner engagement and interaction?

How can technology be used to provide timely and effective feedback to students?

What strategies can be employed to encourage open dialogue and interaction among students and between students and instructors?

How can virtual collaboration be facilitated to ensure effective peer-to-peer learning?

What resources and activities can be provided to support self-directed learning?

How can the course structure promote autonomy while still offering necessary guidance?

What measures can be taken to reduce the psychological and communicative gap in the online learning environment?

How can a sense of community and connectedness be fostered among remote learners?

Section 4: Analyzing Learners' Characteristics

What?

Learner analysis is the process of identifying critical aspects of a learner, such as demographics, prior knowledge, and social needs (Fulgencio & Asino, 2021).

To create engaging and effective online instruction, understanding the target audience's characteristics is crucial. During the instructional design process, instructional designers analyze various learner characteristics, such as demographics, individual differences, beliefs, attitudes, and mental models, as can be seen in Table 5. These characteristics have an impact on motivation, learning, and knowledge transfer (Richey et al., 2010).

Why?

To effectively select and develop instructional objectives and strategies, it is crucial to understand the attributes of learners. These attributes help in the selection of appropriate strategies and the choice of relevant examples, delivery methods, and engaging practices to make learning more meaningful and effective. It informs instructional design decisions and helps modify teaching to the needs of each student for a better understanding of the material.

Table 5

Components of Learners' Analysis

General Learner Characteristics	**Component**	**Source**
Demographic	Gender, Age, Race, Education, Employment, Work Experience	(Richey et al., 2010)
Beliefs and attitudes towards learning	Motivation, Value, Attitudes Toward Content and Delivery, Group Characteristics, Learning Preferences	(Dick et al., 2015)
Academic	Grades, Courses, Degrees, Locality, Literacy, Training	(Doolittle, 2023)
Subject related	Entry Skills, Prior Knowledge, Attitudes Toward Content and Delivery	(Dick et al., 2015)
Individual differences	Culture, Interests Attributions, Special Needs, Belief Systems, Emotional State	(Doolittle, 2023)
Access to Technology	Accessibility to technology Accessibility to learning materials. Technological support	(Fulgencio & Asino, 2021)

How?

Data about these characteristics can be gathered through:

- Observations
- Surveys
- Interviews
- Learning Analytic Tool
- Assessments
- Reviewing Existing Data
- Research
- Consulting With Colleagues

Faculty members can apply this approach by considering diverse learner characteristics when designing courses, creating inclusive content, accommodating various learning preferences, and fostering motivation and engagement (Smith & Ragan, 2005). This focus facilitates a more effective learning experience, guiding students from novice to expert levels of understanding and improving overall academic outcomes and satisfaction.

Dr. Justice (2003) from Kent State University created an example of learner analysis. For further information, please click on this link.

Guiding Questions:

Who are the learners (age, gender, cultural background)?

What is the educational and professional background of the learners?

What pre-existing knowledge and skills do learners possess related to the course content?

Are there any gaps in knowledge that the course needs to address?

What are the learners' attitudes and beliefs towards the subject matter?

What motivates these learners to engage in the learning process?

How proficient are the learners in using the technology required for the course?

What technological support might be necessary for them?

What potential barriers or challenges could learners face in the learning process?

How can the course design address these challenges?

Are there any special needs or accommodations that should be considered?

How can the course be made accessible to all learners?

Section 5: Identifying the Learning Outcomes

When designing a course, the instructor begins by setting broad learning goals. They then identify specific learning objectives that fit within these goals and address various learning domains. After that, the instructor chooses teaching methods and assessments that align with these objectives and domains. This process ensures that the course is well-structured and effective in achieving its intended outcomes.

What?

We need to distinguish between three essential terms here that are commonly used in course design and planning, learning goals, learning objectives, and learning domain. The learning goal, or course goal, is a general statement that describes what students should learn by the end of the course (Fink, 2013). The learning objectives, also known as behavioral and performance objectives or learning outcomes, are precise and measurable statements that describe what learners should be able to do after instruction (Mager, 1962).

The relationship between the two is that learning objectives will collectively ensure the attainment of the course goals. Each learning objective is a step that students need to take to reach the broader educational goals set out for their learning journey.

Learning can be categorized into domains and types of outcomes which reflect diverse ways in which we learn. Learning domains encompass Bloom's cognitive, psychomotor, and affective domains, while types of learning outcomes include intellectual skills, cognitive strategies, verbal information, psychomotor skills, and attitudes, according to Gagne's classification. These categories provide a comprehensive understanding of the different aspects of learning and growth. It is crucial to pinpoint the exact learning type required for a specific subject to assess the results accurately. Once the appropriate learning type is identified, it will help select the suitable instructional strategy. See Table 6 for a description and resources of learning goals, objectives, and outcomes.

Table 6

Description and Resources of Learning Goals, Objectives, and Outcomes

Type	Definition	Components	Example
Learning Goal	Describes what students should learn by the end of the course. (Fink 2013)	General course outcomes	Course goal
Learning Objectives	An observable and measurable statement explaining the learners' achievement by the end of the instruction or lesson.	Intended performance, the conditions related to the demonstration, and the criteria used to evaluate performance.	Bloom’s Taxonomy as a framework for writing learning objectives

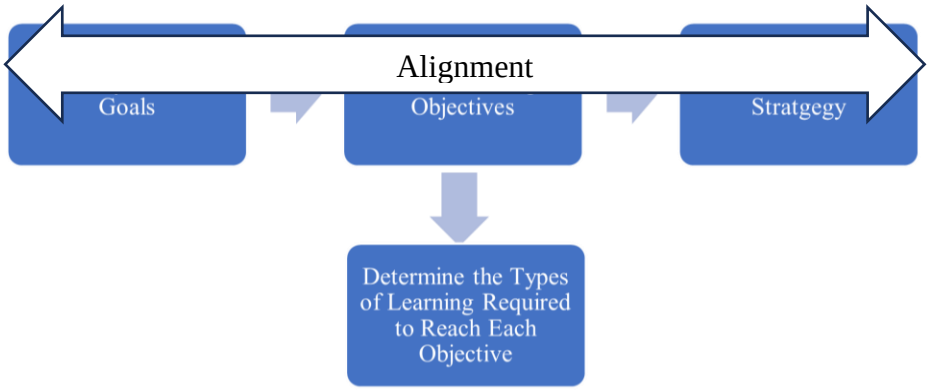
	(Richey et al., 2010)		
Learning Domains and Learning Types	Categories that describe the different areas of learning and development. (see Gagné, 1972) Different subjects require different learning domains for measuring outcomes.	Often divided into three primary types: cognitive, affective, and psychomotor.	Bloom's Taxonomy of Learning Domains Gagne's categories of learning: Verbal information Intellectual skills: • Discrimination • Concepts • Rule application • Higher order Cognitive strategies Motor skills Attitudes

Why?

For online learning to be effective, it is crucial to set clear learning objectives and perform appropriate assessments that are in line with those objectives (Hirumi, 2014). To help learners achieve specific tasks, educators must classify objectives based on the type of learning process (i.e., learning domains or learning types of outcomes) (Larson & Lockee, 2020). Throughout the process, instructors must ensure the alignment among these elements so they can select the proper instructional strategy (see Figure 2).

Figure 2

Elements Alignment



How?

The process to effectively create learning objectives:

- **Define learning objectives**: Craft clear and concise statements that outline learning objectives learners should achieve after completing a specific instruction segment. These objectives serve as a roadmap for both instruction and learning outcomes (Dick et al., 2015; Driscoll, 2014). Make sure it is aligned with the course goal.
- **Start with skill statements**: Identify specific behaviors in skill statements as a starting point. These behaviors are the foundation of the learning objectives.
- **Add conditions and criteria**: Enhance the skill statements by adding relevant conditions and criteria. This transforms them into comprehensive performance objectives. It's essential to consider factors like task complexity, the authenticity of the context, and appropriate resources (Dick et al., 2015).
- **Consider attitudinal objectives**: When setting objectives that focus on attitudes, think about scenarios that allow learners to make choices freely, without fear of negative consequences. This encourages open-mindedness and decision-making skills.
- **Specify evaluation criteria**: Clearly define the criteria for assessing the achievement of the objectives. Ensure these criteria are appropriate for the learners' developmental stage and the conditions of the task (Dick et al., 2015).
- **Incorporate Gagne's learning outcomes categories**: Utilize Gagne's categorization of learning outcomes, which include intellectual skills, cognitive strategies, verbal information, psychomotor skills, and attitudes. These categories emphasize different cognitive processes and are instrumental in guiding instructional strategy selection (Driscoll, 2014; Larson & Lockee, 2020; Richey et al., 2010; Smith & Regan, 2005).

Instructors could then choose instructional strategies that help learners achieve each of these objectives, complement the assessments, and reflect their personal educational principles and values. This comprehensive approach ensures that learners acquire the necessary knowledge and skills to complete their tasks successfully. Instructors can use the Alignment Matrix, as presented in Table 7, to choose strategies that align with their values and help students achieve learning objectives.

Table 7

Alignment Matrix

Course Goal Example	Learning Objective	Type of Learning	Example of Instructional Strategy
Psychology: To develop a comprehensive understanding of modern psychological theories	The learner will be able to analyze five key psychological theories using evidence-based research	Cognitive Learning Cognitive Strategies	Engage students in research activities that require the analysis of psychological literature, case studies, and peer-reviewed articles. Incorporate critical thinking exercises that focus on contrasting psychological theories.
Communication: Gain proficiency in written and oral communication skills	Learner will deliver a 10-minute presentation on a chosen topic that demonstrates clear organization and persuasive communication	Affective Learning Intellectual Skill (application)	Implement a series of public speaking exercises, including peer review feedback sessions. Utilize video recording for students to self-assess their presentation skills.
Computer Science: Understand the principles of human-computer interaction	Learner will design a user interface for a mobile app that adheres to best practices in usability and accessibility.	Psychomotor Learning Cognitive Strategies	Use cloud-based development environments that allow students to code and test applications remotely. Create guided tutorials with step-by-step instructions for using development tools and frameworks relevant to mobile app development. Assign practical tasks that involve using these tools to build app components.

Note. Each learning objective aligns with a domain of learning – cognitive (knowledge-based), affective (emotion-based), or psychomotor (action-based), indicating the type of learning involved.

Guiding Questions:

What is\are the course's overall learning goal(s)?

What is\are the lesson or class learning objectives? Or What specific skills or knowledge should learners acquire by the end of this class?

How do these learning objectives align with the overall goals of the course?

What is the learning objectives domain of learning or type of outcome?

How do these learning objectives reflect the intended learning outcomes?

Which of Gagne's learning outcomes categories are most relevant to this lesson objectives?

How can instructional strategies be chosen to address these specific categories effectively?

Section 6: Learning Theory and Pedagogy

What?

Learning theory is rooted in psychology that seeks to understand how people learn and acquire new skills and knowledge. It explores the role of human behavior, cognition, and mental processes in learning. The theory explains how people acquire new information, retain it, and utilize it to enhance their performance in various domains (Picciano, 2021).

Why?

Learning theories provide a foundation for instructional strategy selection, enabling reliable predictions of their effectiveness. Foundational knowledge about individual learning helps educators choose appropriate strategies. Learning theories guide and inform the decision-making process when choosing instructional strategies, ensuring that teaching methods align with our understanding of how learning best occurs (Hirumi, 2021). By understanding the principles of learning theory, we can develop effective instructional methods and strategies that enable learners to acquire and apply new knowledge and skills effectively.

How?

Operationalizing learning theory into instructional strategies: To operationalize learning theory into strategy application in teaching and learning means to take abstract concepts and principles from learning theories and transform them into tangible, actionable strategies or practices that can be implemented in a teaching and learning environment. It involves:

- Identification of Relevant Theories: Recognizing and understanding learning theories that are pertinent to the specific educational context or audience. For example, in these guidelines, much attention is given to foundational learning theories such as behaviorism, cognitivism, constructivism, and social learning. However, strategies are not limited to these theories and can be expanded. It is worth noting that some instructional strategies can align with multiple theories. For example, problem-based approaches can be consistent with behaviorism, cognitive theory, constructivism, and social learning.
- Breaking Down Theory: Analyzing the key components or principles of the chosen learning theory.
- Development of Strategies: Designing teaching methods, activities, and assessments that align with the principles of the chosen learning theory and learning outcomes.
- Implementation: Applying these strategies in the real-world teaching and learning environment.
- Evaluation and Feedback: Continuously assessing the effectiveness of the implemented strategies, gathering feedback from students, and making necessary adjustments to improve learning outcomes.

For example, if the instructor chooses to operationalize the constructivist learning theory approach, they might employ strategies like problem-based learning, group discussions, and real-world applications, ensuring students are actively constructing their own knowledge rather than passively receiving information. Table 8 presents additional strategies based on learning theories.

Table 8

Instructional Strategies Based on Learning Theories

Behaviorism: Observable behavior is influenced by stimulus. (Skinner, 1938).					
Strategy	Source	Definition	Classification	Online learning Type	Example
Shaping	(Ormrod, 2020) (Woolfolk, 2016)	Shaping involves reinforcing increasingly closer approximations to the desired behavior. Shaping is useful for building complex skills and increasing persistence.	Instructional approach	Synchronous Asynchronous	Start presenting information that the student is already familiar with. Then, the new information is broken down into small, manageable pieces, and the instruction gradually progresses by presenting increasingly complex pieces. As the student successfully answers questions of increasing difficulty, mastery of the topic is gradually achieved. -In online language courses, a step-by-step approach is used to introduce basic vocabulary and sentence structures. The complexity of language tasks gradually increases, with the instructor guiding and reinforcing closer approximations to fluent

					language use. Interactive online exercises provide immediate feedback, reinforcing correct language usage and gently correcting mistakes. This helps students develop and refine their language skills progressively, moving closer to language fluency. See the Scaffolding strategy below.
Personalized System of Instruction (PSI)/ Mastery Learning:	(Driscoll, 2014) (Keller, 1968) (Ormrod, 2020)	This approach considers individual student needs and preferences for a more customized learning experience. The key principles of PSI, such as personalized pacing, focus on mastery learning, formative assessment, and social interaction.	Content Sequencing	Asynchronous	Divided online course content into specific segments or modules. Each module has clear goals that outline the expected learning outcome. These modules are organized in a systematic order, often aligning with textbook chapters, and focus on self-paced learning for each student. This design allows students to work at their own pace, with assessments and feedback provided along the way to help them recognize their own level of competence. Social interaction can also be facilitated through online discussion forums or group projects. Example 1

Direct instruction	(Bronkey, 2015) (Joyce et al., 2015)	The teacher explains new concepts, allows controlled practice, and provides guided practice. It would consist of three main components: modeling, guided practice with formative feedback, and independent practice.	Instructional approach Instructional component	Synchronous Asynchronous	The instructor begins a module by explaining key concepts using a live or pre-recorded video lecture. This direct instruction method introduces students to new concepts in a structured manner. After the lecture, students engage in interactive exercises such as online quizzes or problem sets. These activities are designed to reinforce the newly introduced concepts, allowing students to apply them in a controlled setting. The instructor then conducts a synchronous online session where students work on more complex problems while receiving real-time guidance and feedback. This session could also include breakout rooms for small group discussions, further facilitating guided practice. The instructor provides feedback on student submissions and conducts assessments to gauge understanding and address any misconceptions. Example 1 Example 2

Reinforcement	(Ormrod, 2020) (Sambolt, 2020)	is a concept in behavioral psychology that involves the use of rewards or punishment to increase or decrease the likelihood of a behavior being repeated in the future. In other words, reinforcement is a process of shaping behavior by providing consequences that strengthen or weaken the behavior. Some examples of positive reinforcement include social reinforcement, activity reinforcement, token reinforcement, positive feedback	Instructional component	Synchronous Asynchronous	Positive Feedback on Assignments: When students submit assignments, they receive immediate, positive feedback for correct answers and thoughtful responses. This feedback acts as a reinforcer, encouraging students to continue engaging with the course material actively. Example
Practice/ drill-and-practice	(Ertmer & Newby, 2013) (Joyce et al., 2015)	Practice is the repetitive engagement in an activity with the intent to improve performance over time. To master a skill, learners must engage in deliberate practice by repeatedly performing the exact task they wish to excel at.	Instructional component	Synchronous Asynchronous	Structured practice Guided practice, independent practice (Ertmer & Newby, 2013) Example
Cueing and Prompting	(Drew, 2023a) (Woolfolk, 2016)	Cueing involves presenting a stimulus before a specific behavior occurs and directing attention to relevant aspects. The prompt is an additional cue that follows the first cue to provide further guidance.	Instructional component	Synchronous Asynchronous	Cueing and prompting can take various forms, such as verbal comments, nonverbal signals like gestures, modeling, or visual aids, including videos. Example

					(Drew, 2023)
Cognitivism: An internal process that is influenced by various internal and external factors. (Piaget, 1930)					
Strategy	Source	Definition	Classification	Online learning Type	Example
Elaboration	(Hamilton, 2012) (Maine Department of Education, 2023) (Woolfolk, 2016)	Elaboration refers to the process of adding meaning to new information by connecting it with existing knowledge. It is a technique of encoding the original content in a different but related way. There are various instructional strategies that support elaboration, including Think-Pair-Share, Graphic Organizers, Summarizing and Paraphrasing, and Compare and Contrast.	Instructional component	Asynchronous	Interactive Discussion Forums: Online forums are used where students elaborate on the lesson's content by discussing how the new concepts connect with previous lessons or their existing knowledge. This active engagement helps solidify their understanding of the new material. More Details.
Dual code, multiple memory connections	(Driscoll,2014) (Ormrod, 2020)	Dual code, multiple memory connections: Dual code can enhance memory by encoding information in multiple ways and modes. Utilizing acronyms and imagery, including visual imagery, aids in the formation of mental pictures of objects and ideas.	Instructional component	Synchronous Asynchronous	Video lectures that narrate key concepts while displaying relevant images, charts, or animations help students encode information through both auditory and visual channels, making the learning experience more engaging and memorable.

Organization	(Woolfolk, 2016)	Organization: an element of processing that improves learning. Well-organized material is easier to comprehend and recall, particularly if it is complex or extensive. Chunking is a helpful technique for organization, which involves grouping small bits of information into a larger, more meaningful chunk.	Instructional approach Instructional component	Synchronous Asynchronous	Module Division: In an online computer science course, the course or lesson content is divided into modules, each focusing on a specific aspect of computer science, like programming basics, data structures, algorithms, and software development. This division helps organize extensive information into manageable segments. Instruction
Concept mapping	(Drew, 2023b) (Novak & Cañas, 2008) (UNC-Chapel Hill Learning Center, 2022)	Concept mapping: refers to a visual tool that aids in the organization and representation of knowledge. It involves concepts enclosed in circles or boxes, with connecting lines that show the relationships between the concepts. These lines contain linking words or phrases that specify the nature of the relationship between the two concepts. By using concept maps, learners can visualize how to link newly acquired information with what they already know. Concept maps can take various forms, such as charts, graphic organizers, tables, flowcharts, Venn Diagrams, timelines, or T-charts.	Instructional component	Synchronous	Example 1 Example 2 Example 3

Problem-solving	(Drew, 2023b) (Ormrod, 2020)	Problem-solving is a cognitive learning strategy that requires identifying issues and determining the optimal ways to address them. It involves utilizing previously acquired knowledge and skills to manage an unanswered question or troublesome situation. Related strategy: Brainstorming means–ends analysis, working backward, using visual imagery, drawing an analogy, and using external representations of problem components.	Instructional component	Synchronous	In this approach, students analyze a case study, identify problems, and propose solutions based on a class-selected related theory. They then have group discussions to brainstorm different approaches. Each student/group presents their proposed solution, justifying it with relevant theories, data analysis, and market research. Finally, students reflect on the problem-solving process and discuss what they learned. Example 1 Example 2
Examples/Nonexample	(Reigeluth & Keller, 2009) (Woolfolk, 2016)	An example is a specific instance that demonstrates the application of a concept or illustrates its key attributes. A non-example, on the other hand, is an instance that does not apply the concept or fails to demonstrate its key attributes. By providing both examples and non-examples, learners can develop a more nuanced understanding of the concept and its distinguishing features. This approach also helps learners to identify misconceptions and clarify any misunderstandings they may have about the concept.	Instructional component	Synchronous Asynchronous	It can be provided by the instructor or asked to be provided by learners. It can take many formats, e.g., text-based, image, video, and audio. Example 1 Example 2

Reflection / Journaling	(Reigeluth & Keller, 2009) Wang & Hargis, 2021)	A metacognitive approach can assist learners in gaining a more profound and comprehensive comprehension of an experience by evaluating their work against a predetermined standard or analyzing the changes they have undergone as a result of the learning experience. This approach enables individuals to acquire a better understanding of their own thought processes and how they can improve their learning outcomes.	Instructional component	Asynchronous	Reflective Journals: The instructor may ask students to maintain a reflective journal throughout the course, where they record their thoughts, understandings, and questions about each topic covered. This practice encourages them to think deeply about what they have learned and how it relates to their prior knowledge or experiences. Example
Constructivism: Constructing' knowledge in our minds, learning actively through experience, social interaction, **Social Learning:** Learning in the social context, culture, and interactions among learners (Vygotsky, 1978) (Piaget, 1970) (Bandura, 1977)					
Strategy	Source	Definition	Classification	Online learning Type	Example
Collaborative/ Cooperative learning	(Doolittle, 2023) (Gillies, 2003)	Cooperation is a collaborative approach to achieving a common goal by working with others. It involves students working together to find solutions to problems. To implement a cooperative learning method, a teacher can assign students to work in groups to achieve a specific task. It involves working with others in a group, and it can take	Instructional approach Instructional component	Asynchronous Synchronous	Group Project Assignments: Students are divided into small groups and assigned a project management task, such as creating a project plan for a hypothetical client. Each group member is assigned specific roles and responsibilities, promoting interdependence and cooperation.

		various forms, including discussion, think-pair-share, presentation, or jigsaw.			Jigsaw Technique for Learning Modules: Each student in a group is assigned a different aspect of project management (like risk management, budgeting, and scheduling) to research and learn. Afterward, they 'teach' their area of expertise to their group members, ensuring that everyone gains comprehensive knowledge of the subject. Think-Pair-Share in Live Online Sessions: During live video sessions, students are paired to discuss a specific problem or case study. After discussion, they share their insights with the larger group, encouraging active participation and exchange of ideas. Example 1 Example 2 Example 3
Scaffolding	(Joyce et al.,2015) (Reigeluth & Keller, 2009)	Scaffolding is a process of providing guided support to students. This support is gradually reduced as the student's abilities improve, leading to increased performance standards.	Instructional approach	Asynchronous Synchronous	Early in an online programming course, students are provided with detailed, step-by-step video tutorials and guided exercises on basic programming concepts. This foundational guidance helps build initial understanding and skills. Then, as the course progresses, the level of detailed guidance is gradually reduced.

					Students start working on more complex programming tasks with fewer instructions, encouraging them to apply their learned skills independently. Example 1 Example 2
Problem-based Learning	(Doolittle, 2023) (Driscoll, 2014)	Problem-based learning (PBL) students work collaboratively in groups to solve a real-world, ill-structured, or open-ended problem. They have the flexibility to explore various resources, to arrive at potential solutions. The main emphasis of PBL is on providing students with a systematic problem-solving process. They are required to identify the problem, assign tasks, gather and analyze data, seek resources, and arrive at a solution. Once the problem is solved, the learners reflect on their reasoning, strategies, and group skills.	Instructional approach	Asynchronous Synchronous	Example 1 Example 2 Example 3
Inquiry-based learning	(Driscoll, 2014) (Fielding, 2012) (Pinhorn, 2020)	Inquiry-based learning places students at the center of their own learning. For students, they seek to develop answers to guiding questions of their interest through interactions with peers, where they challenge and test each other's ideas. Learning	Instructional approach	Asynchronous Synchronous	Example 1 Example 2

		involves open-ended investigations, evidence-based reasoning, problem-solving, and problem-finding. Educators need to be responsive to students' learning needs and introduce ideas that move them forward in their inquiry			

Finally, it is worth noting that when we understand how learners learn, we can conclude that some Instructional strategies simultaneously incorporate multiple learning theory principles. For instance, discussion strategies in teaching effectively incorporate principles from multiple learning theories. Theories such as constructivism emphasize the role of interaction and experience in knowledge construction, and social learning theory highlights the importance of modeling and observational learning. Discussions also align with cognitive theory principles, as they encourage the active processing of information and linking it to prior knowledge. By combining these theories, discussion strategies create a rich learning environment where students are not just passive receivers of information but active participants in their learning journey.

Guiding questions:

Which learning theory (or theories) best aligns with the learning objectives, characteristics of the student, and learning environment?

How might elements from different theories be integrated to address diverse learning needs?

What instructional strategies align with these theories?

What kinds of learning activities and assessments would align with the learning outcomes and the principles of the chosen learning theories?

How would these strategies be implemented in an online environment?

How could the effectiveness of the selected strategies be evaluated and revised?

APPENDIX B

IRB APPROVAL

Division of Scholarly Integrity and Research Compliance
Institutional Review Board
North End Center, Suite 4120 (MC 0497)
300 Turner Street NW
Blacksburg, Virginia 24061
540/231-3732
irb@vt.edu
http://www.research.vt.edu/sirc/hrpp

VIRGINIA TECH.

MEMORANDUM

DATE: January 24, 2024

TO: Barbara B Lockee, Bushra Abdulkarim Alghamdi

FROM: Virginia Tech Institutional Review Board (FWA00000572)

PROTOCOL TITLE: Guidelines for Informed Instructional Strategy Selection in Online Higher Education: A Design and Development Study

IRB NUMBER: **24-053**

Based on the submitted project description and items listed in the Special Instructions section found on Page 2, the Virginia Tech Human Research Protection Program (HRPP) has determined that the proposed activity is not research involving human subjects as defined by HHS and FDA regulations.

Further review and approval by the Virginia Tech Human Research Protection Program (HRPP) is not required because this is not human research. This determination applies only to the activities described in the submitted project description and does not apply should any changes be made. If changes are made you must immediately submit an Amendment to the HRPP for a new determination. Your amendment must include a description of the changes and you must upload all revised documents. At that time, the HRPP will review the submission activities to confirm the original "Not Human Subjects Research" decision or to advise if a new application must be made.

If there are additional undisclosed components that you feel merit a change in this initial determination, please contact our office for a consultation.

Please be aware that receiving a "Not Human Subjects Research" Determination is not the same as IRB review and approval of the activity. You are NOT to use IRB consent forms or templates for these activities. If you have any questions, please contact the Virginia Tech HRPP office at 540-231-3732 or irb@vt.edu.

PROTOCOL INFORMATION:

Determined As: **Not Human Subjects Research**
Protocol Determination Date: **January 24, 2024**

ASSOCIATED FUNDING:

The table on the following page indicates whether grant proposals are related to this protocol, and which of the listed proposals, if any, have been compared to this protocol, if required.

APPENDIX C

EXPERT REVIEWER EMAIL INVITATION

Dear Dr. _____

My name is Bushra Alghamdi, and I am a PhD Candidate in the Instructional Design and Technology program at Virginia Tech. I am reaching out to you as I understand that you are an expert in the field of instructional design and online learning. I would like to extend an invitation to you to evaluate a guideline that I am working on for my dissertation, under the supervision of Dr. Barbara B. Lockee (lockeebb@vt.edu). Please note that your participation in this study is completely voluntary.

The purpose of this study is to develop theoretical and literature-supported guidelines that can assist higher education instructors and course developers in selecting the appropriate instructional strategy in online learning environments.

The study utilizes design and development research and is categorized as tool development (Type I) development research. This design and development methodology includes the following phases: Analysis, Design, Development and Revision, and Evaluation.

In the analysis phase, I conducted a comprehensive literature review of the instructional strategy and the factors affecting the selection of instructional strategies in the online environment. During the design phase, I outline the process of selecting instructional strategies for online learning and consider the factors that influence strategy decision-making. In the development phase, I design initial guidelines based on relevant literature. Finally, the evaluation phase requires expert reviewers to evaluate the guidelines by providing feedback and recommendations and identifying areas for improvement.

Additional information regarding the study in the consent form will be available on the shared **project link here**. You are not required to provide a signature, and you will be given the chance to indicate your voluntary agreement to participate as an expert reviewer on the first page of the online survey form.

Once you accept this invitation, we will provide you with a folder shared link that includes all the necessary information. This information includes a) an overview of the dissertation, b) an informed consent form, c) proposed guidelines, and d) a survey link.

Your participation in the review process would require approximately an hour of your time, and you can extend it over a two-week period. You will also have the option to be acknowledged by name for your valuable contribution as an expert reviewer or maintain confidentiality if you prefer.

The deidentified feedback is collected and reviewed in order to re-iterate or fix the framework into a new version for the dissertation's final draft. I would greatly appreciate your expertise in reviewing and improving the guidelines. I would appreciate your participation and am open to answering any questions. Thank you for your time and expertise.

Sincerely,
Bushra Alghamdi
Ph.D. Candidate, Instructional Design & Technology

APPENDIX D

EXPERT REVIEWER REMINDER EMAIL

Dear Dr _____

I recently contacted you to request your participation as an expert reviewer of the "Guidelines for Informed Instructional Strategy Selection in Online Higher Education".

If you have already completed the expert review, I would like to thank you for completing the expert review. Your time and effort are greatly appreciated.

However, if you haven't completed it yet and are still interested in doing so, kindly complete the review by the given deadline. Your input is highly valuable, and I look forward to hearing from you soon.

Sincerely,

Bushra Alghamdi
Ph.D. Candidate, Instructional Design & Technology

APPENDIX E

INFORMED CONSENT FORM

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY Informed Consent for Participants in Research Projects Involving Human Participant

Title of Project: Guidelines for Informed Instructional Strategy Selection in Online Higher Education: A Design and Development Research

IRB# 24-053

Investigator(s) Name: Bushra Alghamdi, Ph.D. candidate, School of Education, Virginia Tech

E-mail / Phone number: bushra@vt.edu (703-505-5281)

Academic Advisor: Dr. Barbara Lockee

Email: lockeebb@vt.edu

I) Purpose of this Study

The aim of this study is to develop guidelines for selecting appropriate instructional strategies in online learning environments in higher education. The guidelines are developed by analyzing relevant literature and feedback from expert reviewers. The proposed guidelines are expected to aid course developers and educators in selecting strategies for creating online courses and lessons.

II) Procedure

The researcher will send the expert reviewers an email that includes the initial guidelines document, the consent form, and the evaluation rubric in the survey. The reviewers will be asked to provide their feedback within two weeks to complete the review and provide evaluation feedback using the online rubric in Google Forms. The study results may be published or presented for research purposes.

III) Risks

In this research project, there are no anticipated risks to you as participant.

IV) Benefits

This design and development research will benefit the participants and intended audience (i.e., higher education instructors and course developers) by improving their ability to create engaging and effective online courses that enhance the learning experience for students. This will ultimately lead to better outcomes for students and a more successful learning environment for everyone involved. Implementing the design and development research method, the guidelines development result may contribute to improving the instructional design process and practice in online learning and will also add to the literature on instructional design and online learning. The guidelines will be reviewed and validated by experts in the field, and their feedback will be used to revise and improve it. You can request a summary of the research study results at any time once they are available. Please note that no promises or guarantees were made to motivate your participation in the study.

V) Extent of Anonymity and Confidentiality

When you participate in this study, you will have the option to include your name, affiliation, title, and field in the Google form survey, which will be published along with the study. We guarantee that your participation in this study is confidential and that only the study researchers will know your name. Unless you indicate otherwise in writing to the researchers, we will make every effort to ensure that your identity remains confidential throughout the study. The Virginia Tech (VT) Institutional Review Board (IRB) may access the study's data for auditing purposes. The IRB is responsible for overseeing the protection of human subjects involved in research.

VI) Compensation

Please note that you will not be receiving any form of compensation for taking part in this study.

VII) Freedom to Withdraw

Your involvement in this study is entirely optional, and you are free to withdraw at any time without facing any consequences. Additionally, if you decide not to participate, you won't face any penalties or lose any benefits that you're entitled to. If you choose to withdraw from the study, we will immediately stop collecting your data and end the survey. Your decision is entirely up to you, and we respect it.

VIII)Questions or Concerns

If you have any questions or concerns regarding this study, please do not hesitate to contact the investigators (Bushra Alghamdi: bushra@vt.edu, Faculty Advisor: Dr. Barbara Lockee: lockeebb@vt.edu). If you have any questions or concerns regarding the study or your rights as a participant, or if you experience a research-related injury or event, please contact the Virginia Tech Institutional Review Board at 540-231-3732 or email irb@vt.edu

IX) Participants' Responsibilities

- Review the guidelines document.
- Please fill out the online survey and submit it electronically.
- Kindly indicate in writing whether you'd like to be acknowledged as an expert reviewer in the research reporting or not. If you choose not to, your name will be kept confidential.

X) Subject's Consent

I hereby acknowledge that I have read and understood the Consent Form and conditions of this project, and that all my questions have been answered. I give my voluntary consent:

Date:
Subject signature:
Subject printed name:

APPENDIX F

EXPERT REVIEW SURVEY

The goal of this research is to establish a set of recommendations for guidelines for selecting appropriate instructional strategies in online learning environments for higher education. The proposed guidelines are expected to aid course developers and educators in selecting strategies for creating online courses and lessons. It is recommended that you use this survey as a rubric write your notes while you review the guidelines. The guidelines can be accessed here. - **"An Instructional Strategy Selection Guidelines for Online Learning in Higher Education."**
This survey consists of three parts. The first part examines the overall design of the guidelines. The second part focuses on the practical application and content of the guidelines. The third part examines the efficacy, feasibility, and real-world limitations of implementing the guidelines as a whole. We would greatly appreciate your feedback and input.

Please feel free to raise any questions or concerns you may have about the review process with Bushra Alghamdi, Ph.D. Candidate in Instructional Design and Technology (bushra@vt.edu). Your input is critical, and we appreciate any feedback you can provide.

I have read and understood the consent form. I am voluntarily giving my consent by answering the survey questions.
Yes
No

Optional: (If you provide the requested information, you will be credited by name when the study is published)
Name:
Affiliation:
Title:
Field:

Part 1: Overall Design of the Guidelines
This part includes questions about the guidelines' design and organization. Please share any feedback you have regarding the guidelines' overall design. In case you have answered Disagree or Strongly Disagree to any question, kindly provide specific suggestions for improvement.

1. The guidelines provide a clear and detailed description of its purpose and intended usage.
   * Mark only one oval.
   Strongly disagree Disagree Neutral Agree Strongly agree

2. Please provide any additional comments and suggestions:

3. The instructions provided for using the guidelines are clear, sufficient, and easy to understand.
   Strongly disagree Disagree Neutral Agree Strongly agree

4. Please provide any additional comments and suggestions:

5. The guidelines' organization and format effectively serve their purpose and use.
   Strongly disagree Disagree Neutral Agree Strongly agree

6. Please provide any additional comments and suggestions:

7. Please provide any additional feedback and suggestions to improve the overall design of the guidelines.

Part 2: Application and Content of the Guidelines:
This part focuses on the content of the guidelines, which include a total of six sections. The first section is the instructional strategy introduction. The following part are the five factors to consider when selecting instructional strategies for online teaching and learning, including the online learning context, online learning mode, learners' characteristics and needs, learning outcomes, and learning theory and pedagogy. In the guidelines, each factor has it is own section that includes a definition (what), purpose (why), usability (how), and guiding questions (application) supported by relevant resources and examples. Please provide feedback related to each section of the guidelines.

Section 1: The Introduction to Instructional Strategies

8. The key components of the Introduction to Instructional Strategies section are both appropriate and sufficient.
   Strongly disagree Disagree Neutral Agree Strongly agree

9. Please provide any additional comments and suggestions:

10. The Introduction to Instructional Strategies section content is clear and easy to understand.
    Strongly disagree Disagree Neutral Agree Strongly agree

11. Please provide any additional comments and suggestions:

12. The Introduction to Instructional Strategies section content is based on relevant research and essential practices for selecting appropriate instructional strategies.
    Strongly disagree Disagree Neutral Agree Strongly agree

13. Please provide any additional comments and suggestions:

Section 2: Analyzing the Online Learning Context

14. The key components of analyzing the online learning context section are both appropriate and sufficient.
    Strongly disagree Disagree Neutral Agree Strongly agree

15. Please provide any additional comments and suggestions:

16. Analyzing the online learning context section content is clear and easy to understand.
    Strongly disagree Disagree Neutral Agree Strongly agree

17. Please provide any additional comments and suggestions:

18. Analyzing the online learning context section content is based on relevant research and essential practices for selecting appropriate instructional strategies.
    Strongly disagree Disagree Neutral Agree Strongly agree

19. Please provide any additional comments and suggestions:

Section 3: Online Delivery Mode

20. The key components of the online delivery mode section are both appropriate and sufficient.
    Strongly disagree Disagree Neutral Agree Strongly agree

21. Please provide any additional comments and suggestions:

22. The online delivery mode section content is clear and easy to understand.
    Strongly disagree Disagree Neutral Agree Strongly agree

23. Please provide any additional comments and suggestions:

24. The online delivery mode section content is based on relevant research and essential practices for selecting appropriate instructional strategies.
    Strongly disagree Disagree Neutral Agree Strongly agree

25. Please provide any additional comments and suggestions:

Section 4: Analyzing the Learners' Characteristics

26. The key components of analyzing the learners' characteristics section are both appropriate and sufficient.
    Strongly disagree Disagree Neutral Agree Strongly agree

27. Please provide any additional comments and suggestions:

28. Analyzing the learners' characteristics section content is clear and easy to understand
    Strongly disagree Disagree Neutral Agree Strongly agree

29. Please provide any additional comments and suggestions:

30. Analyzing the learners' characteristics section content is based on relevant research and essential practices for selecting appropriate instructional strategies.
    Strongly disagree Disagree Neutral Agree Strongly agree

31. Please provide any additional comments and suggestions:

Section 5: Identifying the Learning Outcomes

32. The key components of identifying the learning outcomes section are both appropriate and sufficient.
    Strongly disagree Disagree Neutral Agree Strongly agree

33. Please provide any additional comments and suggestions:

34. Identifying the learning outcomes section content is clear and easy to understand
    Strongly disagree Disagree Neutral Agree Strongly agree

35. Please provide any additional comments and suggestions:

36. Identifying the learning outcomes section content is based on relevant research and essential practices for selecting appropriate instructional strategies.
    Strongly disagree Disagree Neutral Agree Strongly agree

37. Please provide any additional comments and suggestions:

Section 6: Learning Theory and Pedagogy

38. The key components of the learning theory and pedagogy section are both appropriate and sufficient.
    Strongly disagree Disagree Neutral Agree Strongly agree

39. Please provide any additional comments and suggestions:

40. The learning theory and pedagogy section content is clear and easy to understand
    Strongly disagree Disagree Neutral Agree Strongly agree

41. Please provide any additional comments and suggestions:

42. The learning theory and pedagogy section content is based on relevant research and essential practices for selecting appropriate instructional strategies.
    Strongly disagree Disagree Neutral Agree Strongly agree

43. Please provide any additional comments and suggestions:

Part 3

This part discusses the practicality, effectiveness, and potential real-world limitations of using guidelines to select instructional strategies in online higher education.

44. On a scale of 1-5, indicate how you agree or disagree that the following indicators are applicable to the guidelines, with (1) representing strongly disagree and (5) strongly agree
    A. Usefulness: The guidelines are useful for practical application.
       1 2 3 4 5

    B. Functionality: The guidelines support their intended purpose.
       1 2 3 4 5

    C. Feasibility: The guidelines are feasible for real-world use.
       1 2 3 4 5

    D. Relevant: The guidelines are appropriate for educators in higher education.
       1 2 3 4 5

    E. Easy to understand: The guidelines are clear and easy to follow.
       1 2 3 4 5

    F. Reliable: The information in the guidelines can be trusted.
       1 2 3 4 5

    G. Adequate: The guidelines are comprehensive and sufficient.
       1 2 3 4 5

45. Please indicate how strongly you believe each factor could impact the guidelines' usage.

    A. Budget
       Strongly disagree Disagree Neutral Agree Strongly agree

    B. Time
       Strongly disagree Disagree Neutral Agree Strongly agree

    C. Complexity of the procedure to be taught.
       Strongly disagree Disagree Neutral Agree Strongly agree

D. Technical nature of the content to be developed.
Strongly disagree Disagree Neutral Agree Strongly agree

E. Level of expertise
Strongly disagree Disagree Neutral Agree Strongly agree

46. How effective do you think the guidelines are in achieving their goal of providing instruction to select an instructional strategy for online learning in higher education?
Very effective Somewhat effective Not effective

47. If you selected Somewhat effective or Not effective, please explain your response

48. The guidelines are presented in an organized manner that supports their goal and intended use.
Yes.
No.

49. If you selected no, please indicate how to improve the organization and format of the guidelines.

50. Please share any further recommendations or suggestions you may have regarding how we can enhance the guidelines for selecting instructional strategies for higher education online teaching and learning.

Thank you for your feedback.

APPENDIX G

REVISED GUIDELINES

Instructional Strategy Selection Guidelines for Online Learning in Higher Education

Developed by:

Bushra Alghamdi

Academic Advisor:

Dr. Barbara Lockee

Table of Contents

Section One

Purpose and Use of Instructional Strategy Selection Guidelines

The COVID-19 pandemic has highlighted the need for better infrastructure and training to support remote learning in higher education. As the demand for online instructors increases, it is crucial for them to be well-prepared to teach effectively in the online environment. To ensure the quality of online education, faculty members need to develop the necessary skills to succeed in the virtual classroom.

Instructional strategy selection is a vital pedagogical component of online learning as it directs the effective teaching and learning process. The rapid growth of online education has also led to an increased demand for effective instructional strategies in online learning environments across disciplines. However, selecting appropriate instructional strategies for online teaching and learning can be a complex and challenging process.

To support this process, this guide aims to provide evidence-based direction to educators in higher education for selecting effective instructional strategies in online learning environments. The guidelines will help to equip faculty with valuable resources to engage students effectively in remote settings and better accommodate diverse student populations, thereby contributing to improving the quality of online educational experiences.

This guide will prioritize pedagogical approaches and support faculty in selecting appropriate instructional strategies for online learning. In this guide, the first section explains instructional strategy definition, types, and the factors influencing the selection of instructional strategy in the online learning environment. The following sections explain each factor, including the online learning context, online learning mode, learners' characteristics and needs,

learning outcomes, and learning theory and pedagogy. The primary focus of this guide will be on selecting instructional strategies along with practical examples and resources.

Instructions on How to Use the Guidelines:

To effectively use the guidelines in the instructional strategy selection process, each factor should be organized as follows:

9. Definition (What?): Clearly define each factor of the instructional strategy. This involves describing the component and its role in the overall strategy selection.
10. Purpose (Why?): Explain the purpose of each factor. This includes detailing why the element is essential in the instructional strategy and its intended outcomes.
11. Instructional Application, Resource, and Example (How?): Provide instructional resources and examples of how the element has been used effectively. This could include links to resources or case studies demonstrating the successful implementation of the factor affecting strategy selection.
12. Guiding Questions for User Application: Offer guiding questions to help users apply the strategies in their instructional context. These questions should prompt educators to think about how they can adapt and implement the factors for selecting strategies in their own online teaching.

Note: A simplified version of the guidelines with guiding questions for each category is provided in Appendix A.

How to Use this Guide Checklist:

Definition (What?)

1. Understand and define each factor that affects the selection of the instructional strategy □
2. Describe its component and its role in the overall strategy selection. □

Purpose (why?)

3. Understand the purpose of each factor □
4. Detail why the element is essential in the instructional strategy and its intended outcomes □

Instructional application, resource, and example (how?)

5. Review the instructional resources and examples of effective use. The links to resources or case studies demonstrating successful implementation □

Guiding questions for user application

6. Think about adaptation and implementation in your own online teaching □
7. Use the guiding questions for the application □

Introduction to Instructional Strategies

In order to gain a deeper understanding of instructional strategies and their impact on student learning and instructional design, it is important to connect this section to relevant research and review relevant literature included in this part. There is a vast array of studies and literature available on this topic; thus, users and educators can gain valuable insights into best practices for instructional design and delivery, as well as strategies for promoting student learning and success.

What is an Instructional Strategy?

An instructional strategy describes the techniques and methods teachers or instructors use to deliver content and achieve learning objectives (Hill & Jordan, 2021). In essence, these strategies are the methods used to ensure that students understand and learn academic content. The primary goal of instructional strategies is to facilitate effective teaching and learning, enabling students to achieve specific learning outcomes and engage students in the learning process.

Instructional strategies are also commonly referred to as teaching methods, techniques, and activities (Larson & Lockee, 2020). These terms, while sometimes used interchangeably, may have nuanced differences depending on the context or specific educational framework in which they are used. However, they all pertain to the approaches, methods, and techniques educators employ to deliver content and facilitate learning (Reigeluth & Keller, 2009).

Type of Instructional Strategy:

Instructional strategies encompass a wide range of teaching and learning activities. Larson and Lockee (2020) define these as activities, exercises, and methods that facilitate learning. The distinction between teaching and learning strategies is crucial: teaching strategies

are approaches used by instructors, focusing on the delivery of content, while learning strategies are employed by students, emphasizing their role in the learning process.

There are several ways to classify instructional strategies. One classification, by Dick et al. (2015) and Richey et al. (2010), divides strategies into micro and macro strategies. Micro strategies are specific tactics employed by instructors for certain learning objectives, like using visual aids or leading discussions. Macro strategies, however, define the overall structure of a lesson or unit, setting the sequence of events and goals. Another name for this type is an instructional framework, which serves as an organizational structure that coordinates various instructional strategies, such as cooperative learning, reciprocal teaching, and think-pair-share. The line between class strategies and structure strategies can sometimes be unclear (Doolittle, 2023). For instance, Doolittle (2023) suggests various strategies, such as lectures, group work, flipping classes, and problem-based structures, that can be utilized as class structures. Reigeluth (1983) categorizes strategies based on their function, naming three key components: content organization, media delivery, and management. Organizational strategies handle content presentation, ensuring a logical sequence. Delivery strategies are about choosing the right medium and grouping learners appropriately. Management strategies, as explained by Smith and Ragan (2005), oversee these other strategies, coordinating instructional events and resources. This classification can be considered as a framework for instructional strategies.

Organizational Strategies

Reigeluth and Keller (2009) classify organization strategies into three types: instructional approach, instructional component, and content sequencing, as presented in Table 1. First, when designing instruction, it is essential to consider the instructional approach, which provides a general direction for teaching, such as project-based learning, direct instruction, or collaborative

learning and learning, and this type may include components strategy such as practice. Second, it is crucial to select appropriate instructional components depending on the specific situation, such as providing opportunities for practice or coaching. Third, content sequencing should be considered, which involves organizing the learning material logically and coherently, such as by organizing it from easy to difficult. These factors work together to create an organization's comprehensive and effective strategy for teaching and learning.

Smith and Ragan (2005) introduce another classification based on the level of support: supplantive and generative strategies. Supplantive strategies provide more guidance and structure, benefiting novice learners or complex tasks. Generative strategies, on the other hand, allow learners more autonomy in their learning, promoting active engagement and critical thinking.

Both supplantive and generative strategies have their merits. While generative approaches can yield better outcomes for knowledgeable learners, they might overwhelm novice learners. Supplantive strategies offer more support but might be less engaging for some (Dabbagh, 2003). A successful instructional design considers the balance between these strategies, taking into account factors like learner characteristics and content complexity.

Table 1

Instructional Strategy Classification

Category	Definition & Classification	Source
Basic Classification	- Teaching strategies: approaches used by instructors focusing on content delivery. - Learning strategies: used by students to emphasize their role.	(Larson & Lockee, 2020)
Size Classification	- Micro strategies: Specific tactics for certain objectives (e.g., using visual aids, leading discussions).	(Dick et al., 2015; Richey et al., 2010)

Category	Definition & Classification	Source
Function Classification	- Macro strategies: Define the overall structure of a lesson (sequence & goals). - Content organization: Handles content presentation in a logical sequence. - Media delivery: Choosing the right medium and grouping learners. Related to the learning environment and mode. - Management: Coordinating instructional events and resources. Related to the learning context and management system.	(Reigeluth, 1983; Smith & Ragan, 2005)
Organization Strategy Classification	- Instructional approach: general direction and may include components (e.g., PBL, direct instruction, collaborative learning) - Instructional component: individually selected depending on the instruction situation (e.g., practice, coaching) - Content sequencing: used with both approach and component (e.g., easy-to difficult sequencing)	(Reigeluth & Keller, 2009)
Support Based Classification	- Supplantive strategies: Provide more guidance; benefit novice learners or complex tasks (e.g., direct instruction). - Generative strategies: Allow learners autonomy and promote engagement and critical thinking (e.g., strategy for problem-based learning)	(Smith & Ragan, 2005)
Consideration	Generative strategies can be better for knowledgeable learners but might overwhelm some learners. Supplantive strategies offer more support but may be less engaging. (level of scaffolding)	(Dabbagh, 2003; Smith & Ragan, 2005)

What Factors Influence Instructional Strategy Selection in Online Learning?

According to instructional design literature (Driscoll, 2014; Hill & Jordan, 2021; Hirumi, 2021; Larson & Lockee, 2020; Richey et al., 2010; Smith & Ragan, 2005), several variables influence the selection of instructional strategies, including:

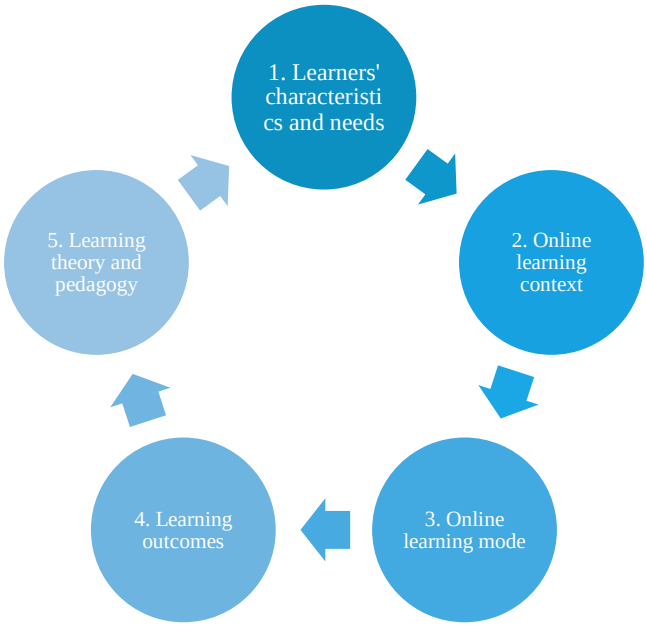
6. Learners' characteristics and needs
7. Online learning context
8. Online learning mode
9. Learning outcomes
10. Learning theory and pedagogy

Learner analysis is the process of identifying critical aspects of a learner, such as demographics, prior knowledge, and social needs (Fulgencio & Asino, 2021). Learning context or environmental analysis involves examining the physical and functional aspects of instructional systems (Tessmer, 1990; Tessmer & Richey, 1997). Online learning is a mode of education that enables instructors to deliver instruction to students who are physically separated from the instructor(s) (Singh & Thurman, 2019). The learning objectives, also known as behavioral and performance objectives or learning outcomes, are precise and measurable statements that describe what learners should be able to do after instruction (Mager, 1962). The learning theory explains how people acquire new information, retain it, and utilize it to enhance their performance in various domains (Picciano, 2021).

Understanding the impact of each element on course design and development is essential for making informed decisions about online strategy. By doing so, these elements can be effectively incorporated into course designs and support enhanced learning outcomes. The following details each element, explicates why it is essential to the strategy selection process, and provides guidance on how to integrate it into online course design and development.

Figure 1

Factors Influence the Selection of Instructional Strategies



Section 2

Factor One: Analyzing Learners' Characteristics

What?

Learner analysis is the process of identifying critical aspects of a learner, such as demographics, prior knowledge, and social needs (Fulgencio & Asino, 2021).

To create engaging and effective online instruction, understanding the target audience's characteristics is crucial. During the instructional design process, instructional designers analyze various learner characteristics, such as demographics, individual differences, beliefs, attitudes, and mental models, as can be seen in Table 2. These characteristics have an impact on motivation, learning, and knowledge transfer (Richey et al., 2010).

Why?

To effectively select and develop instructional objectives and strategies, it is crucial to understand the attributes of learners. These attributes help in the selection of appropriate strategies and the choice of relevant examples, delivery methods, and engaging practices to make learning more meaningful and effective. It informs instructional design decisions and helps modify teaching to the needs of each student for a better understanding of the material.

According to Dr. Miko Nino, an expert in instructional design, when it comes to learner characteristics, it is essential to have a good understanding of the learners to design effective instruction. However, this can be challenging at times, as data may not always be readily available, or an instructor may not have enough time to conduct a thorough analysis. That being said, it is important to include realistic data points that instructors can consider when designing instruction. For example, an undergraduate course will have a different population than a graduate course, and this should be considered. Another consideration is designing instruction

for traditional undergraduates versus working adult undergraduates. It is also important to note that learners in different institutions, such as community colleges versus 4-year institutions, may have different needs. While conducting a study to gather data on perceptions, beliefs, preferences, and access to resources can be challenging, instructors can focus on data points that are more obvious and require less additional research (Dr. Miko Nino, personal communication, 2024).

Table 2

Components of Learners' Analysis

General Learner Characteristics	Component	Source
Demographic	Gender, Age, Race, Education, Employment, Work Experience	(Richey et al., 2010)
Beliefs and attitudes towards learning	Motivation, Value, Attitudes Toward Content and Delivery, Group Characteristics, Learning Preferences	(Dick et al., 2015)
Academic	Grades, Courses, Degrees, Locality, Literacy, Training	(Doolittle, 2023)
Subject related	Entry Skills, Prior Knowledge, Attitudes Toward Content and Delivery	(Dick et al., 2015)
Individual differences	Culture, Interests Attributions, Special Needs, Belief Systems, Emotional State	(Doolittle, 2023)
Access to technology	Access to technology Access to learning materials, Technological support	(Fulgencio & Asino, 2021)
Accessibility needs and disabilities	Accessible online course to anyone, including blind, deaf, physical disabilities, or multiple learning preferences students	(Burgstahler, 2020)

How?

Data about these characteristics can be gathered through:

- Observations
- Surveys
- Interviews
- Learning Analytic Tool
- Assessments
- Reviewing Existing Data
- Research
- Consulting With Colleagues

Instructors in higher education can apply this approach by considering diverse learner characteristics when designing courses, creating inclusive content, accommodating various learning preferences, and fostering motivation and engagement (Smith & Ragan, 2005). When designing an online course, it is essential to ensure that it is inclusive and accessible to all learners. As mentioned before, analyzing every individual's needs may not be feasible; hence, it is advisable to create courses that cater to a broad audience. For instance, incorporating a universal design (UDL) framework can help achieve this goal by providing equal access to education for all (Rao, 2021). This framework is widely used as an integrated part of an instructional design process, which provides flexible options for all learners. This focus facilitates a more effective learning experience, guiding students from novice to expert levels of understanding and improving overall academic outcomes and satisfaction. See Rao, 2021, for more information about UDL frameworks.

Justice (2003) created an example of learner analysis. During their process of conducting a learner analysis, it was given greater importance to the surveys completed by the students as a source of data. The different categories that were taken into consideration during this analysis included entry behaviors, prior knowledge, attitudes, motivation, education and ability, learning

preferences, attitudes toward organization, and group characteristics. The data for this analysis was sourced from a variety of mediums, such as surveys completed by both students and instructors, interactions with students, observations, and discussions with other instructors.

Guiding Questions:

Who are the learners (age, gender, cultural background)?

What is the educational and professional background of the learners?

What pre-existing knowledge and skills do learners possess related to the course content?

Are there any gaps in knowledge that the course needs to address?

What motivates these learners to engage in the learning process?

How proficient are the learners in using the technology required for the course?

What technological support might be necessary for them?

What potential barriers or challenges could learners face in the learning process?

How can the course design address these challenges?

How can the course be made accessible to all learners?

What accommodations or accessibility needs should the course consider to ensure that all learners have equal access to the content and learning experience?

Factor Two: Analyzing the Online Learning Context

What?

Learning context or environmental analysis involves examining the physical and functional aspects of instructional systems. Therefore, it is crucial in shaping strategies and activities that promote learning (Tessmer, 1990; Tessmer & Richey, 1997). Understanding its nature allows educators to make informed decisions about fostering learning and achieving desired outcomes (Larson & Lockee, 2020).

Why?

Instructional strategies and activities can also influence the learning context and technologies used for delivery. The contextual aspects of an online learning environment differ from the contextual features of traditional in-person settings (Cheuk, 2021). For instance, online learning may not need to consider classroom size, seating arrangements, lighting, and projection facilities, but instead focus on the physical environments where students may be learning, such as the workplace or home, along with the features of these settings (Cheuk, 2021). In addition, Instructional contexts may encompass physical, temporal, and social aspects that influence learning (Dick et al., 2015; Smith & Ragan, 2005; Tessmer & Richey, 1997).

How?

To analyze the physical and functional aspects of instructional systems, it is important to consider the general elements of online instructional contexts. These elements can shape the strategies and activities used in online learning and contribute to achieving desired outcomes. In the following, some of the general elements of online instructional contexts will be explored to detail how they can influence the learning experience and demonstrate what analyzing the online learning context involves.

General Elements of Online Instructional Contexts

(Cheuk, 2021; Tessmer & Richey, 1997):

What are the physical aspects?

- Consider advising learners to have a specific and private location and space with the least number of disruptions to complete online courses successfully.
- Consider the learner space to be functional and comfortable and allow the control of temperature, noise, lighting, and air quality.
- A proper computer workstation setup includes an eye-level screen and a keyboard and mouse at elbow height to avoid physical discomfort.

What are the social aspects?

- Provide the learners with the opportunity to interact with peers.
- Provide the learners with the opportunity to communicate or collaborate with colleagues\ communities of practice.
- Provide the learners with the opportunity to communicate with the instructor.

What are the technological aspects?

- Consider learners' access to reliable internet, wireless connection, power outlets, and a variety of computer devices. It is important to note that internet access and functionality vary based on location and device.
- Inform the learners of any supporting software, program, and device needed or required.
- Consider learners' access to learning management systems and communication channels.
- Consider technical support for any technical issues (Cheuk, 2021).

Analyzing the online learning context involves understanding the resources, constraints, and other factors that impact the learning process. Dick et al. (2015) have proposed four key aspects to consider; we can apply these elements to analyze the online learning context as follows in Table 3:

Table 3

Online Learning Context Analysis Elements

Element	Description	Source	Example
Compatibility of Site with Instructional Requirements	Ensure the online learning platform, like a learning management system (LMS), supports essential tools and resources for effective instruction. Check compatibility with various devices, accessibility features for disabled students, and multimedia resource availability.	(Cheuk, 2021; Hodges et al., 2020).	Learning management tool -LMS (Canvas, Blackboard) - Accessibility features Canvas Voluntary Product Accessibility Template
Adaptability of Site to Simulate Workplace	Simulate workplace aspects using virtual tools, case studies, real-world projects, or online collaboration tools. Consider incorporating interactive simulations or virtual labs for learners to practice skills in a safe, controlled environment resembling their future workplace.	(Georgiou et al., 2007; Jowsey et al., 2021; Martin & Bolliger, 2018).	Interactive simulation: -The decision-making process for supporting sales associates. -Virtual labs: Online chemistry lab
Adaptability for Delivery Approaches	Online platforms should support various instructional strategies and delivery approaches, such as synchronous and asynchronous learning, video lectures, interactive modules, discussion boards, and group projects. Be mindful of students' diverse learning preferences and ensure adaptability to these needs.	(Cheuk, 2021; Hodges et al., 2020; Shank, 2007; Tessmer & Richey, 1997)	Canvas Blackboard Moodle Google Classroom

Learning Site Constraints Affecting Design and Delivery	Analyzing constraints in an online learning context, consider factors like internet connectivity, device compatibility, and learners' digital literacy. Identify organizational policies or decisions affecting online instruction design and delivery, such as the required use of specific technologies or platforms.	(Cheuk, 2021; Dick et al., 2015; Shank, 2007; Tessmer & Richey, 1997)	Constraints in an online learning context

Note. In higher education, almost every college and university, around 99%, uses a learning management system (LMS) to manage the online learning processes (Brown et al., 2015). Therefore, it is expected that educators will utilize this tool to facilitate the learning experience.

Guiding Questions:

How and what can you advise the learner to prepare their physical space to complete an online course effectively?

What are the physical, social, and technological aspects of the learning environment?

What is the management strategy or learning management system for this lesson or course?

How is the site (LMS) compatible with the instructional requirements?

How can the site (LMS) be modified to simulate a workplace environment?

How does the site (LMS) support various instructional strategies and delivery approaches?

What are the possible learning site (LMS) constraints that would affect design and delivery?

Factor Three: Online Delivery Mode

What?

Online learning is a mode of education that enables instructors to deliver instruction to students who are physically or geographically separated from the instructor(s) (Singh & Thurman, 2019). Online Learning supports regular and substantive interaction between students and instructor(s). The class can be conducted synchronously, asynchronously, or a combination of both modes (blended). with synchronous requiring students to participate at a specific time each week and asynchronous allowing them to view instructional materials at any time during the week. Various technologies could be utilized for instruction in online learning, such as the Internet, audio conferencing, video cassette, DVDs, CD-ROMs, one-way and two-way transmissions through open broadcasts, closed circuit, cable, microwave, broadband lines, fiber optics, satellite, or wireless communication devices (Singh & Thurman, 2019).

In terms of technology and media selection, educators and course developers may need guidance in making informed decisions about technology integration. They should focus on enhancing learning experiences rather than just using technology for the sake of it. For example, to ensure that they choose the right technological tools to support their teaching strategies, educators can use the SAMR and TPACK models (Kendon & Anselmo, 2023). These models help educators choose tools that are not only technologically sound but also pedagogically effective and appropriate for their content (Kendon & Anselmo, 2023).

Educators may also want to consult with instructional designers or other experts in online learning to determine the most effective and efficient technology for their particular situation. The ultimate goal is to choose a technology that enhances the learning experience and facilitates

student engagement and interaction. The process of selecting technology is equally important, and additional guidelines may be necessary to explain it.

Why?

Online learning makes higher education more accessible to a broader range of students, including those with disabilities, those living in remote areas, or those who cannot attend traditional classes due to various constraints. Effective online learning requires careful planning and instructional design, which greatly impacts the overall quality of instruction (Hodges et al., 2020). In higher education, the decision on the online delivery mode is often made before the course begins and is based on considerations such as learning needs, learner characteristics, and the learning context (Lockee et al., 2022). It should also align with the organization's infrastructure, values, and management strategies (Lockee et al., 2022; Moore, 2020). However, instructors can adjust the online delivery mode as the course progresses based on student engagement, learner needs, and their own teaching experience (Lockee et al., 2022).

How?

Online courses can be presented in synchronous or asynchronous modes (Dennen, 2019; Shank, 2007), impacting the timing of class activities and the nature of student interactions. Understanding the benefits and challenges of both synchronous and asynchronous delivery assists instructors in choosing the most appropriate approach, or a combination of both, for a given situation (Shank, 2007). See Table 4 for a comparison of these delivery modes. For example, in asynchronous learning, communication and interaction between the instructor and the learner are not in real-time. Therefore, the technology tool used plays a crucial role in providing feedback and facilitating learning. The system can be designed to analyze the performance of the learner and provide personalized feedback, which can be used to improve the

learning experience. Additionally, the technology can also offer resources to the learner, such as additional reading materials or video tutorials, to supplement the learning process. By leveraging the capabilities of technology, asynchronous learning can be made more effective and engaging for learners.

For instance, a student is taking an online course, and they are struggling with a particular concept. In an asynchronous learning environment, they do not have the opportunity to interact with the instructor in real time to clarify their doubts. However, the system can be programmed to identify the student's weak areas and provide feedback to help them improve. For example, in a quiz activity, if the student is consistently getting a particular question wrong, the system can provide hints or links to additional resources that would help them understand the concept better. By providing personalized feedback and resources, the system can help the student learn at their own pace and build their confidence in the subject.

Table 4

Comparison Between Synchronous and Asynchronous Modes:

Type	Definition	Interaction	Meeting	Learners
Synchronous	Type of delivery mode that takes place online in real time. Students are provided with content and assignments and are given a time frame to complete coursework and exams.	Interact online in real time simultaneously, and participants can interact through text, video, or audio chat.	Classes are held on a regular basis, either daily or weekly.	For students to participate in a course from a distance in real time.
Asynchronous	The type of delivery mode does **not** take place in real time. Students are provided with content and assignments and are given a time frame to complete coursework and exams.	Interaction usually takes place through discussion boards, blogs, wikis, and email.	There is no scheduled class meeting time. The course is self-paced.	For students with time constraints or busy schedules

Planning and designing an online course can be a complex task that involves various aspects, such as content creation, selecting the right platform, and leveraging technology (see Table 5 for more examples). It is crucial to keep in mind that creating a successful online course requires careful planning and execution.

Table 5

Examples of mode, strategy, and tool

Learning Mode	Strategy	Technology Tool
Synchronous Learning	Live lectures: conducting real-time lectures via video conferencing tools. These sessions can include live Q&A, enhancing immediate student-teacher interaction.	Conference tools like Zoom, Microsoft Teams, Google Hangout, or Live Sessions via Canvas.
	Interactive group work: Utilizing breakout rooms for group activities, discussions, or collaborative projects.	Tools like Zoom breakout room, Interactive whiteboard, Google Docs, or slides can facilitate these interactions.
	Real-Time Assessments: Conducting quizzes or polls during live sessions.	Platforms such as Kahoot and Poll Everywhere are useful for assessing comprehension and encouraging participation.
Asynchronous Learning	Recorded Lectures: Pre-recording lectures allow students to access content at their convenience.	Tools like Loom, Panopto, or YouTube can be used to create and share these videos.
	Discussion Forums: Using platforms like Canvas or Moodle for threaded discussions where students can post and respond at their own pace, encouraging reflective thinking.	LMS discussion tools like Canvas, Moodle.
	Self-paced Assignments: Assignments or projects	

Learning Mode	Strategy	Technology Tool
	students work on independently. Such as creating a reading summary or reflection. This allows flexibility in managing their learning schedule	Create a video via Flipgrid or submit it via an LMS. Padlet and Mindmeister for concept map activity.
Blended Modes	Flipped Classroom: Students watch recorded lectures asynchronously before class, then engage in interactive, application-based activities synchronously.	Zoom, Microsoft Teams, Google Hangout, YouTube, or recorded Sessions via Canvas. For synchronous activities, see the examples above.
	Communication	Email, LMS announcement, or live chatting tool in live sessions.

One of the limitations of online learning is the communication gap that may exist between the learner and the instructor or among learners. This gap could hinder the learning process and make it difficult for instructors to provide the necessary support and guidance to learners. Therefore, it is essential to use the appropriate tools and strategies to facilitate effective communication and collaboration among learners and between learners and instructors.

To address the psychological and communicative gap between instructors and students in distance learning, notably online education, Michael G. Moore developed the *Theory of Transactional Distance* (Moore, 1993). This theory guides educators in choosing effective instructional strategies that promote learner autonomy and accommodate diverse learner needs. The emphasis is on dialogue and interaction, highlighting the role of communication tools and collaborative platforms for effective online engagement. By providing adaptable content delivery, such as a mix of recorded and live sessions, educators can cater to varying learner

preferences. Furthermore, timely feedback is crucial to counteract the potential isolation in online learning environments. The theory also encourages educational institutions to provide robust support systems to mitigate transactional distance. Overall, this theory aids educators in navigating the complexities of online learning, promoting strategies that enhance engagement, learner autonomy, and overall educational effectiveness.

Adopting the *Theory of Transactional Distance* (Moore, 1993) in online learning involves strategies tailored to synchronous, asynchronous, and blended modes. Table 6 describes each mode.

Table 6

Online Learning Mode Description (*Martin et al., 2020)*

Mode	Description
Synchronous	Enhances real-time interaction between instructors and students through live discussions, immediate feedback, and interactive activities like polls or group work. Utilizes video conferencing tools for real-time dialogue and collaboration, reducing transactional distance and fostering community.
Asynchronous	Adapts by structuring course materials and activities to promote learner autonomy while maintaining connection. Includes discussion forums, recorded lectures with embedded questions, and timely feedback. Facilitates ongoing dialogue and caters to diverse learning preferences and schedules.
Blended	A fully online course combines both asynchronous and synchronous online learning. The students can engage in learning activities at any time and from any location during the asynchronous portions of the course. However, for the synchronous parts of the course, students are required to participate in real-time activities. The amount of online learning will depend on the course and the activities included.

Finally, the delivery mode of a course is essential, but it should not be prioritized over instructional strategies and appropriate media use. The type of instructional strategy used should

be considered when selecting a delivery mode, as the two are interconnected. Regardless of whether a course is delivered online synchronously, asynchronously, or both, the quality of instruction depends heavily on the teaching methods and learning materials used. Furthermore, when planning instruction and selecting a strategy, instructors should consider the affordance and limitations of online learning. The following sections will provide more detailed information and guidance regarding strategy types and selection.

Guiding Questions:

What type of online delivery mode of learning is going to be implemented synchronously, asynchronously, or both (blended)?

What is the course communication and interaction plan? Which online platform best supports interactive features and real-time communication?

How user-friendly and accessible is the chosen platform for all learners?

What balance of recorded versus live sessions will be offered to accommodate different learning needs in blended mode?

What tools and technologies can be integrated to enhance learner engagement and interaction?

How can technology be used to provide timely and effective feedback to students in different modes?

What strategies can be employed to encourage open dialogue and interaction among students and between students and instructors?

How can virtual collaboration be facilitated to ensure effective peer-to-peer learning?

How can learners in asynchronous courses interact and receive feedback?

What resources and activities can be provided to support self-directed learning?

How can the course structure promote autonomy while still offering necessary guidance?

What measures can be taken to reduce the psychological and communicative gap in the online learning environment?

How can a sense of community and connectedness be fostered among remote learners?

Factor Four: Identifying the Learning Outcomes

When designing a course, the instructor begins by setting broad learning goals. They then identify specific learning objectives that fit within these goals and address various learning domains. After that, the instructor chooses teaching methods and assessments that align with these objectives and domains. This process ensures that the course is well-structured and effective in achieving its intended outcomes.

What?

A distinction needs to be made between three essential terms here that are commonly used in course design and planning, learning goals, learning objectives, and learning domain. The learning goal, or course goal, is a general statement that describes what students should learn by the end of the course (Fink, 2013). The learning objectives, also known as behavioral and performance objectives or learning outcomes, are precise and measurable statements that describe what learners should be able to do after instruction (Mager, 1962).

The relationship between the two is that learning objectives will collectively ensure the attainment of the course goals. Each learning objective is a step that students need to take to reach the broader educational goals set out for their learning journey.

Learning can be categorized into domains and types of outcomes which reflect diverse ways in which we learn. Learning domains encompass Bloom's (1956) cognitive, psychomotor, and affective domains, while types of learning outcomes include intellectual skills, cognitive strategies, verbal information, psychomotor skills, and attitudes, according to Gagne's (1972) classification. These categories provide a comprehensive understanding of the different aspects of learning and growth. It is crucial to pinpoint the exact learning type required for a specific subject to assess the results accurately. Once the appropriate learning type is identified, it will

help select the suitable instructional strategy. See Table 7 for a description and resources of learning goals, objectives, and outcomes.

Table 7

Description and Resources of Learning Goals, Objectives, and Outcomes

Type	Definition	Components	Example
Learning Goal	Describes what students should learn by the end of the course. (Fink, 2013)	General course outcomes	Course goal
Learning Objectives	An observable and measurable statement explaining the learners' achievement by the end of the instruction or lesson. (Richey et al., 2010)	Intended performance, the conditions related to the demonstration, and the criteria used to assess performance.	Bloom's Taxonomy as a framework for writing learning objectives
Learning Domains and Learning Types	Categories that describe the different areas of learning and development. (see Gagné, 1972) Different subjects require different learning domains for measuring outcomes.	Often divided into three primary types: cognitive, affective, and psychomotor.	Bloom's Taxonomy of Learning Domains Gagne's categories of learning: -Verbal information -Intellectual skills: • Discrimination • Concepts • Rule application • Higher order -Cognitive strategies -Motor skills -Attitudes

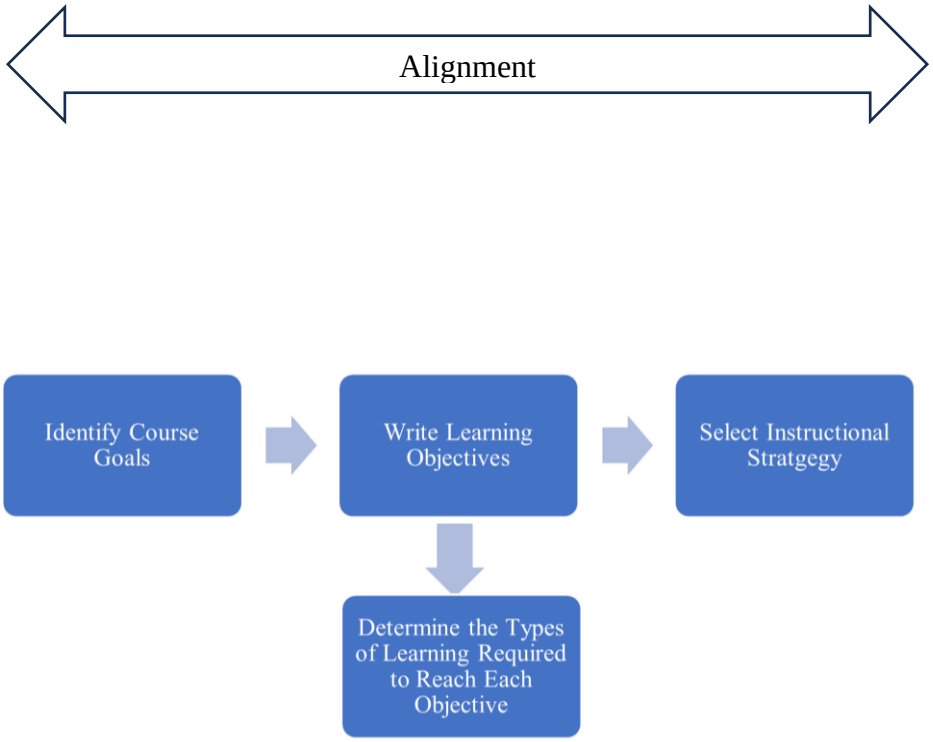
Why?

For online learning to be effective, it is crucial to set clear learning objectives and perform appropriate assessments that are in line with those objectives (Hirumi, 2014). To help

learners achieve specific tasks, educators must classify objectives based on the type of learning process (i.e., learning domains or learning types of outcomes) (Larson & Lockee, 2020). Throughout the process, instructors must ensure the alignment among these elements so they can select the proper instructional strategy (see Figure 2).

Figure 2

Elements for Alignment



How?

One approach that helps to create and organize the learning objective and domain process is the ABCD model of learning objectives. It focuses on Audience, Behavior, Condition, and Degree (ABCD) (Kurt, 2020). With this approach, objectives may be written in any order see Table 8 for examples. This approach can be applied as follows:

1. Audience: Identify who the learners are. Consider their background, existing knowledge, and specific needs (Kurt, 2020).
2. Behavior: Define what you want learners to be able to do after the lesson.

   Here, you can Embed Bloom's Taxonomy to categorize the type of learning: Cognitive (thinking), Affective (emotional), and Psychomotor (physical) (Bloom, 1956)

   Or

   Incorporate Gagne's learning outcomes categories (Gagné, 1972), which include: Intellectual skills, cognitive strategies, verbal information, psychomotor skills, and attitudes.

   These categories emphasize different cognitive processes and are instrumental in guiding instructional strategy selection (Driscoll, 2014; Larson & Lockee, 2020; Richey et al., 2010; Smith & Regan, 2005).
3. Condition: Add and specify the conditions under which the behavior will be performed. Enhance the skill statements by adding relevant conditions. This transforms them into comprehensive performance objectives. It's essential to consider factors like task complexity, the authenticity of the context, and appropriate resources (Dick et al., 2015; Kurt, 2020).
4. Degree: Define the standard for acceptable performance and the achievement of the objectives. This could be a level of accuracy, speed, or quality, which helps in assessing whether the objective has been met. Ensure these criteria are appropriate for the learners' developmental stage and the conditions of the task (Dick et al., 2015; Kurt, 2020).

Instructors could then choose instructional strategies that help learners achieve each of these objectives, complement the assessments, and reflect their personal educational principles

and values. This comprehensive approach ensures that learners acquire the necessary knowledge and skills to complete their tasks successfully. Instructors can use the Alignment Matrix, as presented in Table 8, to choose strategies that align with their values and help students achieve learning objectives.

Table 8

Alignment Matrix

Course Goal Example	Learning Objective	Type of Learning	Example of Instructional Strategy
Psychology: To develop a comprehensive understanding of modern psychological theories	The learner will be able to analyze five key psychological theories using evidence-based research	Cognitive Learning Cognitive Strategies	Engage students in research activities that require the analysis of psychological literature, case studies, and peer-reviewed articles. Incorporate critical thinking exercises that focus on contrasting psychological theories.
Communication: Gain proficiency in written and oral communication skills	The learner will deliver a 10-minute presentation on a chosen topic that demonstrates clear organization and persuasive communication.	Affective Learning Intellectual Skill (application)	Implement a series of public speaking exercises, including peer review feedback sessions. Utilize video recording for students to self-assess their presentation skills.
Computer Science: Understand the principles of human-computer interaction	Learner will design a user interface for a mobile app that adheres to best practices in usability and access.	Psychomotor Learning Cognitive Strategies	Use cloud-based development environments that allow students to code and test applications remotely. Create guided tutorials with step-by-step instructions for using development tools and frameworks relevant to mobile app development. Assign practical tasks that involve using these tools to build app components.

Note. Each learning objective aligns with a domain of learning – cognitive (knowledge-based), affective (emotion-based), or psychomotor (action-based), indicating the type of learning involved.

Guiding Questions:

What is\are the course's overall learning goal(s)?

What is\are the lesson or class learning objectives? Or what specific skills or knowledge should learners acquire by the end of this class?

How do these learning objectives align with the overall goals of the course?

What is each learning objective domain of learning or type of outcome?

For ABCD approach:

1. Audience: Who are your learners?
2. Behavior: What should, or will the learners be able to know, think, or do?
3. Condition: Under what conditions or context will the learner be able to perform?
4. Degree: What level or degree of proficiency is required for the behavior? How well does the behavior need to be performed?

Which of Bloom's (1956) type of learning or Gagne's (1972) learning outcomes categories are most relevant to this lesson objectives?

How do these learning objectives reflect the intended learning outcomes?

How can instructional strategies be chosen to address these specific categories effectively?

Factor Five: Learning Theory and Pedagogy

What?

Learning theory is rooted in psychology that seeks to understand how people learn and acquire new skills and knowledge. It explores the role of human behavior, cognition, and mental processes in learning. The theory explains how people acquire new information, retain it, and utilize it to enhance their performance in various domains (Picciano, 2021).

Why?

Learning theories provide a foundation for instructional strategy selection, enabling reliable predictions of their effectiveness. Foundational knowledge about individual learning helps educators choose appropriate strategies. Learning theories guide and inform the decision-making process when choosing instructional strategies, ensuring that teaching methods align with our understanding of how learning best occurs (Hirumi, 2021). By understanding the principles of learning theory, we can develop effective instructional methods and strategies that enable learners to acquire and apply new knowledge and skills effectively.

In addition, instructors' choice of theory is influenced by various factors that are interconnected with the factors that influence strategy selection. Therefore, to choose the most suitable theory or theories, several factors must be considered, such as the type of course, the characteristics and needs of the students, the types of assessments, the course goals and learning objectives, and the learning environment (Driscoll & Burner, 2021).

How?

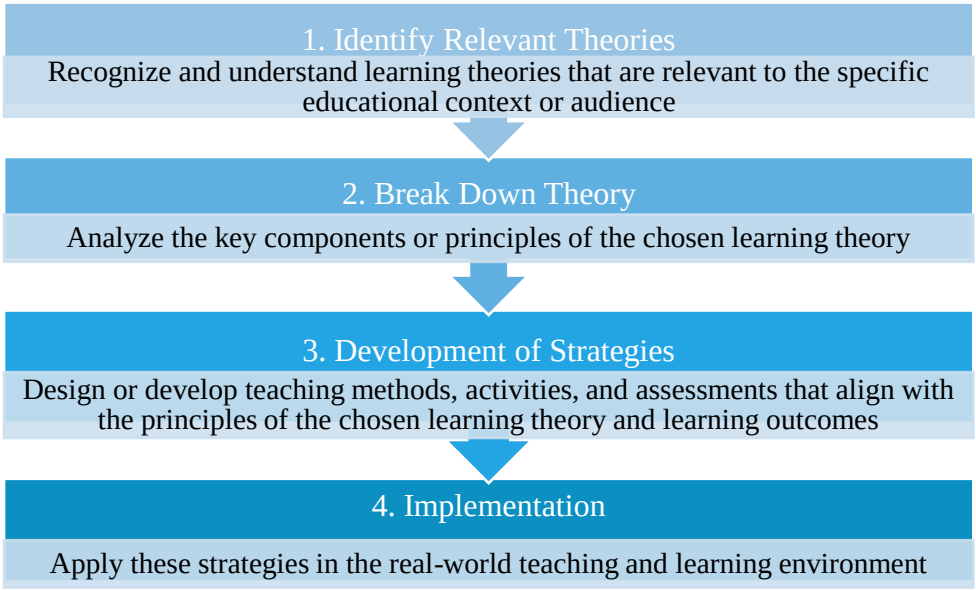
To operationalize learning theory into strategy application in teaching and learning means to take abstract concepts and principles from learning theories and transform them into tangible,

actionable strategies or practices that can be implemented in a teaching and learning environment. It involves:

- Identification of Relevant Theories: Recognizing and understanding learning theories that are pertinent to the specific educational context or audience. For example, in these guidelines, much attention is given to foundational learning theories such as behaviorism, cognitivism, constructivism, and social learning. However, strategies are not limited to these theories and can be expanded. It is worth noting that some instructional strategies can align with multiple theories. For example, problem-based approaches can be consistent with behaviorism, cognitive theory, constructivism, and social learning.
- Breaking Down Theory: Analyzing the key components or principles of the chosen learning theory.
- Development of Strategies: Designing teaching methods, activities, and assessments that align with the principles of the chosen learning theory and learning outcomes.
- Implementation: Applying these strategies in the real-world teaching and learning environment.
- Evaluation and Feedback: Continuously assessing the effectiveness of the implemented strategies, gathering feedback from students, and making necessary adjustments to improve learning outcomes.

Figure 3

Learning Theory Application Process



For example, if the instructor chooses to operationalize the constructivist learning theory approach, they might employ strategies like problem-based learning, group discussions, and real-world applications, ensuring students are actively constructing their own knowledge rather than passively receiving information. Table 9 outlines several strategies based on learning theories. While there are many learning theories, these theories are the most commonly used and provide a foundation for others.

Table 9

Instructional Strategies Based on Learning Theories

Behaviorism:
Observable behavior is influenced by stimulus.
(Skinner, 1938).

Strategy	Source	Definition	Classification	Online learning Type	Example
Shaping	(Ormrod, 2020; Woolfolk, 2016)	Shaping involves reinforcing increasingly closer approximations to the desired behavior. Shaping is useful for building complex skills and increasing persistence.	Instructional approach	Synchronous Asynchronous	Start presenting information that the student is already familiar with. Then, the new information is broken down into small, manageable pieces, and the instruction gradually progresses by presenting increasingly complex pieces. As the student successfully answers questions of increasing difficulty, mastery of the topic is gradually achieved. - In online language courses, a step-by-step approach is used to introduce basic vocabulary and sentence structures. The complexity of language tasks

					gradually increases, with the instructor guiding and reinforcing closer approximations to fluent language use. Interactive online exercises provide immediate feedback, reinforcing correct language usage and gently correcting mistakes. This helps students develop and refine their language skills progressively, moving closer to language fluency. See the Scaffolding strategy below.
Personalized System of Instruction (PSI)/ Mastery Learning:	(Driscoll, 2014; Keller, 1968; Ormrod, 2020)	This approach considers individual student needs and preferences for a more customized learning experience. The key principles of PSI, such as personalized pacing, focus on mastery learning, formative assessment, and social interaction.	Content Sequencing	Asynchronous	Divided online course content into specific segments or modules. Each module has clear goals that outline the expected learning outcome. These modules are organized in a systematic order, often aligning with textbook chapters, and focus on self-paced learning for each student. This design allows students to work at their own pace, with assessments and feedback provided along the way to help them recognize their own level of competence.

					Social interaction can also be facilitated through online discussion forums or group projects. Example 1 (Johnson, 2020)
Direct instruction	(Bronkey, 2015; Joyce et al., 2015)	The teacher explains new concepts, allows controlled practice, and provides guided practice. It would consist of three main components: modeling, guided practice with formative feedback, and independent practice.	Instructional approach Instructional component	Synchronous Asynchronous	The instructor begins a module by explaining key concepts using a live or pre-recorded video lecture. This direct instruction method introduces students to new concepts in a structured manner. After the lecture, students engage in interactive exercises such as online quizzes or problem sets. These activities are designed to reinforce the newly introduced concepts, allowing students to apply them in a controlled setting. The instructor then conducts a synchronous online session where students work on more complex problems while receiving real-time guidance and feedback. This session could also include breakout rooms for small group

					discussions, further facilitating guided practice. The instructor provides feedback on student submissions and conducts assessments to gauge understanding and address any misconceptions. Example 1 (Direct and Indirect Instruction, 2023) Example 2 (Bronkey, 2023)
Reinforcement	(Ormrod, 2020; Sambolt, 2020)	A concept in behavioral psychology that involves the use of rewards or punishment to increase or decrease the likelihood of a behavior being repeated in the future. In other words, reinforcement is a process of shaping behavior by providing consequences that strengthen or weaken the behavior. Some examples of positive reinforcement include social	Instructional component	Synchronous Asynchronous	Positive feedback on assignments: When students submit assignments, they receive immediate, positive feedback for correct answers and thoughtful responses. This feedback acts as a reinforcer, encouraging students to continue engaging with the course material actively. Example

		reinforcement, activity reinforcement, token reinforcement, positive feedback			(Sambolt, 2020)
Practice/ drill-and-practice	(Ertmer & Newby, 2013; Joyce et al., 2015)	Practice is the repetitive engagement in an activity with the intent to improve performance over time. To master a skill, learners must engage in deliberate practice by repeatedly performing the exact task they wish to excel at.	Instructional component	Synchronous Asynchronous	Structured practice Guided practice, independent practice (Ertmer & Newby, 2013) Example (Tortora & Derrickson, 2011).
Cueing and Prompting	(Drew, 2023a; Woolfolk, 2016)	Cueing involves presenting a stimulus before a specific behavior occurs and directing attention to relevant aspects. The prompt is an additional cue that follows the first cue to provide further guidance.	Instructional component	Synchronous Asynchronous	Cueing and prompting can take various forms, such as verbal comments, nonverbal signals like gestures, modeling, or visual aids, including videos. Example (Drew, 2023)
Cognitivism: An internal process that is influenced by various internal and external factors. (Piaget, 1930)					

Strategy	Source	Definition	Classification	Online learning Type	Example
Elaboration	(Hamilton, 2012; Maine Department of Education, 2023; Woolfolk, 2016)	Elaboration refers to the process of adding meaning to new information by connecting it with existing knowledge. It is a technique of encoding the original content in a different but related way. There are various instructional strategies that support elaboration, including Think-Pair-Share, Graphic Organizers, Summarizing and Paraphrasing, and Compare and Contrast.	Instructional component	Asynchronous	Interactive Discussion Forums: Online forums are used where students elaborate on the lesson's content by discussing how the new concepts connect with previous lessons or their existing knowledge. This active engagement helps solidify their understanding of the new material. More Details. (ION Professional eLearning Programs, 2022a)
Dual code, multiple memory connections	(Driscoll, 2014; Ormrod, 2020)	Dual code, multiple memory connections: Dual code can enhance memory by encoding information in multiple ways and modes. Utilizing acronyms and imagery, including visual imagery, aids in the formation of mental pictures of objects and ideas.	Instructional component	Synchronous Asynchronous	Video lectures that narrate key concepts while displaying relevant images, charts, or animations help students encode information through both auditory and visual channels, making the learning experience more engaging and memorable.

Organization	(Woolfolk, 2016)	Organization: an element of processing that improves learning. Well-organized material is easier to comprehend and recall, particularly if it is complex or extensive. Chunking is a helpful technique for organization, which involves grouping small bits of information into a larger, more meaningful chunk.	Instructional approach Instructional component	Synchronous Asynchronous	Module Division: In an online computer science course, the course or lesson content is divided into modules, each focusing on a specific aspect of computer science, like programming basics, data structures, algorithms, and software development. This division helps organize extensive information into manageable segments. (Shaw, 2021) Instruction (Poorvu Center for Teaching and Learning, 2021)
Concept mapping	(Drew, 2023b; Novak & Cañas, 2008; UNC-Chapel Hill Learning Center, 2022)	Concept mapping: refers to a visual tool that aids in the organization and representation of knowledge. It involves concepts enclosed in circles or boxes, with connecting lines that show the relationships between the concepts. These lines contain linking words or phrases that specify the nature of the relationship between the two concepts. By using concept maps,	Instructional component	Synchronous	Example 1 (UNC-Chapel Hill Learning Center, 2022) Example 2 (ION Professional eLearning Programs, 2022b) Example 3 (Eberly Center, 2023)

		learners can visualize how to link newly acquired information with what they already know. Concept maps can take various forms, such as charts, graphic organizers, tables, flowcharts, Venn Diagrams, timelines, or T-charts.			
Problem-solving	(Drew, 2023b; Ormrod, 2020)	Problem-solving is a cognitive learning strategy that requires identifying issues and determining the optimal ways to address them. It involves utilizing previously acquired knowledge and skills to manage an unanswered question or troublesome situation. Related strategy: Brainstorming means–ends analysis, working backward, using visual imagery, drawing an analogy, and using external representations of problem components.	Instructional component	Synchronous	In this approach, students analyze a case study, identify problems, and propose solutions based on a class-selected related theory. They then have group discussions to brainstorm different approaches. Each student/group presents their proposed solution, justifying it with relevant theories, data analysis, and market research. Finally, students reflect on the problem-solving process and discuss what they learned. Example 1 (Stern, 2010) Example 2 (Center for Teaching, 2023)

Examples/Nonexample	(Reigeluth & Keller, 2009; Woolfolk, 2016)	An example is a specific instance that demonstrates the application of a concept or illustrates its key attributes. A non-example, on the other hand, is an instance that does not apply the concept or fails to demonstrate its key attributes. By providing both examples and non-examples, learners can develop a more nuanced understanding of the concept and its distinguishing features. This approach also helps learners to identify misconceptions and clarify any misunderstandings they may have about the concept.	Instructional component	Synchronous Asynchronous	It can be provided by the instructor or asked to be provided by learners. It can take many formats, e.g., text-based, image, video, and audio. Example 1 (Deans For Impact, 2021) Example 2 (Malamed, 2022)
Reflection/Journaling	(Reigeluth & Keller, 2009; Wang & Hargis, 2021)	A metacognitive approach can assist learners in gaining a more profound and comprehensive comprehension of an experience by evaluating their work against a predetermined standard or analyzing the changes they have undergone as a result of the learning experience. This approach enables individuals	Instructional component	Asynchronous	Reflective Journals: The instructor may ask students to maintain a reflective journal throughout the course, where they record their thoughts, understandings, and questions about each topic covered. This practice encourages them to think deeply about what they have learned and how it relates to

		to acquire a better understanding of their own thought processes and how they can improve their learning outcomes.			their prior knowledge or experiences. Example (ION Professional eLearning Programs, 2022c)
Constructivism: Constructing' knowledge in our minds, learning actively through experience, social interaction, Social Learning: Learning in the social context, culture, and interactions among learners (Bandura, 1977; Piaget, 1970; Vygotsky, 1978)					
Strategy	Source	Definition	Classification	Online learning Type	Example
Collaborative/ Cooperative learning	(Doolittle, 2023; Gillies, 2003)	Cooperation is a collaborative approach to achieving a common goal by working with others. It involves students working together to find solutions to problems. To implement a cooperative learning method, a teacher can assign students to work in groups to achieve a specific task. It involves working with others in a group, and it can take various forms, including discussion, think-pair-share, presentation, or jigsaw.	Instructional approach Instructional component	Asynchronous Synchronous	Group project assignments: Students are divided into small groups and assigned a project management task, such as creating a project plan for a hypothetical client. Each group member is assigned specific roles and responsibilities, promoting interdependence and cooperation. Jigsaw technique for learning modules: Each student in a group is assigned a different aspect of project management (like risk management, budgeting, and scheduling) to research and learn.

					Afterward, they 'teach' their area of expertise to their group members, ensuring that everyone gains comprehensive knowledge of the subject. Think-Pair-Share in Live Online Sessions: During live video sessions, students are paired to discuss a specific problem or case study. After discussion, they share their insights with the larger group, encouraging active participation and exchange of ideas. Example 1 (Walker Center for Teaching and Learning, 2023) Example 2 (Peshkam, 2020) Example 3 (Cornell, 2023)
Scaffolding	(Joyce et al., 2015; Reigeluth & Keller, 2009)	Scaffolding is a process of providing guided support to students. This support is gradually reduced as the student's abilities improve,	Instructional approach	Asynchronous Synchronous	Early in an online programming course, students are provided with detailed, step-by-step video tutorials and guided exercises on basic programming

		leading to increased performance standards.			concepts. This foundational guidance helps build initial understanding and skills. Then, as the course progresses, the level of detailed guidance is gradually reduced. Students start working on more complex programming tasks with fewer instructions, encouraging them to apply their learned skills independently. Example 1 (Centre for the Integration of Research, Teaching and Learning, 2020) Example 2 (Center for Instructional Technology and Training, n.d.)
Problem-based Learning	(Doolittle, 2023; Driscoll, 2014)	Problem-based learning (PBL) students work collaboratively in groups to solve a real-world, ill-structured, or open-ended problem. They have the flexibility to explore various resources, to arrive at potential solutions. The main emphasis of PBL is on	Instructional approach	Asynchronous Synchronous	Example 1 (Ham, 2015) Example 2 (Center for Teaching Innovation, 2023) Example 3 (Van Oostveen et al., 2014)

		providing students with a systematic problem-solving process. They are required to identify the problem, assign tasks, gather and analyze data, seek resources, and arrive at a solution. Once the problem is solved, the learners reflect on their reasoning, strategies, and group skills.			
Inquiry-based learning	(Driscoll, 2014; Fielding, 2012; Pinhorn, 2020)	Inquiry-based learning places students at the center of their own learning. For students, they seek to develop answers to guiding questions of their interest through interactions with peers, where they challenge and test each other's ideas. Learning involves open-ended investigations, evidence-based reasoning, problem-solving, and problem-finding. Educators need to be responsive to students' learning needs and introduce ideas that move them forward in their inquiry	Instructional approach	Asynchronous Synchronous	Example 1 (Outcomes Assessment Committee, n.d.) Example 2 (Malamed, 2023)

Finally, it is worth noting that when it is understood how learners learn, course designers can conclude that some instructional strategies simultaneously incorporate multiple learning theory principles. For instance, discussion strategies in teaching effectively incorporate principles from multiple learning theories. Theories such as constructivism emphasize the role of interaction and experience in knowledge construction, and social learning theory highlights the importance of modeling and observational learning. Discussions also align with cognitive theory principles, as they encourage the active processing of information and linking it to prior knowledge. By combining these theories, discussion strategies create a rich learning environment where students are not just passive receivers of information but active participants in their learning journey.

Guiding questions:

Which learning theory (or theories) best aligns with the learning objectives, characteristics of the student, and learning environment?

How might elements from different theories be integrated to address diverse learning needs?

What instructional strategies align with these theories?

What kinds of learning activities and assessments would align with the learning outcomes and the principles of the chosen learning theories?

How would these strategies be implemented in an online environment?

How could the effectiveness of the selected strategies be evaluated and revised?

Appendix A of the Guidelines		
Factors Which Influence Instructional Strategy Selection in Online Learning		
Factor	Description	Guiding Questions
1. Learners' Characteristics and Needs	Understanding the target audience's characteristics is crucial for creating engaging and effective online instruction. Learner analysis involves identifying critical aspects such as demographics, prior knowledge, and social needs. Analyzing learner characteristics like beliefs, attitudes, and mental models impacts motivation, learning, and knowledge transfer. Components of Learners' Analysis: • Demographic: Gender, Age, Race, Education, Employment, Work Experience • Beliefs and attitudes towards learning: Motivation, Value, Attitudes Toward Content and Delivery, Group Characteristics, Learning Preferences • Academic: Grades, Courses, Degrees, Locality, Literacy, Training • Subject related: Entry Skills, Prior Knowledge, Attitudes Toward Content and Delivery • Individual differences: Culture, Interests, Attributions, Special Needs, Belief Systems, Emotional State • Access to Technology: Access to technology, learning materials, and technological support. • Accessibility Needs and Disabilities: Provide accessible online courses to anyone, including students who are blind, deaf, have physical disabilities, or have multiple learning preferences. Data about these characteristics can be gathered through: • Observations • Surveys	• Who are the learners (age, gender, cultural background)? • What is the educational and professional background of the learners? • What pre-existing knowledge and skills do learners possess related to the course content? • Are there any gaps in knowledge that the course needs to address? • What motivates these learners to engage in the learning process? • How proficient are the learners in using the technology required for the course? • What technological support might be necessary for them? • What potential barriers or challenges could learners face in the learning process? • How can the course design address these challenges? • How can the course be made accessible to all learners? • What accommodations or accessibility needs should the course consider **ensuring** all learners have equal access to the content and learning experience?

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Factors Which Influence Instructional Strategy Selection in Online Learning		
Factor	Description	Guiding Questions
	• Interviews • Learning Analytic Tool • Assessments • Reviewing Existing Data • Research • Consulting With Colleagues It is important to create inclusive content and accommodate diverse learning preferences in higher education courses. The Universal Design (UDL) framework is recommended to provide equal access to education for all learners and improve academic outcomes.\	
2. Online Learning Context	Learning context or environmental analysis involves examining the physical and functional aspects of instructional systems.is crucial in shaping strategies and activities that promote learning. Understanding its nature allows educators to make informed decisions about fostering learning and achieving desired outcomes. Elements of Online Instructional Contexts: • Physical aspects • Social aspects • Technological aspects Learning context involves understanding the resources, constraints, and other factors that impact the learning process. Dick et al. (2015) have proposed four key aspects to consider: • Compatibility of Site with Instructional Requirements • Adaptability of Site to Simulate Workplace • Adaptability for Delivery Approaches • Learning Site Constraints Affecting Design and Delivery	• How and what can you advise the learner to prepare their physical space to complete an online course effectively? • What are the physical, social, and technological aspects of the learning environment? • What is the management strategy or learning management system for this lesson or course? • How is the site (LMS) compatible with the instructional requirements? • How can the site (LMS) be modified to simulate a workplace environment? • How does the site (LMS) support various instructional strategies and delivery approaches?

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Factor	Description	Guiding Questions
		• What are the possible learning site (LMS) constraints that would affect design and delivery?
3. Online Delivery Mode	Online learning is a mode of education that enables students to learn from instructors who are geographically separated. It can be conducted either synchronously, asynchronously, or a blend of both modes. Various technologies could be utilized for instruction in online learning, such as the Internet, audio conferencing, video cassettes, DVDs, CD-ROMs, and so on. Online courses can be presented synchronously or asynchronously, affecting class activities and student interactions. Knowing the pros and cons of both helps instructors choose the best approach for their situation. Synchronous: • This is a delivery mode that takes place online in real time. Students are provided with content and assignments and	• What type of online delivery mode of learning will be implemented synchronously, asynchronously, or both (blended)? • What is the course communication and interaction plan? Which online platform best supports • interactive features and real-time communication? • How user-friendly and accessible is the chosen platform for all learners? • What balance of recorded versus live sessions will be offered to accommodate different learning needs in blended mode? • What tools and technologies can be integrated to enhance learner engagement and interaction?

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	given a time frame to complete coursework and exams. • Participants can interact online in real-time simultaneously through text, video, or audio chat. • Classes are held on a regular basis, either daily or weekly. • For students to participate in a course from a distance in real-time. Asynchronous: • The type of delivery mode does not take place in real-time. Students are provided with content and assignments and are given a time frame to complete coursework and exams. • Interaction usually takes place through discussion boards, blogs, wikis, and email. • There is no scheduled class meeting time. The course is self-paced. • For students with time constraints or busy schedules Delivery mode is important but should not be prioritized over instructional strategies and appropriate media use. The type of strategy used should inform the delivery mode. Quality of instruction depends on teaching methods and materials. Instructors must consider the affordances and limitations of online learning when selecting a strategy.	• How can technology be used to provide timely and effective feedback to students in different modes? • What strategies can be employed to encourage open dialogue and interaction among students and between students and instructors? • How can virtual collaboration be facilitated to ensure effective peer-to-peer learning? • How can learners in asynchronous courses interact and receive feedback? • What resources and activities can be provided to support self-directed learning? • How can the course structure promote autonomy while still offering necessary guidance? • What measures can be taken to reduce the psychological and communicative gap in the online learning environment? • How can a sense of community and connectedness be fostered among remote learners?
4. Learning Outcomes	In course design and planning, we need to distinguish between learning goals, learning objectives, and learning domains. The learning goal is a general statement that describes what students	• What is\are the course's overall learning goal(s)?

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Factors Which Influence Instructional Strategy Selection in Online Learning

Factor	Description	Guiding Questions
	should learn by the end of the course. The learning objectives are precise and measurable statements that describe what learners should be able to do after instruction. Learning domains encompass different ways in which we learn, such as Bloom's (1956) cognitive, psychomotor, and affective domains. It's essential to identify the appropriate learning type required for a specific subject to select a suitable instructional strategy. The process to effectively create learning objectives: One approach that helps to create and organize the learning objective and domain process is the ABCD model of learning objectives. It focuses on Audience, Behavior, Condition, and Degree (ABCD). With this approach, objectives may be written in any order This approach can be applied as follows: 5. Audience: Identify who the learners are. Consider their background, existing knowledge, and specific needs. 6. Behavior: Define what you want learners to be able to do after the lesson. Here, you can Embed Bloom's Taxonomy to categorize the type of learning: Cognitive (thinking), Affective (emotional), and Psychomotor (physical) (Bloom, 1956) Or Incorporate Gagne's learning outcomes categories (Gagne, 1972), which include: Intellectual skills, cognitive strategies, verbal information, psychomotor skills, and attitudes.	• What is\are the lesson or class learning objectives? Or What specific skills or knowledge should learners acquire by the end of this class? • How do these learning objectives align with the overall goals of the course? • What is each learning objective domain of learning or type of outcome? • For ABCD approach: o Audience: Who are your learners? o Behavior: What should, or will the learners be able to know, think, or do? o Condition: Under what conditions or context will the learner be able to perform? o Degree: What level or degree of proficiency is required for the behavior? How well does the behavior need to be performed? • Which of Bloom's type of learning or Gagne's learning outcomes categories are most relevant to this lesson's objectives? • How do these learning objectives reflect the intended learning outcomes? • How can instructional strategies be chosen to address these specific categories effectively?

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	7. Condition: Add and specify the conditions under which the behavior will be performed. Enhance the skill statements by adding relevant conditions, which transform them into comprehensive performance objectives. It's essential to consider factors like task complexity, the authenticity of the context, and appropriate resources. 8. Degree: Define the standard for acceptable performance and the achievement of the objectives. This could be a level of accuracy, speed, or quality, which helps in assessing whether the objective has been met. Ensure these criteria are appropriate for the learners' developmental stage and the conditions of the task. Instructors could then choose instructional strategies that help learners achieve each of these objectives, complement the assessments, and reflect their personal educational principles and values. This comprehensive approach ensures that learners acquire the necessary knowledge and skills to complete their tasks successfully.	
5. Learning Theory and Pedagogy	Learning theory is rooted in psychology and seeks to understand how people learn and acquire new skills and knowledge. It explores the role of human behavior, cognition, and mental processes in learning. The theory explains how people acquire new information, retain it, and utilize it to enhance their performance in various domains. Operationalizing learning theory into instructional strategies: To operationalize learning theory into strategy application in teaching and learning means to take abstract concepts and principles from learning theories and transform them into tangible, actionable strategies or	• Which learning theory (or theories) best aligns with the learning objectives, characteristics of the student, and learning environment? • How might elements from different theories be integrated to address diverse learning needs? • What instructional strategies align with these theories? • What kinds of learning activities and assessments would align with the learning

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	practices that can be implemented in a teaching and learning environment. It involves: • Identification of Relevant Theories: Recognizing and understanding learning theories pertinent to the specific educational context or audience. For example, these guidelines give much attention to foundational learning theories such as behaviorism, cognitivism, constructivism, and social learning. However, strategies are not limited to these theories and can be expanded. It is worth noting that some instructional strategies can align with multiple theories. For example, problem-based approaches can be consistent with behaviorism, cognitive theory, constructivism, and social learning. • Breaking Down Theory: Analyzing the key components or principles of the chosen learning theory. • Development of Strategies: Designing teaching methods, activities, and assessments that align with the principles of the chosen learning theory and learning outcomes. • Implementation: Applying these strategies in the real-world teaching and learning environment. • Evaluation and Feedback: Continuously assess the effectiveness of the implemented strategies, gather feedback from students, and make necessary adjustments to improve learning outcomes.	outcomes and the principles of the chosen learning theories? • How would these strategies be implemented in an online environment? • How could the effectiveness of the selected strategies be evaluated and revised?